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Editorial

Grech Victor, Borg-Buontempo Mariella on behalf of *QAIAC*

The Merit Award Scheme

The Merit Award Scheme was launched in November 2007 by the Malta Government with the intention of rewarding good practice. This is accordance with the Government-Medical Association of Malta agreement which "recognizes the need for specialists to keep abreast of the rapid progress made in the various fields of medical and health specialization and the effort it takes for such specialists to keep themselves abreast of developments, to improve professional standards and to provide quality assurance in the health system."

The ultimate aim behind the Merit Award Scheme is to improve the quality of health care delivery within the public service. For this reason, the Quality Assurance Initiative Adjudicating Committee (QAIAC) was set up in order to ensure that submitted proposals were complaint with the scheme.

Suitable proposals include research studies, publications in peer reviewed journals, clinical audit, protocols and guidelines, and participation in the Foundation programme.

Reviewing for the Malta Medical Journal

The peer review process continues to be a crucial element in scholarly publication. Review consists of the evaluation of work by one or more individuals of similar competence to the producers of said work. Such review, if properly undertaken, constitutes a form of self-regulation of a particular field of study.[1,2] Reviewing is unpaid and unsung work, and takes a considerable amount of time to accomplish properly.

The solution

QAIAC has agreed to accept Malta Medical Journal (MMJ) reviews as valid proposals for the purpose of the Merit Award Scheme. Three reviews will be considered as one proposal for any one given year. Only one such proposal per year will be entertained.

The three reviews need not be carried out in one specific year and are cumulative. The MMJ will issue numbered certificates for such reviews, backdating to the start of the year 2012.

Reviews will include a bespoke form and must be carried out to a sufficiently high standard and in a timely manner in order to qualify for certification.

Reviewers will also be asked to re-review resubmissions in order to ensure that authors have complied with instructed changes and other amendments.

We sincerely hope that this will incentivise individuals to undertake high-quality peer review for the MMJ, while recognising its value as contributing to health care quality improvement.

Interested potential reviewers may indicate this by sending an email to the journal's secretary, Ms. Elizabeth Cassar (elizabeth.cassar@um.edu.mt) indicating their area/s of expertise.

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Cover Picture:
'Seascape - final push',
oil on canvas.
By Maurice Falzon

Maurice Falzon is a consultant anaesthetist and has never had any formal teaching and instruction in art. After trying out various media he has gravitated to oils and pencil drawings.

Original Article

Door-to-balloon time in primary percutaneous coronary intervention for patients with ST-Segment Elevation Myocardial Infarction

An audit from the Accident and Emergency department of Mater Dei Hospital, Malta.

Mark A. Attard Biancardi

Abstract

Introduction: Over the past years Primary Percutaneous Coronary Intervention (PCI) has emerged as an effective treatment strategy for acute ST-Elevation Myocardial Infarction (STEMI).[1] The survival rate with Primary PCI however is dependent on the time to treatment,[2] thus, given the time dependency of survival in patient with STEMI undergoing Primary PCI, the American College of Cardiology and American Heart Association (ACC/AHA) in their management guidelines of acute myocardial infarction also endorsed by European Society of Cardiology (ESC) have established a door-to-balloon time of 90 minutes as a gold standard for Primary PCI.[4] The aim of this audit is to measure and compare this key performance measurement for quality of care of patients with STEMI in the Maltese Islands.

Methods: This audit was conducted at the only PCI-capable hospital in Malta – Mater Dei Hospital. All the patients coming in through the Accident and Emergency Department with an ST-elevation Myocardial Infarction or a new onset Left Bundle Branch Block (LBBB), thus eligible for a Primary PCI, were included in this audit. This was a prospective audit between January 2012 and December 2012 and using a proforma, data was collected primarily to map out the Door-to-Ballon times for Primary PCI during that period. This data was also used to pinpoint areas were time delays occur when dealing with STEMI cases.

Door-to-Balloon times from pre-hospital diagnosis of STEMI using the MRX was also audited and compared to times of in-hospital STEMI diagnosis.

Results: During the 12 months duration of the audit, 157 patients were recorded in the CathLab Database as having had an Emergency Primary PCI. Recorded in the audit were 135 patients of which 123 were STEMI patients eligible for a Primary PCI and 12 STEMI patients not eligible for Primary PCI and thus not included in the audit. The Mean Door-to-Balloon times of all 123 patients was found to be 101.45 minutes. Data analysis showed that the times during 'Office Hours' (8am to 5pm) were statistically significantly less than those of 'After hours' (5pm to 8am) (N=123, p<0.001) and those with a Door-to-Balloon time of more than 90 minutes, data analysis showed the number of such cases were statistically significantly less during 'Office Hours' (N=36, p=0.02). With pre-hospital ECG diagnosis of STEMI, data analysis showed that with MRX, Door-to-Ballon times are significantly less when compared to those during 'Office Hours' and 'After Hours' (N=57, p=0.003 and N=66, p<0.001 respectively).

Conclusion: From the results obtained, local achievement to remain well within the standards suggested by the ACC/AHA and ESC of Primary PCI ≤ 90 minutes for STEMI was not reached, however several factors contributing to delays and strategies to minimize delay were pointed out in order to further improve the local practice and thus lowering mortality rates associated with STEMI.

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Key Words

Primary Percutaneous Coronary Intervention, ST segment elevation Myocardial Infarction, STEMI, Acute Coronary Syndrome, Door-to-Ballon time.

Introduction

Over the past years Primary Percutaneous Coronary Intervention (PCI) has emerged as an effective treatment strategy for acute ST-Elevation Myocardial Infarction (STEMI). The benefits of Primary PCI when compared to Thrombolytic therapy include a reduction in the frequency of total stroke and haemorrhagic stroke; a reduction in the frequency of reinfarction and an increase in the frequency of infarct related artery patency thus improving in-hospital and long term survival.[1]

The survival rate with Primary PCI however is dependent on the time to treatment. In the Global use of Strategies To open Occluded arteries in Acute coronary syndromes (GUSTO-IIb) substudy,[2] the lowest 30-day mortality rate was observed in patients undergoing Primary PCI within 60 minutes from presentation to the emergency room, whereas the highest mortality rate was observed in patients undergoing Primary PCI >90 minutes from presentation to the emergency room (1% vs 6.4%). Similar data were reported in an analysis of data from the National Registry of Acute Myocardial Infarction (NRMI) – with the lowest mortality rate observed in patients undergoing PCI within 60 minutes and significantly higher mortality rates in patients undergoing PCI beyond 120 minutes.[3] Thus given the time dependency of survival in patient with STEMI undergoing Primary PCI, the American College of Cardiology and American Heart Association in their management guidelines of acute myocardial infarction have established a door-to-balloon time of 90 minutes as a gold standard for Primary PCI.[4]

This door-to-Balloon time has also been adopted as a key performance measurement for quality of care of patients with STEMI by the European Community. In fact guidelines on myocardial revascularization of the European Society of Cardiology (ESC)[5] and the European Association for Cardiothoracic Surgery (EACTS) developed with the special contribution of the European Association for Percutaneous Cardiovascular Interventions (EAPCI) have placed this golden number as a benchmark for better performance in STEMI patients.

In 1997 *Caputo et al* [6] reported the effect of a detailed quality improvement intervention aimed at reducing Door-to-Balloon time in a single institution. The intervention included avoidance of re-evaluation of the patient; education of emergency room staff, transport personnel and cardiology staff on the importance of rapid diagnosis of myocardial infarction and rapid transport to the catheterization laboratory; immediate activation of the CathLab team on notification of a patient with suspected acute MI and requirment for the CathLab team to be in hospital within 30 minutes. A significant reduction in Door-to-Balloon time, and in particular a marked reduction for the 'after hours' cases, was observed after implementation of the intervention. Action through systematic intervention can result in significant improvement in care for patients with acute myocardial infarction and the Door-to-Balloon time can be favourably influenced if the complex system surrounding it is understood and modified.

This audit measures and also compares this key performance measurement for quality of care of patients with STEMI in the Maltese Islands. With one PCI-capable hospital in Malta catering for the whole population, the objective was to make sure that the gold standard Door-to Balloon time of 90 minutes is being respected and to explore other ways with which efficiency and speed can be further improved.

Methods

Study Design

This audit was conducted at the only PCI-capable hospital in Malta – Mater Dei Hospital – and all the patients coming in through the Accident and Emergency Department with an ST-elevation Myocardial Infarction or a new onset Left Bundle Branch Block (LBBB), thus eligible for a Primary PCI, were included in this audit.

This prospective audit was run for 12 months, from January 1st 2012 to December 31st 2012. A proforma was available at the A&E Department for data collection for eligible patients. All Emergency Physicians had a formal introduction and explanation on what type of data collection is needed on the proforma prior to the start of this audit. Appointed personnel at the Catheterization Lab were also involved in this audit so that balloon times recorded on the CathLab Database could be later accessed and recovered using patients' identification numbers.

Measures and Data Collection

From the proforma at the Accident and Emergency Department the following information was collected:

- Identification Number, Date, Sex and Age
- Time of onset of symptoms
- Time of arrival at the A&E Department
- Time of First Medical Contact and Grade
- Time of further Medical contact (if needed) and Grade
- Time of Cardiologist contact
- Time of Cath-Lab team contact
- Time of PCI initiation

In cases where old notes were requested to aid in the diagnosis (ex: new LBBB), the time of request

and the time these were made available were recorded on the proforma. Time of Primary PCI initiation was obtained using the Catheterization Lab Database, where all patients with a STEMI who were treated with a Primary PCI were recorded. Eligible patients which were not recorded on the proforma for various reasons were tracked down using the CathLab Database and the relevant time data was retrieved using both the PAS system and Accident and Emergency documentation sheets.

Primary PCI in Mater Dei Hospital is available 24/7, however the CathLab team and Cardiologists are on hospital premises during office hours, hence the cut-off time taken in this audit, to differentiate between "Office Hours" and "After hours" was taken to be 5pm. Thus 'Office Hours' from 8am to 5pm and 'After hours' from 5pm to 8am.

In June 2012 the Mater Dei Pre-hospital team which is also run by the A&E Department, introduced the Philips HeartStart MRX monitor/defibrilator on ambulances attending to patients with chest pain, which basically is a pre-hospital electrocardiogram nurses can perform en-route to hospital. The ECG can be dispatched to the A&E Department before the patient arrives to hospital and in cases of STEMI the Cardiologist and CathLab team can be mobilized even before the patient arrives to the A&E. Data from patients with a STEMI where the MRX was used were also included in this audit.

The Mean Door-to-Balloon times for STEMI patients was the primary measure in this audit with *p* value measurements using Chi-square goodness-of-fit test and Mann-Whitney U test, for any statistical significance between office hours, after hours and MRX door-to-Balloon times. Other analysis in this audit include mean measurements for patients age and presentation time to A&E from onset of symptoms, first medical contact and CathLab team response time.

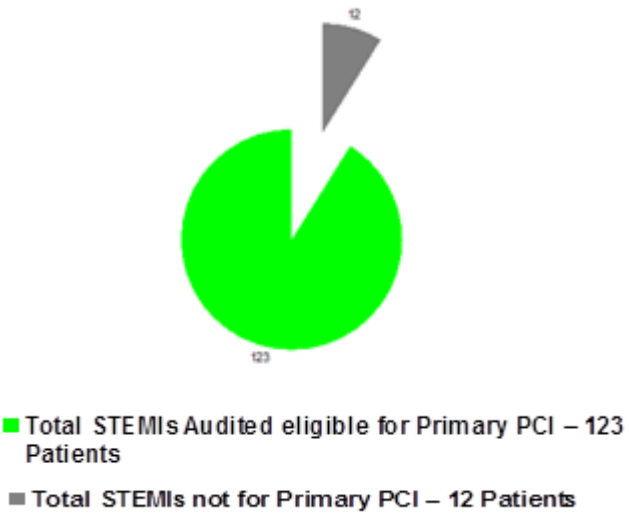
Results

During the 12 months duration of the audit, 157 patients were recorded in the CathLab Database as having had an Emergency Primary PCI. Recorded in the audit were 135 patients of which 123 were STEMI patients eligible for a Primary PCI and 12 STEMI patients not eligible for Primary PCI and thus not included in the audit (*figure 1*).

Twenty-two cases of STEMI patients having a Primary PCI could not be included in this audit due to missing identification numbers on the proforma and/or missing Primary PCI initiation times on the database. MRX data was limited to only 5 cases from a total of 18 cases due to inaccurate or absent documentation mainly identification numbers.

The Mean age of patients presenting with a STEMI to the Accident and Emergency Department was 58 years (*SD*=10) (*Figure 2*). The mean first medical contact was of 6 minutes (SD=5) and the mean time of presentation of patients from onset of symptoms to A&E attendance was of 4 hours (SD=2.9). The mean CathLab team response from contact to receiving the patient was of 40 minutes during 'Office Hours' that is between 8 am and 5 pm and 51 minutes in the 'After Hours' that is between 5 pm and 8 am.

Figure 1: *Total STEMI's needing PPCI in 2012 – 157 Patients*
Total STEMI's recorded in Audit – 135 Patients



Of the 123 patients with a STEMI eligible for Primary PCI, 57 patients (46.3%) presented during 'Office Hours' and 66 patients (53.6%) presented 'After Hours' (*Figure 3*).

The Mean Door-to-Balloon times of all 123 patients was found to be 101.45 minutes. Seventy percent of cases had a Door-to-Ballon time of less than 90 minutes and thirty percent, more than 90 minutes (SD 95 – 500 minutes).

A Chi-square goodness-of-fit test was used to examine if there was a statistical difference in the number of STEMIs presenting before 5pm ('Office Hours', *N*=66) and after 5pm ('After Hours', *N*=69) (*Figure 4 and Figure 5*). No significant difference was found (*N*=135, *p*=0.796).

A Mann-Whitney U test was used to examine if there was a difference in the Door-to-Balloon times of Primary PCIs for STEMIs presenting during 'Office Hours' and those presenting 'After hours'. The test showed that the times for the 'Office Hours' were statistically significantly less than those of 'After Hours' (*N*=123, *p*<0.001).

Figure 2: *Mean age group presenting with STEMI*

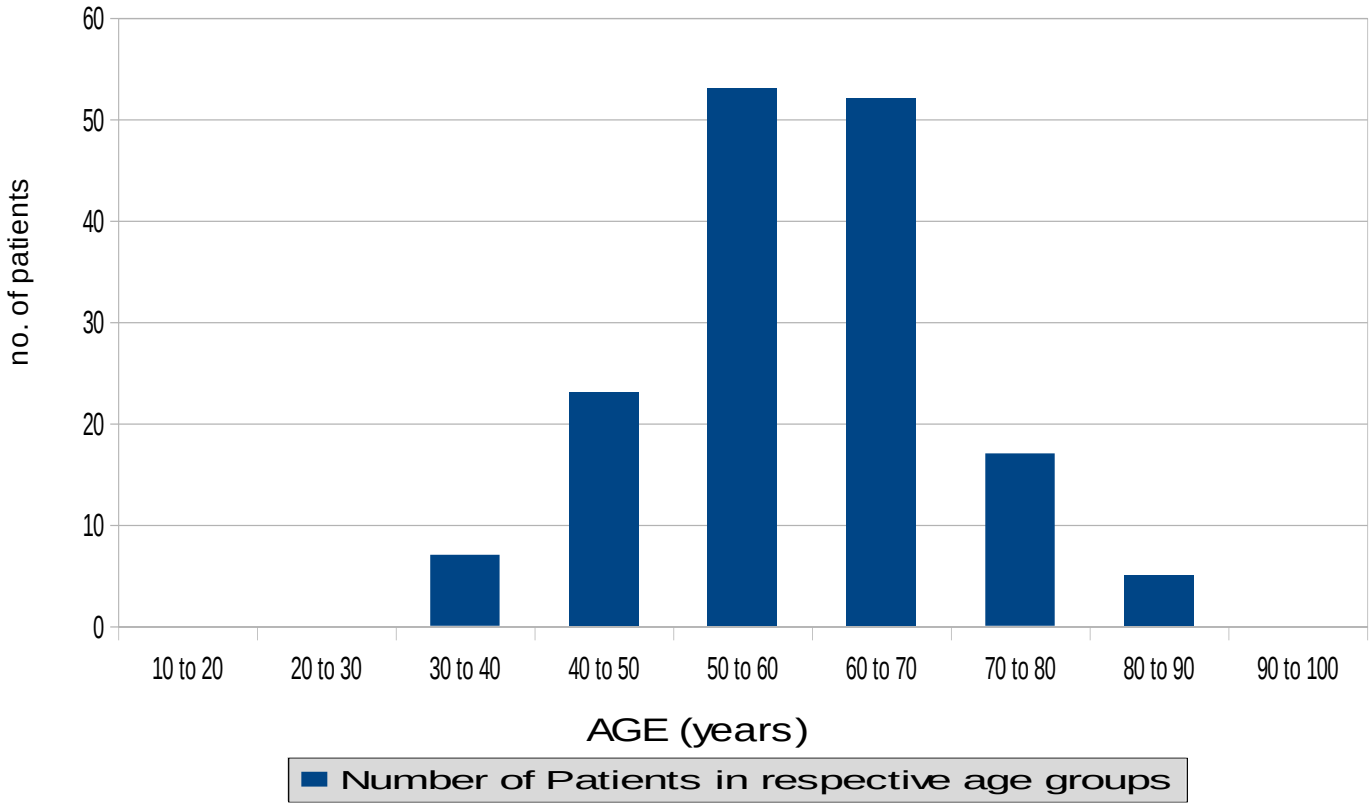


Figure 3: *Presentation of STEMI patients*

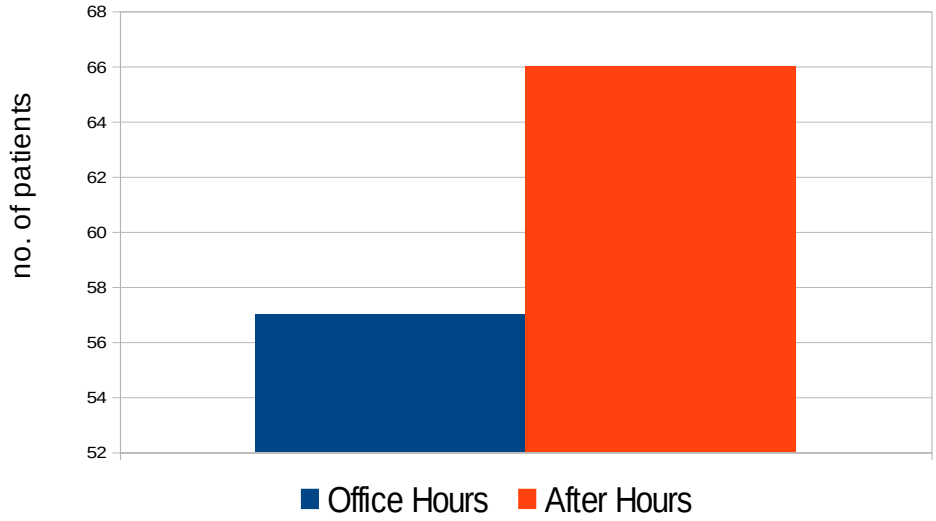


Figure 4: *Door-to-Balloon time 'Office Hours*

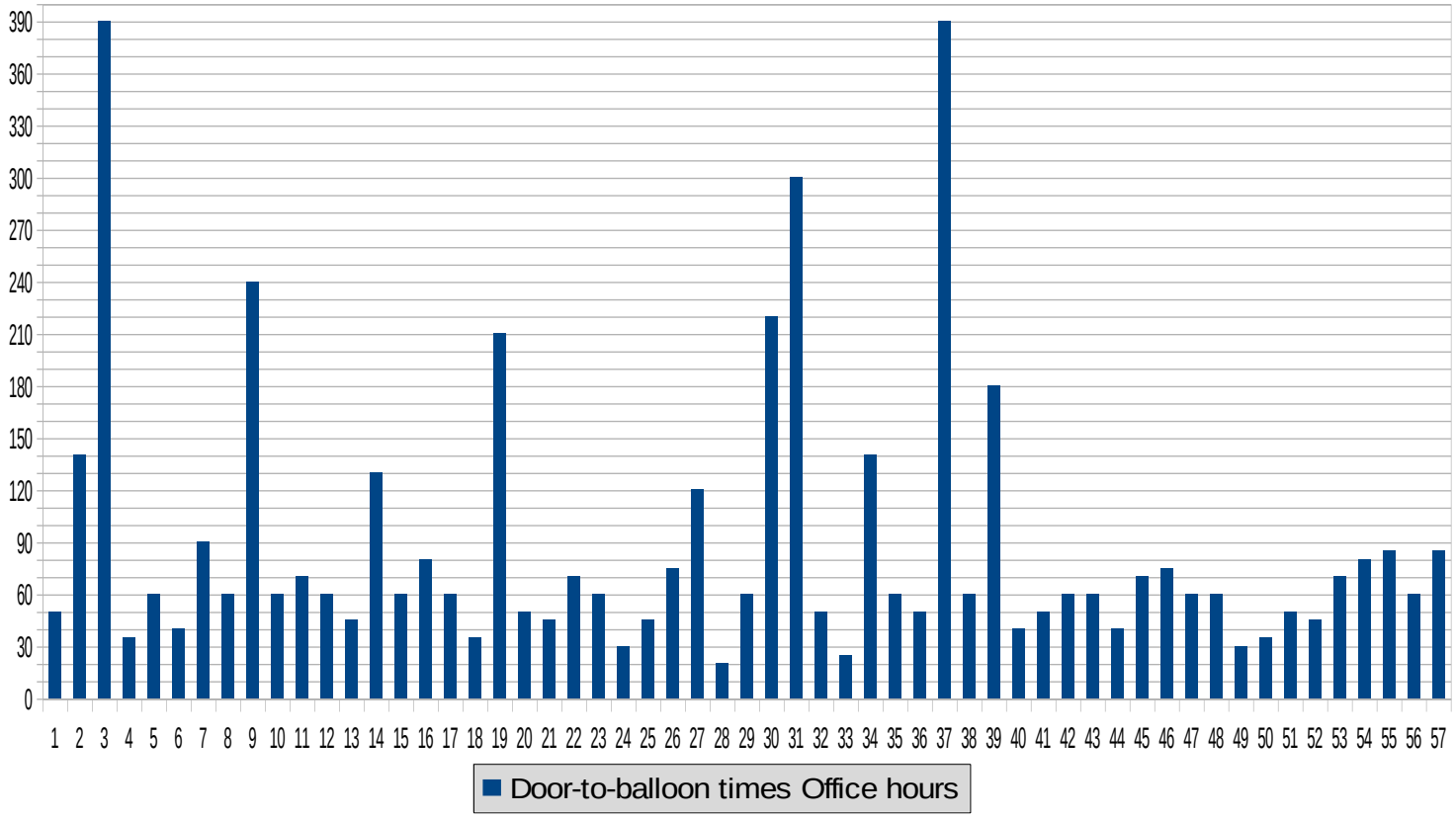
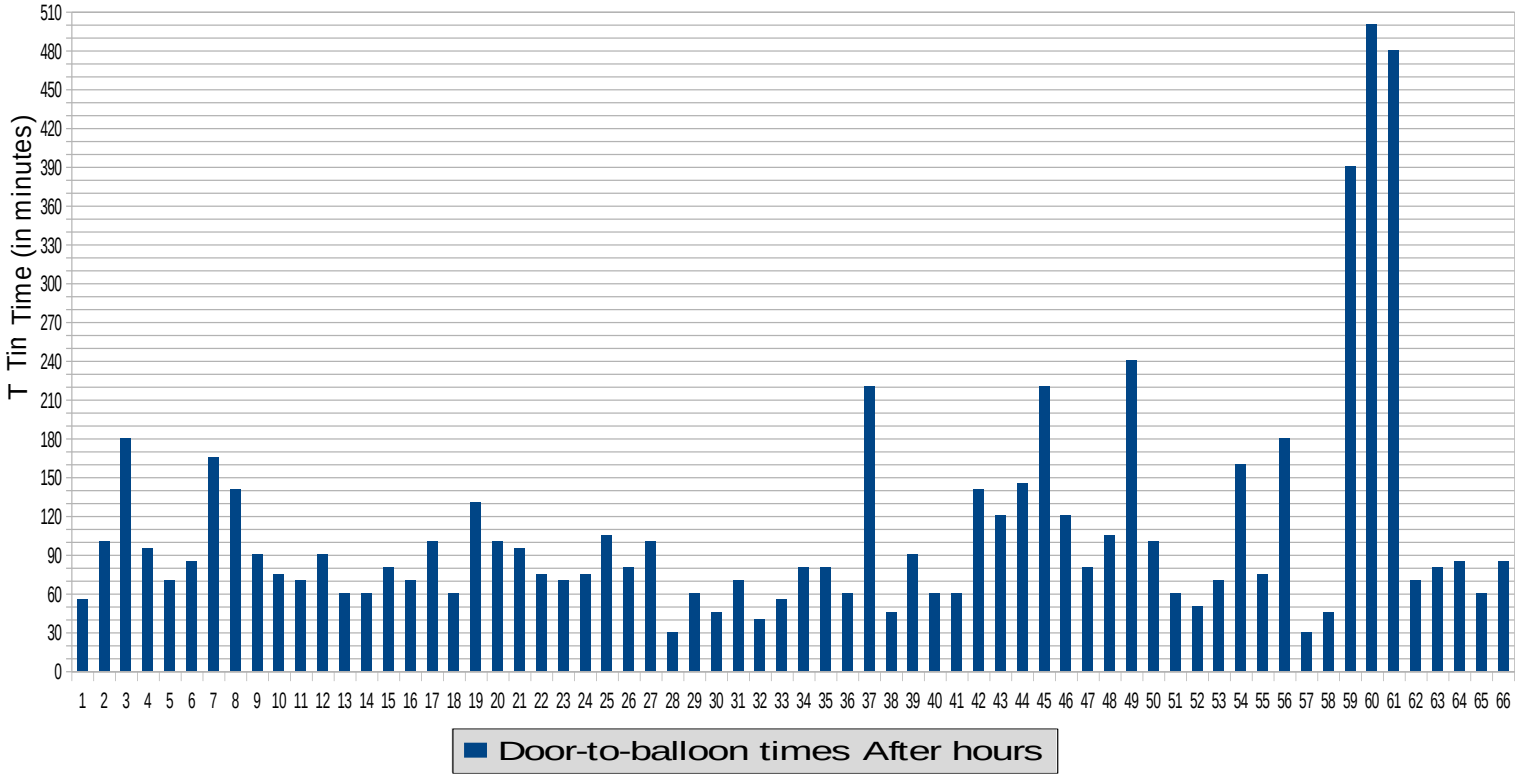


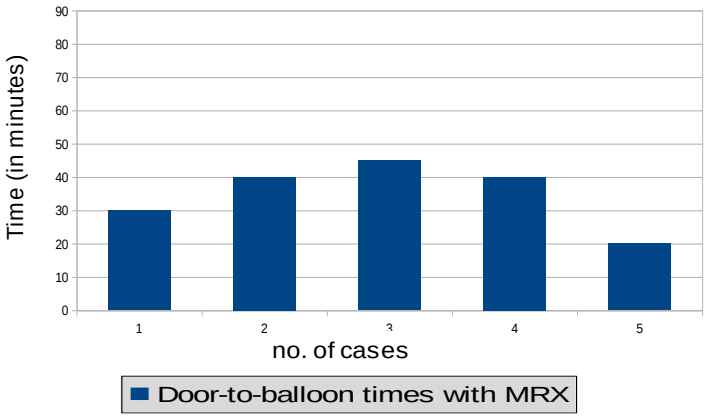
Figure 5: *Door-to-Balloon times 'After Hours'*



Chi-square goodness-of-fit test was used to examine if there was a statistical difference in the number of STEMIs who had a Door-to-Balloon time longer than 90 minutes in the 'Office Hours' (*N*=11) and 'After Hours' (*N*=25) categories. The test showed the number of such cases were statistically significantly less in 'Office Hours' category (*N*=36, *p*=0.02)

As mentioned earlier, in June 2012 the MRX was introduced on ambulances attending to patients with chest pain. A total of 18 MRX ECG's showing a STEMI were recorded, of which however only 5 could be used in the audit, since the omission or erroneous input of the identification number on the actual rhythm strip, made it impossible to trace or match it to patients on the CathLab database or A&E documentation sheets. Of the 5 cases audited, the Mean Door-to-Balloon time was 35 minutes (*Figure 6*).

Figure 6: *Door-to-Balloon times MRX*



A Mann-Whitney U test was used to examine if there was a difference in the Door-to-Balloon times of Primary PCIs for STEMIs that were diagnosed before arrival of the patient to A&E with MRX and the ones diagnosed after arrival to A&E. The test showed that the times for the MRX cases where statistically significantly less (*N*=118, *p*<0.001). A Mann-Whitney U test was also used to examine if there was a difference in the Door-to-Balloon times of Primary PCIs for STEMIs that were diagnosed before arrival of the patient to A&E with MRX and the ones diagnosed after arrival to A&E during 'Office Hours' and 'After Hours' separately. In both cases the times for the MRX patients were significantly less (*N*=57, *p*=0.003 and *N*=66, *p*<0.001 respectively).

Discussion

The results from this audit showed that the mean Door-to-Balloon times for patients with STEMI needing Primary PCI was above the 90 minute mark set as standard by the ACC/AHA and ESC.

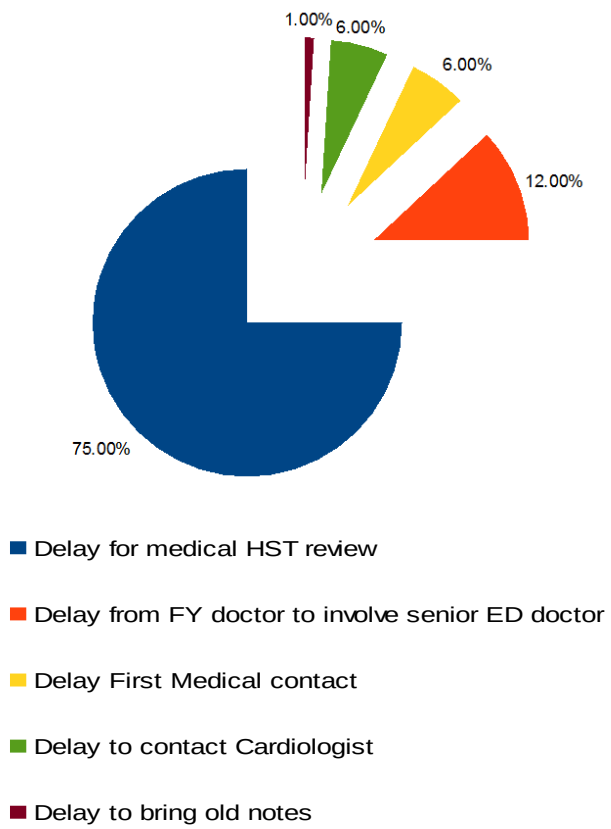
Contributing significantly to this mean were the 30% of STEMI patients with a Door-to-Balloon time well above the 90 minute mark. The encouraging part in this audit however was that 70% of STEMI patients had a Door-to-Balloon time less than 90 minutes. Having said that 30% is still significantly high and in the local setting where transfer delays of patients with a STEMI from one hospital to the other is not an issue, and relative short distances patients need to travel to hospital, in-hospital performance and efficiency of A&E and Cathlab teams are the major contributing factors for this result.

The first striking result that emerged from this audit is the statistical difference between Door-to-Balloon times achieved during 'Office Hours' and those achieved 'After Hours'. Taken separately the mean Door-to-Balloon times during 'Office Hours' is 89.2 minutes while that of 'After Hours' is 111.14 minutes. From the data recovered, all those with a Door-to-Balloon time over 90 minutes (30% of patients) were analyzed to try to pinpoint the causes of delays *(figure 7)*. Seventy-five percent of delays were due to time lost by A&E trainees (BST/HST) to contact a medical Higher Specialist Trainee when a STEMI was diagnosed. Twelve percent of delays was time lost from Foundation Year doctors to involve a senior A&E doctor. Six percent were delays in First Medical Contact and another six percent were delays in contacting a cardiologist. Requesting old ECG's for diagnosis of new LBBB summed up a very small number of patients (*N*=2), however, delays to manually retrieve old notes resulted in delayed Door-to-Ballon times for those patients. All mentioned delays were much more common in the 'After Hours' category.

Another striking result that emerged from this audit, was the use of MRX. Although the population taken was very small, prehospital ECG diagnosis of STEMI with early cardiologist and CathLab team mobilization before the actual patient arrives at A&E, resulted in shorter door-to-balloon times. Previous studies[7-9] have shown that performing ECG en route to the hospital can reduce Door-to-Balloon time, and the American National Heart Attack Alert Programme Coordinating Committee[10] has recommended increased use of such electrocardiographic services.

Keeping Door-to-Balloon times as low as possible is of huge importance when it comes to morbidity and mortality as the mortality benefit achieved with primary PCI in STEMI patients is diminished by treatment delays.[11]

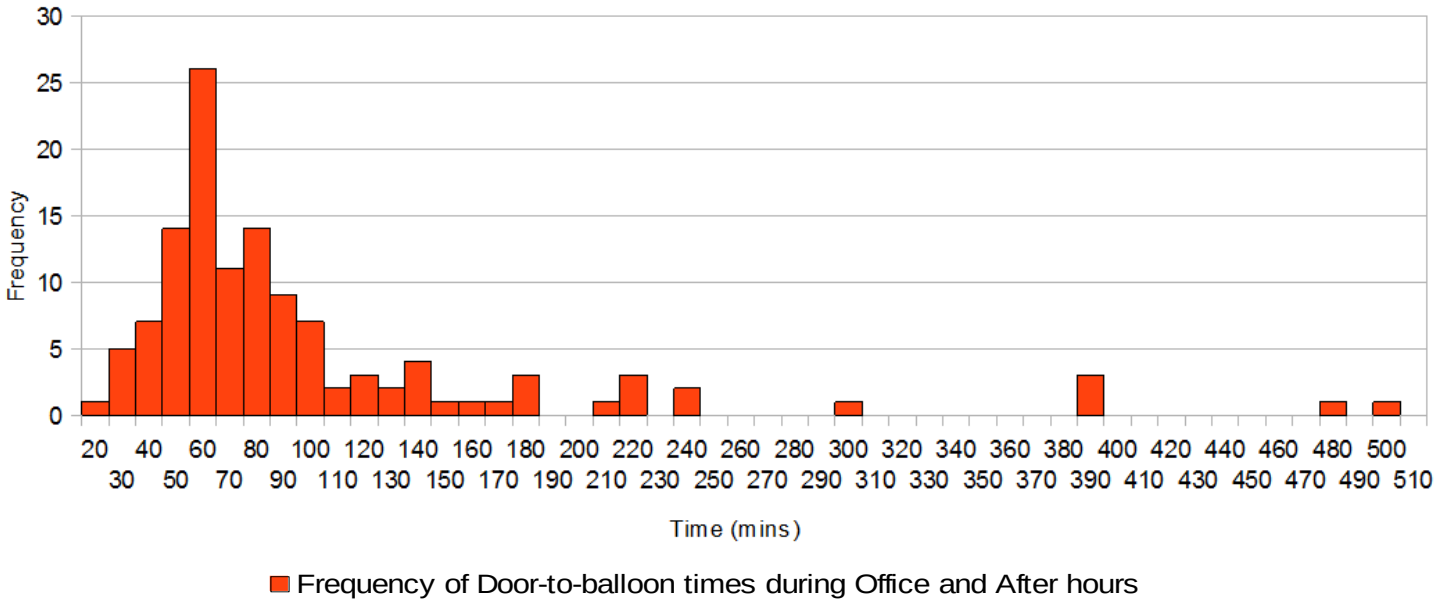
Figure 7: *Causes of Door-to Balloon time >90 minutes, (30% of STEMI patients audited)*



Some factors that can improve locally the mean Door-to-Balloon times for patients with a STEMI include:

- Direct contact with the cardiologist whenever a STEMI is diagnosed, therefore avoiding intermediators and re-evaluation of the patient.
- Having well trained and experienced A&E doctors on the shopfloor who can diagnose early, patients with STEMI even with subtle ECG changes.
- Having well trained nursing staff who can triage early, patients with features of myocardial infarction, and performing early Electrocardiograms in patients with atypical chest pains.
- More training to prehospital personnel on how to use the MRX.
- Having a digital database of ECG's available for the Emergency Physician, comparable to the present PACS for X-rays, to access past ECG's of the patient.
- Having an in-hospital CathLab team with cardiologist cover capable in performing Primary PCI especially 'After Hours'.
- Training to CathLab teams to maintain response times of 30 minutes or less especially 'After Hours' if an in-hospital team cannot be obtained.

Figure 8: *Door-to-Balloon Times*



In *figure 8* a histogram of frequency against door-to-ballon times shows clearly several outliers which had an effect on the final mean measurment presented in this audit. If these were to be excluded, that is 12 patients having times greater than 180 minutes the mean would be below the suggested time by the ACC/AHA and ESC, however it was decided not to exclude them from the audit since:

- these patients amount to 10% of those with door-to-ballon times greater than 90 minutes of the 30% mentioned earlier and
- the reason for this delay in these patients were the same as the other patients with times greater than 90 minutes but less than 180 minutes as mentioned above, with the exeption of coming in A&E at peak hours when the department is flooding with patients.

I firmly believe that the management of a patient with STEMI should be equal wheather he presents during busy or less busy hours.

Conclusion

In conclusion this audit has looked at 123 patients over a 12 month period to determine the local Door-to-Balloon times in Primary Percutaneous Coronary Intervention for patients with ST-Elevation Myocardial Infarction. From the results obtained, local achievement to remain well within the standards suggested by the ACC/AHA and ESC of Primary PCI ≤ 90 minutes for STEMI was not reached, however several factors contributing to delays and strategies to minimize delay were pointed out in order to enhance the local practice and thus lowering mortality rates associated with STEMI.

Acknowledgments

Special thanks to Mr. Clayton Cassar in charge of the CathLab Database and Dr. A. Drago A&E consultant for his mentorship and help in statistical analysis.

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Review Article

Is low cardiac ejection fraction a risk factor for stroke?

Patrick Pullicino, Sophie Raynor

Abstract

Background and Purpose: Reduced ejection fraction (EF) ≤35% has been suggested as a criterion for anticoagulation in persons with heart failure in sinus rhythm, but the literature supporting EF as an independent stroke risk factor is conflicting. We here review the status of reduced EF as a stroke risk factor.

Methods: We performed a Medline search combining terms for stroke and heart failure (HF) or cardiac left ventricular systolic dysfunction and reviewed evidence that reduced EF increases the risk of stroke. We also reviewed clinical and epidemiological HF studies that included data on stroke and EF.

Results: Two of three longitudinal cohort studies found reduced EF (<50%) to be a stroke risk factor but did not find an inverse relationship between EF level and degree of stroke risk. Exploratory analyses of three clinical studies found an inverse relationship between EF level and degree of stroke risk but only in specific subgroups and vascular risk factors appeared to attenuate this relationship. Three analyses suggested an increased stroke risk with EF ≤20%.

Conclusion: Reduced EF (<50%) probably increases stroke risk but this is not consistently demonstrated in all populations studied. Reduced EF of any degree may be a surrogate for atherosclerotic cerebrovascular disease and in these patients traditional vascular risk factors may be more important for stroke risk than EF. There is no evidence to support EF ≤35% as a specific stroke risk factor. Research is needed to determine if very reduced EF (≤20%) is a specific stroke risk factor.

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Introduction

Ejection fraction (EF) is the percentage of cardiac left ventricular volume emptied in systole and is a reliable measure of left ventricular systolic dysfunction (LVSD). The prevalence of asymptomatic LVSD in the general population is about 3% to 6%[1-3] and about 37% of patients with heart failure (HF) in the United States have a reduced EF.[4] Reduced EF is one of the principal indications for anticoagulation in dilated cardiomyopathy,[5] and in 2006 the Heart Failure Society of America recommended that warfarin anticoagulation merits consideration in all patients with dilated cardiomyopathy and EF≤35%.[6] The most recent American College of Cardiology Foundation/American Heart Association Guidelines for the Management of Heart Failure[7] however do not recommend anticoagulation in patients with chronic HF without atrial fibrillation and specifically do not mention a level of EF as an indication for anticoagulation. The data supporting a connection between reduced EF and an increased risk of stroke is therefore conflicting,[8] and EF might not be the best criterion for selection of patients with LVSD for anticoagulation. Here we review the data supporting reduced EF as a risk factor for stroke.

Methods

We performed a Medline database search to identify potential studies. For cardiac dysfunction (left ventricular dysfunction) we used the exploded terms ‘‘heart failure’’ ‘‘ventricular dysfunction, left,’’ and ‘‘cardiac output, low’’ combined with the ‘‘or’’ operator. The stroke terms used were ‘‘brain infarction,’’ ‘‘brain ischaemia,’’ ‘‘stroke,’’ and ‘‘intracranial embolism’’ combined with the ‘‘or’’ operator. Cardiac dysfunction terms were combined with the stroke terms using the “and” operator. The search was conducted during the week of July 22, 2013. Articles were included regardless of year of publication. Additional articles were identified by hand-searching the reference lists of included articles identified by electronic search. Initial inclusion criteria were that the study contained a population with both EF data and reported the number (or percent) of persons with HF who experienced an ischemic stroke during follow-up, irrespective of heart

rhythm. Studies were excluded if the article did not separate ischemic strokes from hemorrhagic strokes, if >50% of the study population required artificial support with a ventricular assist device, or parenteral inotropic medications. Case reports, case series, reviews and non-original research articles were not included.

Optimal study requirements to identify reduced EF as a stroke risk factor were: a) Stroke must be a pre-specified endpoint and EF measured in all participants, b) It should only include patients in sinus rhythm or include a multivariable analysis including atrial fibrillation as an independent variable. Desirable criteria include a) a multivariable analysis that includes prior stroke (or use only first ever stroke), and HF as independent variables, b) it should be a cohort study rather than an exploratory analysis of a clinical study, c) it should also look for increasing risk with decreasing levels of EF, d) it should include both ischemic and non-ischemic cardiomyopathy (which should be analysed separately). Studies were reviewed against these criteria. We reviewed in detail those studies where the stroke or thromboembolism rate and EF were documented that were performed in patients in sinus rhythm or in whom a multivariable analysis including atrial fibrillation had been performed.

Results

The Medline search revealed 938 papers. Thirty-five of these met initial study inclusion criteria. Hand searching of the references listed in these included articles and of the American College of Cardiology and American Heart Association meeting proceedings yielded an additional 20 papers that met initial inclusion criteria.

We reviewed the remaining 55 papers in detail and selected those giving information relating EF to risk of stroke and thromboembolism. From these only 15[9-23]met one or more desirable criteria.(Table 1) No studies fulfilled the optimal or all of the desirable criteria.

Studies were mainly either cohort studies, exploratory analyses of clinical studies or primarily echocardiographic studies. It was difficult to compare results between studies as there was no standard way of giving EF results: Most frequently results were expressed as the Relative Risk or Odds Ratio [10,13] of stroke or thromboembolism between normal and reduced EF (usually <50%) or EF strata. Frequency of patients with reduced EF with and without stroke were given in other papers,[16] but others gave mean EF in the stroke and control groups[23] or an odds ratio of an abnormal EF comparing stroke and control groups[19]. Individual EF results were only occasionally provided.

We found only two cohort studies which fit desirable criteria[9,11]and one case control analysis of a subset from a cohort study.[10] There were seven exploratory analyses of clinical studies that met desirable criteria.[12-16,18,21] Two of three cohort studies found reduced EF (<50%) to be a risk factor for stroke but did not find an inverse relationship between EF level and degree of stroke risk.[9,10] The three exploratory analyses found an inverse relationship between EF level and degree of stroke risk but only in specific subgroups and vascular risk factors appeared to attenuate this relationship. Three exploratory analyses suggested an increased stroke risk with EF ≤20%.[13-15] Of eight other studies showing data on EF and stroke, two found an association between EF and stroke[16,23]and six[17-22]did not. These papers varied in sample size and methodology and all were exploratory analyses.

Discussion

The largest cohort study to date that looks at the relationship of LVSD and stroke is the *Cardiovascular Health Study*.[9] This study used Cox proportional hazard regression after adjustment for covariates to examine time to stroke in a community study of 5888 persons 65 years or older. All patients had EF estimation by two-dimensional echocardiography at baseline. They divided persons into three categories of left ventricular function (normal [EF ≥55%], borderline [45%-54%] and impaired [<45%] without HF and the same three categories of left ventricular function with HF. They found that the hazard ratio of stroke was 2.41 (95%CI:1.3,4.5) (event rate 5.07 per 100 patient years) in persons with HF and borderline left ventricular systolic function and 1.91 (1.3,2.7) (event rate 4.52 per 100 patient years) in persons with HF and impaired left ventricular systolic function but hazard ratio for stroke was not significantly increased or of marginal significance in the other groups. Two negative aspects of this study are that it did not include prior stroke in the multivariable analysis and did not separate out persons with nonischaemic cardiomyopathy. Although the study found EF to be a risk factor for stroke in HF, the fact that there was no increasing hazard with decreasing EF would appear to go against the theory that stasis in a dilating ventricle increases thromboembolic risk. It suggests that decreased EF at any level is a non-specific risk factor for stroke. Reduced EF at any level might therefore be a surrogate for the presence of atherosclerotic cerebrovascular disease. The cut off for LVSD in this study was however very high at 45% and does not preclude a pro-thromboembolic effect at lower EF

levels.

The *Northern Manhattan study* population was used for a case-control study in a subpopulation comparing 270 first stroke patients with 288 controls.[10] This study compared the frequency and severity of LVSD (mild: EF 41-50%, moderate: EF31-40% and severe: ≤30%) in a multivariable analysis and found that the odds ratio of LVSD of any degree was 3.92 (95%CI 1.93,7.97) in patients with stroke compared to controls.(Table 2) As in the *Cardiovascular Health Study*, there was no relationship between degree of EF reduction and stroke risk. All stroke risk factors including clinical HF were adjusted for, although the frequency of HF in the groups was not stated. These results reinforce the possibility that reduced EF at any level may be a non-specific surrogate of cerebro-vascular disease. One interesting finding however was that in the subset (20%) of strokes that were cardioembolic, LVSD was more strongly related to stroke risk than in the other stroke subtypes. This suggests that decreased EF may impart a small pro-thromboembolic risk that is not apparent when all stroke subtypes are pooled.

A further cohort study that included an analysis of EF was the *Olmsted County study* of ischemic stroke after HF.[11] 630 persons with incident HF were studied over a median of 4.3 years for the frequency of incident stroke. Baseline data comparing persons with (*n*=102) and without (*n*=528) subsequent stroke showed no significant difference in the frequency of EF<50% between the groups. In a very high stroke risk subgroup (19.8 per 100 patient years) within the first 30 days after HF diagnosis, the mean EF was >40%. A multivariable analysis of significant predictors of stroke >30 days after HF also showed that EF was not a significant risk factor for stroke. The drawbacks of this study are that EF was only available in about 50% of persons and there was no classification into ischemic and nonischaemic cardiomyopathy. Severity of HF by NYHA class was not given. This result does not support the *Cardiovascular Health Study* analysis linking EF to stroke risk in patients with HF. The finding that even in a very high stroke risk subgroup, the mean EF was only marginally decreased suggests that other risk factors for stroke are likely more important than reduced EF in stroke occurring in acute HF.

The Survival and Ventricular Enlargement (SAVE)[12] was the first exploratory analysis of a clinical trial of patients with LVSD to be published. SAVE was a study of 2,231 patients with EF ≤40% but without HF, enrolled a mean of 11 days after myocardial infarction. The patients were followed up for a mean of 42 months and had a low annual incidence of stroke of 1.5%. Patients with EF ≤28% had a relative risk of stroke of 1.86 compared with patients with EF of >35% (*p*=0.01). Age and decreased EF were significant risk factors for stroke in a multivariable analysis. Atrial fibrillation was not a risk factor for stroke but up to 31% of patients were on anticoagulation and this significantly reduced stroke risk. Neither hypertension nor diabetes was a risk factor for stroke. The SAVE study found that EF (especially EF ≤28%) was the most important independent predictor of stroke in patients after MI.(Figure 1) In addition, the risk of stroke increased by 1.18 times for every absolute decrease of 5% in the EF. Men made up 83% of the study sample. A concern about this study is that prior stroke was not included in the multivariable analysis and since prior stroke is a known strong risk factor for stroke,[11] its exclusion might have allowed LVSD to become a significant risk factor. This criticism could also be levelled at the *Cardiovascular Health Study* results for stroke discussed above and at the *Sudden Cardiac Death in Heart Failure* (SCD-Heft) trial outlined below.

The Studies of Left Ventricular Dysfunction (SOLVD) thromboembolism analysis[13] included 6,378 patients with EF≤35% in sinus rhythm, half of whom had symptomatic HF. All thromboembolic events: strokes, pulmonary and peripheral emboli were included together in the main analysis. Separate analyses were performed for men and women since a significant interaction between EF and gender was found (*p*=0.04). In an average follow up time of 40 months there were 1.82 events per 100 participant years of follow up in men and 2.42 events per 100 participant years in women. The SOLVD trial found that EF was independently related to thromboembolic risk, in women but not in men (fig 3). Multivariable analysis of the relative risk for a thromboembolic event per 10% decrease in EF was 1.53 (95%CI:1.06,2.20) in women and 1.08 (95%CI:0.89,2.20) in men. In SOLVD, multivariable risk factors for thromboembolism were dominated by prior stroke, diabetes and age in men, and EF did not reach significance. In women diabetes was the strongest, and only vascular, risk factor and EF was also a risk factor for thromboembolism. Sex differences in pathogenesis of thromboembolism are also suggested by the finding that in women but not in men, the relative risk of thromboembolic events was 2.17 [95%CI:1.10-4.30] times the risk with EF 11-20% than with EF ≥30%. Since a high percentage of endpoints were pulmonary emboli, a repeat multivariable analysis was performed excluding these cases to look at risk factors for stroke alone.

***Table 1**: Details of 15 studies examined. EF ejection fraction; HF: heart failure; HR: hazard ratio, RR: Relative risk; OR: Odds ratio; MVA: multivariable analysis.*

Reference	% with HF (NYHA class)	Stroke rate (no of strokes/total no of patients)	EF cut-offs	How EF compared	Atrial Fibrillation % excluded/ MVA	EF Risk of stroke? And level	Prior stroke included in MVA
9 Gottdiener *CHS*	4.9%	12.5-50.7 per 1000 pt. yrs. 5532 total patients	Borderline <55%, impaired 45%	HR for stroke in normal vs low EF groups	2%	HR:Borderline: +HF:2.41; Impaired: -HF: 1.27; +HF: 1.91	No
10 Hays *NOMASS*	Not stated	277 strokes 288 controls	mild 41-50%; mod 31-40%; severe ≤30	OR for mild, mod or severe ↓EF in strokes vs controls	10% of strokes	OR: mild: 4.0; mod/severe 3.9; All ↓EF: 3.9	Not relevant
11 Witt *Olmsted County Study*	100%	102/630	<50% (EF missing in 50% of strokes)	RR of stroke with↓EF	47% of strokes (adjusted for in MVA)	P 0.014 (but EF lower in non-stroke)	Yes
12 Loh *SAVE*	0% "overt HF"	103/2231	All pts : <40%: 3 gps:<28% ; 29-35%; >35%	RR of stroke in MVA	16% of strokes (adjusted in MVA)	RR: 1.18: 18% increase in stroke for 5% ↓EF	No
13 Dries *SOLVD*	38%	226/6378	All pts: ≤35%: 4 gps:≥30%; 21-30%; 11-20%; ≤10%	RR of thrombo-embolic events	excluded	RR: 1.53 per 10% ↓EF	Yes
14 Freuden-berger *SCD-Heft*	(All pts NYHA II or III)	56/2114	All pts: ≤35%:	HR for thrombo-embolic events	excluded	HR 0.82 per 5% ↑EF	Yes
15 Falk *PROMISE*	(All pts NYHA III or IV)	22/1088	All pts: ≤35%: 1 subgp	% with stroke EF≤20% vs EF>20%	Not stated	Warfarin reduced stroke in EF≤20%: p<0.05	No MVA
16 Fox *ARIC*	0.04%	98/1792	50%	% with low EF: stroke vs no-stroke	Not stated	P<0.0001	No MVA
17 Siachos	100% (NYHA III or IV)	34/168	20%	EF in stroke vs no-stroke	Excluded	P=0.82	excluded
18 Mujib *DIG*	100%	222/7788	<35%	OR for stroke in ↓EF	excluded	P=0.85	No

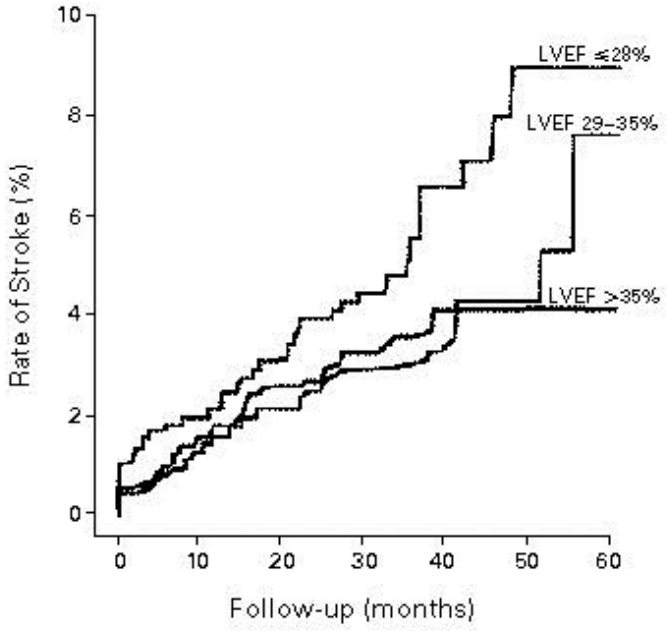
***Table 1**: Details of 15 studies examined. EF ejection fraction; HF: heart failure; HR: hazard ratio, RR: Relative risk; OR: Odds ratio; MVA: multivariable analysis (cont.).*

Reference	% with HF (NYHA class)	Stroke rate (no of strokes/total no of patients)	EF cut-offs	How EF compared	Atrial Fibrillation % excluded/ MVA	EF Risk of stroke? And level	Prior stroke included in MVA
19 Mahajan	Not stated	73 strokes 73 controls	All pts: ≤35%:	EF in stroke gp vs EF in controls	excluded	P0.38	No MVA
20 Komori	100% (70% NYHA III or IV)	10/111	43%-45%	EF in stroke gp vs EF in no-stroke	10% of strokes	P 0.7	No
21 Szummer *VALIANT*	26%	81/5573	43%-49%	EF in stroke gp vs EF in no-stroke	16% of strokes	0.081	Yes
22 Deleu	Not stated	72 strokes 79 controls	37%-50%	EF in stroke gp vs EF in no-stroke	Not stated	Not significant	No
23 Kozdag	Mean NYHA class III	18 strokes 28 no stroke	29%-34%	EF in stroke gp vs EF in no-stroke	Not stated	P 0.03. Not significant in MVA	No

***Table 2**: LV function in stroke patients and control subjects in the Northern Manhattan Study[10]. Normal LVEF >50%, mild LV dysfunction 41-50%, moderate 31-40% and severe <30%. ±Adjusted for age, gender, AF, diabetes mellitus, hypertension, hypercholesterolemia, current smoking, CAD, HF and LV mass index.*

	Stroke patients, n (%)	Control subjects, n (%)	Unadjusted Odds Ratio (CI)	±Adjusted Odds Ratio (CI)
Normal LV function	205 (75.9)	274 (95.1)		
LV dysfunction Any degree	65 (24.1)	14 (4.9)	6.21 (3.39-11.37)	3.92 (1.93-7.97)
Mild LV dysfunction	29 (10.7)	7 (2.4)	5.54 (2.38-12.89)	3.96 (1.56-10.0)
Moderate/Severe LV dysfunction	36 (13.3)	7 (2.4)	6.87 (3.00-15.75)	3.88 (1.45-10.39)

***Figure 1**: Cumulative rate of stroke in the SAVE trial according to left ventricular EF* [12]



In these results, in women, EF was no longer a significant risk factor, and prior stroke and smoking became significant. This suggests that the pathogenesis of thromboembolism is different from that of stroke, and that EF is less important as a risk factor for stroke than for thromboembolism. The reason for this is likely that the risk of a clinical ischemic event in the brain is increased by pre-existing vascular disease risk factors, which may not be the case for other locations of embolism. SOLVD also appears to show that the pathogenesis of thromboembolism is more likely to be related to reduced EF in women than in men, possibly because in men multiple strong vascular risk factors override any effect of reduced EF and make it undetectable.

A third trial analysis that showed an inverse relationship between thromboembolism risk and EF was that of the *SCD-Heft Trial*.[14] 2114 patients in sinus rhythm enrolled in this implanted cardiac defibrillator study were followed over a median 45.5 months for stroke and peripheral or pulmonary embolism. Hypertension (Hazard Ratio [HR] 1.86 [95%CI:1.10,3.13]) and EF (HR 0.82[0.69,0.97] for every 5% decrease) were the only risk factors for thromboembolism. Two concerns about these results however are that the multivariable analysis did not include prior stroke, even though up to 7% of patients had prior stroke.

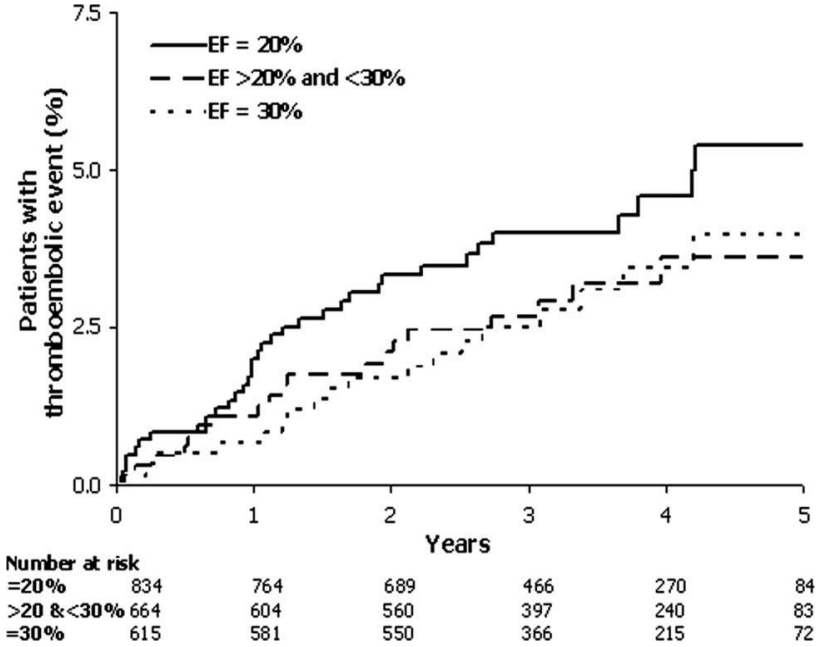
Secondly, stroke was not analysed separately from other thromboembolic events and when transient ischemic attack was included as an endpoint, EF was no longer a significant predictor of thromboembolism. The authors commented that ischemic stroke in LVSD may be related to severity of cerebral arterial disease rather than thromboembolism alone, echoing what several of the studies above appear to show.

The fact that these three trials have shown an inverse relationship between EF and thromboembolism/stroke risk does support a specific effect of severe LVSD on thromboembolism risk, independent of reduced EF of any level being a surrogate marker of cerebrovascular disease. The three trials that showed this relationship, all studied EF below 28%,[12-14] whereas those failing to show this relationship[9-11]had cutoffs for LVSD that were higher. SOLVD data show that the rate of thromboembolism increases significantly with an EF of 11-20% in women[13] (Table 3) and the SCD-Heft data also shows an increase in stroke with an EF of 20%.[14] (Figure 2) This is similar to an earlier finding that in severe HF in patients with an EF of 20% the stroke rate was increased and was reduced with warfarin.[15] These three analyses suggest that the left ventricle may only become a significant source of thromboembolism with very low EFs around 20%, and this may be one factor why the other studies above failed to show an inverse relationship between thromboembolism and stroke.

***Table 3**: Incidence and relative risk of thromboembolism according to gender and EF quartile from the SOLVD trial. CI = confidence interval. Adapted from Dries et al. (1997).*[13]

LVEF	Incidence	Relative Risk (95% CI)
Men, n=5457		
≤30%	1.70	1.00
21-30%	1.83	1.08 (0.83-1.41)
11-20%	2.01	1.21 (0.86-1.70)
≤10%	1.96	1.21 (0.30-4.92)
Women, n=921		
≤30%	1.78	1.00
21-30%	2.41	1.35 (0.74-2.47)
11-20%	3.80	2.17 (1.10-4.30)
≤10%	4.20	2.43 (0.32-18.26)

***Figure 4**: Proportion of patients with thromboembolic events in three strata of baseline Efs. SCD -Heft Study.*[14]



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Original Article

Medico-legal evaluation of the gynaecological consultation in cases of annulment presenting to the Ecclesiastical Tribunal of the Roman Curia in Malta.

George Gregory Buttigieg, Gabrielle Buttigieg

Abstract

The Ecclesiastical Tribune of the Roman Curia in Malta appoints gynaecologists as medical experts to certain cases seeking annulment. These cases often essentially revolve around the confirmation or exclusion of virginity but may involve requests for other information. In this article an experienced gynaecologist and a practicing lawyer, evaluate the gynaecologist's role, outline clinical pitfalls and offer relevant advice.

Introduction

The Roman Catholic Church views marriage as a sacramental and indissoluble bond between a man and a woman. It is a contract which for validity requires two participants of opposite gender who are free to marry and who freely and knowingly enter into matrimony. There is also the very essential requisite that they intend to execute the contract through consummation of their marriage. The Catholic Church considers this bond as created through a human contract but ratified by divine grace and hence virtually indissoluble until consummation, after which it attains absolute indissolubility.

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However, a marriage can be **annulled** by the Roman Catholic Church and this is a declaration of invalidity of the marriage at the time that the matrimonial vows were made. In contrast to "divorce", an "annulled marriage" never existed and it is only so declared when an ecclesiastical tribunal confirms a lack of validity at the time that the marriage was contracted. We are concerned here with those cases seeking annulment from the Metropolitan Tribunal on the basis of non-consummation of the marriage and hence its invalidity.

A crucial point in the proceedings of such cases will be the referral of the female side for gynaecological assessment, the crux being the establishment of the presence or absence of the hymen. Other medical issues may require gynaecological elucidation.

The clinical consultation

Our advice is to handle this case ethically and medically, like all other gynaecological consultations. This will involve detailed history taking with special reference to the gynaecological and sexual elements. Ideally one should have a nurse present unobtrusively in the background but this is not indispensable.during hisory taking though strongly advised during the physical examination. You are dealing with a patient about whom you know little and with whom you lack the doctor-patient bonding you have with your normal patients. Uppermost in your mind should be the fact that though ecclesiastical, this is still a medico-legal case with the remote but definite possibility that it might railroad into a civil medico-legal case especially if the Tribunal ruling does not favour the patient. The golden rule is not to discover what can go wrong through bitter experience. All documentation must be carefully and legibly annotated and carefully filed away.

It is essential to realize that such a consultation may present a complete paradigm shift. You are facing a patient on whom you will perform a most intimate examination and who unlike your usual patients did not choose you herself. Another major point of difference is

that the patient may be subjecting herself to an examination, the conclusion of which she may dread to hear. The patient may not be a virgin at all but hope to talk her way through an explanation of the use of vaginal tampons or an odd fall or maybe even an act of God in not being born without a hymen.

The gynaecologist must use the short time of the history taking to come across as humane as possible and try his/her best to bond with the patient who may be reserved, embarrased, earful, nervous or outright (rarely) antagonistic. Be it body odour, a belligerent attitude, shifty stance or unkempt dress, it is essential not to alienate the patient. If a patient is nervous at history taking she will be doubly so when vulnerably undressed and about to be examined by an unknown doctor whose conclusion may affect her future disastrously and permanently. A woman who presents at the Curia seeking annulment is more than likely desperately seeking a Church release of her disastrous marriage possibly but not necessarily to seek re-union with another partner with the Church's blessing. She is possibly in great awe of you but you may hold one of the keys of her future peace and happiness

Taking a clinical history

The state of virginity may be a life-long chosen vocation for some, but by and large it is nowadays, a rare finding whether the patient is referred by the Roman Curia or not.[1]

However one must maintain an open mind at all times and it is crucial to remember that the patient herself may not be precisely clear in her mind as to what virginity truly means and what the gynaecologist wil look for. This is a commoner state of affairs than many imagine. We suggest that you explain what you will do and that this may also serve as a gynaecological check-up.

Your questions should be simple, clear and to the point, always tactful and discrete. In spite of her vulnerability the patient will often open up with her conjugal problems. It is neither a time for cracking of jokes to quicken friendship nor for much talking but rather for listening and writing down the essentials. A quiet reassuring and serene atmosphere may manage to relax the patient nicely and likely to lead to a relaxed patient at examination excepting in the presence of cases like vaginismus. The latter may be hinted at in the sexual history when the patient may simply refer to symptoms of dyspareunia. However if for some reason or other, the patient senses cold detachment or even indifference she may be sub-consciously less co-operative at the point of physical examination.

It is important not to miss systemic complaints and the examination carries the usual responsibility of a consultation (in fact you are free to charge a normal fee for it). Unrelated pathology such thyroid dysfunction, hyper-prolactinaemia, liver problems as well as psychiatric problems have all surfaced at these consultations and some of these may have directly or indirectly contributed to the original marital dysfunction.

Of importance and to be duly noted are any points related to sexual activity which may arise in answer to direct questioning or volunteered by the patient. One patient for example spontaneously stressed her husband's perennial avoidance of vaginal penetration in favour of anal intercourse. Even perversions may leave the patient *virgo intacta*. Only God in His wisdom knows the vagaries of mankind – be overtly shocked a nothing but maintain a stoic exterior. Things may be poured out with great pain, things which happen behind closed doors where one person may be at the complete mercy of her lawfully wedded husband. At times one will be moved by great compassion hearing about a husband who one wonders if he is human recalling John Locke's [John Locke was an English empiricist philosopher (1632-1704). This saying is often attributed to James Joyce, the Irish writer who only echoed Locke] words "The actions of men are the best interpreters of their thoughts." At other times you wonder if the patient's husband is a saint. You listen with empathy, you write quietly but maintain frequent eye contact and you pass, no judgement.

One way of de-stressing the tense patient is to explain that besides fulfilling the request of the Metropolitan Tribunal the examination also serves as a check-up, thus introducing the element of 'medical care'. This bringing down the examination to an almost ordinary visit often increases the patient's general receptivity and co-operation. At this juncture the odd patient, (pardon the pun), might explain to you, in all naivety that only recently she had a check-up and a pap smear. Inevitably one is left wondering whether the patient is not a *virgo inacta* and thinks she is, whether she was indeed a *virgo* till some over-enthusiastic gynaecologist forced a speculum in to perform a smear test or was perhaps a smear test performed using a virginal speculum – to what end one wonders.

During history taking one may also ask about the use of tampons. A positive reply does not augur well for the presence of an undamaged hymen. One particular patient stated rather proudly that she had had a regular full gynaecological assessment every year for the last ten years including smear testing, but she was still a virgin as she had never had intercourse !

Another patient explained to me that she had experienced pain with intercourse for a good many years – a mystifying statement backed by a patulous vagina on physical examination. This points to one fact alone – that some patiets have a pathetic ignorance of the scope of the gynaecological examination in this specific instance.

Others do not know what virginity means and others still know nothing about everything.

History may reveal other strange facts likely not to be believed if heard outside the consulting room. Conjual sexual ignorance can be astounding with the normal coitus thought to involve the male genitals and various parts of the female ranging from the anus up to the umbilicus. Both husband and wife may be unbelievably devoid of knowledge of coitus with insertion being effected in many places save the right one –not as a fetish or perversion but in the honest belief that this is what should be done. Whereas lack of knowledge of coitus and birth in a substantial number of women is a known and well published phenomenon,[2] absent coitus from lack of knowledge is not. The same phenomenon has also rarely presented with infertility to the medical author of this paper

It is helpful to form a good idea of the patient's sexual history both before and within marriage. Some patients will clam up and open up slowly whereas others may need slowing down if notes are to be taken legibly. Voluminous talking aboutn sex does not equate with seual activity but the patient may have much to complain about whether the cause of her problems lies with her or her husband. One should delve into the details of the subject and tactfully ask abouit orgasm, pain or discomfort during any sexual activity, vaginismus. Some patients may not even understand your drift while others may have run the gaubntlet of much medical investigations and state their condition themselves such as vaginismus. It is best to omit the use of jargon with these patients even if they attempt to use it themselves as it may wel be that they do not know precisely the meaning of what they are casually quoting, sometimes to impress. If they reveal that they have already been through the mill of medical investigations it is always useful to get as detail of conclusions as they can deliver. It should not be accepted blindly for patients at times reach conclusions which were never given to them by medical practitiones but having an idea of what went on may help e.g. a laparoscopy was done and endometriosis diagnosed.

Psychological factors

The gynaecologist faces a patient who may be harbouring myriad complex psychological permutations. One assumes that the patient is in front of you hoping that you will find an intact hymen which is another step forward in the long haul of obtaining an annulment. Yet rarely one may meet a patient who consciously or sub-consciously does not desire an annulment. Such a woman who knowlingly or not, fears the idea of the loss of her marriage, especially but not necessarily if the cause lies with her persona, might tell untruthfully that she has had coitus. In one such case witnessed in Glasgow by the medical author of this paper, a woman maintained that she had had regular intercourse within marriage and then was found to have an intact hymen and a severe case f vaginismus. She may not have read Baudrillard's hypothesis [Jean Baudrillard a French sociologist and philosopher (27 july 1929 – 6 March 2007)whose work is frequently associated with postmodernism and specifically post-structuralism.] but she certainly had a sub-conscious that could speak! In such cases one must also bear in mind the possibility of psychological or even psychiatric disturbances.[3]

Very rarely a patient may ask you openly to certify (falsely) their virginity to which one may react by throwing the patient out or recommendably explain that the Metropolitan Tribnal is not bound to rely on this single gynaecological assessment. And lest she gets the wrong idea one must add that the suggestion is not only wrong but could endanger your medical registration. In view of this danger we believe that the gynaecologist should avoid undertaking such an examination in relatives or close acquaintances. He/she may also make a note to the effect that the patient is neither close a friend nor a blood declaration in the officia report althogh this is not a requirement.

While taking a patient's history it is our advice to be liberal with empathy but very stringent with sympathy. The former is a positive cognitive attribute which by 'feeling with' the patient involves an understanding of the patient's perspectives as a separate individual.[4] It implies both a capability to understand the patient as well as a clinical capability to communicate this understanding to the patient, thus building or strengthening the clincal bond. On the other hand. sympathy is defined as a relationship or an affinity between a person in which whatever affects one correspondingly affects the other.[5] To an immature patient sympathy may consciously or subconsciously imply support to the point of favouring her case – if long term it may also give subliminal symptoms which may be dangerous to the doctor-patient relationship. To a mature person, open sympathy may translate as patronisation. Empathy, a laudatory quality, is very much entwined with the aspect of the practising the humane art and science of medicine and is fast being lost in a busy world. Sympathy is what the patient should get, along with a hug when she relates her problems to her best friend ove a cup of tea.

The gynaecological examination

A gynaecological assessment on a stranger who was sent to you for assessment may present an extremely delicate scenario. Combined with what is at stake the situation demands even more tact. Borrowing from numerous studies on cervical screening where "embarrassment and fear of pain during examination

have been reported as potential barriers to such screening.[6-8] It is of the utmost importance to conduct a detailed examination in optimal psychologicl circumstances.

As in all examinations of this nature, over-familiarity must be shunned and ideally an assisting nurse should be present, although this may not be habitual in the private sector. An explanation of what is being performed is useful to keep the patient calm as well as distracted while it enforces the clinical nature of an intimate examination. As in history taking, unexpected pathology may always be detected.

Occasionally one finds an anomaly of the lower genital tract whether directly affecting the vagina and of importance to the examination in question or less directly important such as the anomalous opening of the urethra or anus. The vagina may be absent (along with an absent uterus) or alternatively one may find two vaginas, one of which may be functional[9] and the other, non functional and still with its intact hymen. A hemivagina, a septated vagina or even male genitalia, rudimentary or not ma be present. We speak here of astronomically rare conditions for example the incidence of congenital absense of vagina (and uterus) is unknown but is believed to be in the region of 1 in 4,000 to 5,000 female births.[10] Conscious of the difficulty of proving the statement, it is the medical author's opinion that however rare these anomalies are, the patient in question stands a higher than average chance of suffering from them. The findings must be explained in layman's terms and in view of the potential of harm to health, further investigations of the genital tract as well as the renal sysytem should be emphasized. These can be arranged through the patient's family doctor or gynaecologist (unlikely to have one). We recommend prudence in taking over the case for long term management although at the end of the day the patient's choice of gynaecologist is final.The question of how much of this information is to be forward to the original non-medical referring choice is discussed elsewhere.

If genuine vaginismus is encountered one must accept that the patient cannot consciously relax enough even to allow inspection of the vulva, never mind that of the hymen if there is one. This does not automatically preclude previous coitus with a resultant hymenorrhexis for the vaginismus may be the result of sexual violence or even rape in or out of marrage. In such cases we recommend a formal examination under light general anaesthesia or sedation in an operating theatre. Using simple sedation may not suffice and if this is used we still recommend that it is administered by an anaesthetist

In cases of vaginismus one should obtain a further detailed history and ask direct questions. One patient answered such a specific question about possible sexual abuse in childhood with an immediate, very frank and surprising story of how an uncle used to abuse her as a child -a fact she had revealed to no one including a very patient husband.

With regard to the examination of the hymen, one must assess how much of the vaginal orifice it covers. Although normally only *part* of the orifice is occluded, rarely it may cover the *whole* vaginal orifice and although an imperforate hymen as a rule presents in adolescence, at least one case of presentation in an early married woman has been noted (Pers comm.. Mr. Charles Brown F.R.C.O.G., Consultant Gynaecologist, Southern General Hospital, Glasgow, Scotland.) Inspection alone may be insufficient to conclude that a hymen is intact[11] and here one may gently feel the circumferential resistant edge of the hymeneal orifice using the tip of the small finger. One should also make a note of the *shape* of the hymeneal orifice as well its approximate size. Damage through examination must be guarded against and an attending nurse may vouchsafe such taken care if possible future accusations were to arise. The hymeneal details need to be reported on and although photographic representation is obviously unethical a good diagram would be definitely in order.

If the hymen is absent, one may further gather a good indication of the frequency of the practiced coitus from the state of the vagina. Thus a broken hymen and a vagina which hardly admits a normal finger may be justified by the insertion of a just a tampon. Incidentally one must express no personal opinions to the patient on his findings including the controversial aspect as to whether a hymeneal cleft has been caused by the insertion of a tampon. In the Tribunal court such an explanation would prove to be uphill all the way but it is up to the Tribunal to give the corrsponding weight. Any degree of vaginal wall laxness equates with frequent insertion of some object or other and coitus may not be excluded – it is in fact the most likely cause. An over lax and even patulous vagina is obviously even more significant and may be even consonant with childbirth. Be not urprised that these varying degrees of "virginity" may have been heralded by seemingly honest protestations of definite virginity in the course of history taking. The mind may play tricks but the hymen unfortunately is to sexual function what te black box is to an aeroplane. Furthermore, as comedian Groucho Marx once stated "I can say I'm suffering from a severe case of utter self delusion but you can say that I'm plain lying! We're both right". Extremely rarely one may find a hymen which has been displaced eccentrically during coitus and never torn – anatomically a *virgo intacta*, though practically having had consummate sexual intercourse. In examining the hymen one is hardly likely to encounter an imperforate hymen although medicine is the biggest exponent of the truism that one should neve say never. An obviously torn hymen with the hymeneal

remnants known as carunculae myrtiformes should be clear to see. In the adult woman, consensual intercourse (as contrasted to rape) often tears the hymen centrally and spreading into an indeterminate tear.[12] Some hymeneal variations may cause confusion such as cribriform opening may be misinterpreted as an imperforate hymen until the fine openings are detected. A septated hymeneal opening may also be initially confusing. One must also be conscious that in extremely rare occasions (0.03%) a hymen may be congenitally absent[9], though in such cases there will not be the tell-tale ridge left after a hymen is normally torn during coitus.

One may also very rarely encounter strange hymeneal orifices two examples being represented here in Figures 4 and 5 namely the sub-septate which is reminiscent of the uvula of the throat and the fimbriated type. One must be careful in trying to diagnose in-betweens by which we mean a situation where the hymen is present and seemingly intact but is beginning to show the early signs of rupture such as the insertion of a smallish finger. The hymen first shows early signs of strain or partial early rupture between the 3 and 9 o'clock positions i.e. the posterior half where one may see irregular edges (Stage I). These may progress to an irregularity of the normal regular orifice and may be due say to masturbatory activity.

In these situations a very accurate and detailed decription must be given. Also one should not omit to gently ask specific questions directed at the patient.

The possibility of hymenoplasty must also be borne in mind and this may be combined by a vaginal "rejunevation" operation by which the vagina is also tightened. Any patient is a candidate for this operation but it seems to be especially comon among women from the Middle East and Latin America. Hymenoplasty may be performed either by gathering together the ridges of the torn hymen and approximating them or else by the insertion of a very delicate and artificial silicone based implant which tears on pressure. Very careful inspection should reveal tell-tale signs which are subtle but present nonetheless. However if truth be told laser hymenoplasty may leave hardly any tell-tale signs and here minimal scarring might be detected by the trained eye on microscopic visualisation. If a genuine doubt exists, play by honesty being the best honesty and document your findings and your doubts.

Having conducted the gynaecological assessment, it is only fair to expect questions about your findings. The way these are handled depends on the gynaecologist's attitude. As a rule we believe that should respect the patient's right to information about herself and the medical author has in the great majority of cases adhered to this sacrosanct fact. However if all truth be told, being but flesh and blood facing a very litiginous patient, with a full clinic waiting outside and with a pounding headache after a morning's major list, he has, very rarely explained gently that the facts of his report will be fully explained to her by her lawyer. Not giving information is acceptable since the information would be given later – telling the patient one thing and writing another is beyond contempt. If the state of virgo intacta is confirmed the gynaecologist is acting ultra vires by raising even the least hope of a positive decision on the case by the Tribunal will decide. Such involvement is unnecesary and dangerous.

Drawing up a report

In drawing up the report, the gynaecologist must be succinct, clear-precise and ideally give diagramatic representations. The answers posed by the Tribunal must be answered clearly and unambiguously and if this is not possible this must be clearly stated with the supporting reasons.. If possible the report should clearly answer the key question as to whether the hymen is present or not. If this is asked which is the normal state of affairs. Any conjectures must be clearly stated as such and these should be backed by reference to the latest publications wherever possible. At the end of the day the Tribunal is asking your expertise and your report should answer more questions than it raises.

***Fig. 1**: Pictorial representation of the different types of openings found in the hymen.*[14]

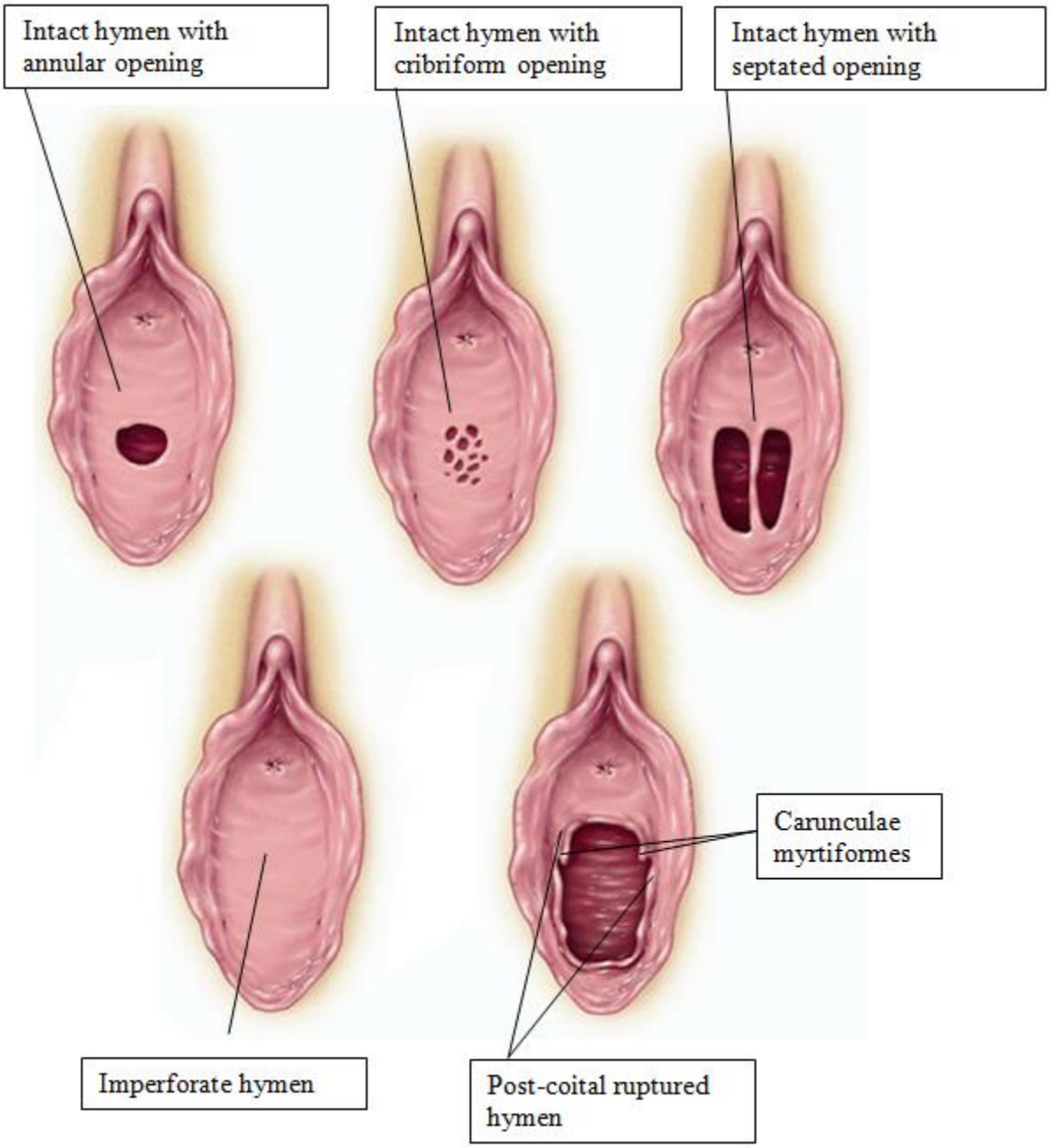


***Fig. 2**: HYMENOPLASTY*[15]

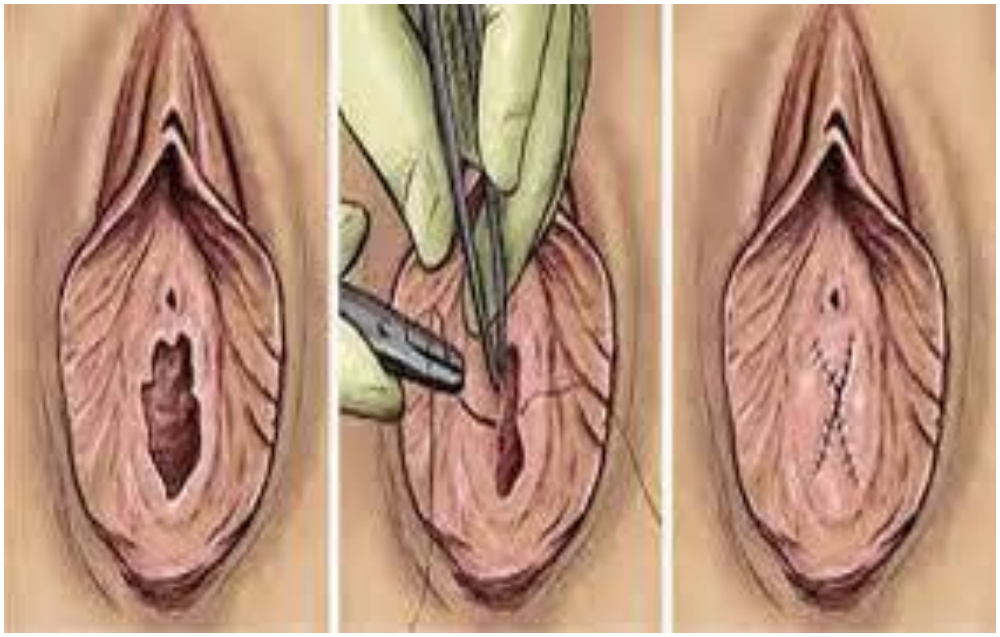


***Fig.3** A rather poor example of a surgically reconstituted hymen.*[16]

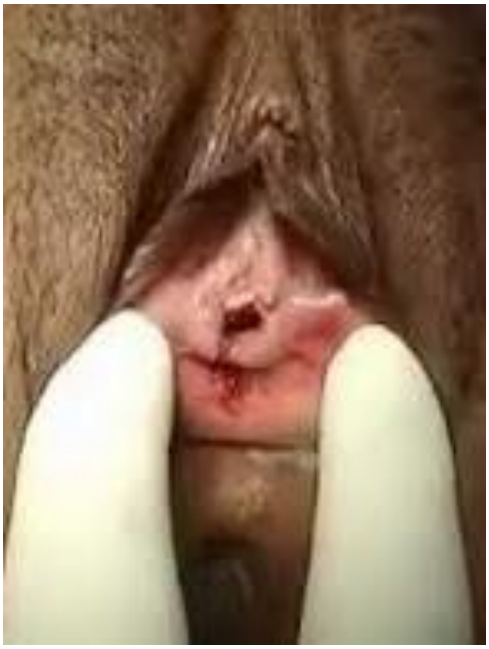


***Fig 4**: The very rare intact sub-septate hymen*[17]

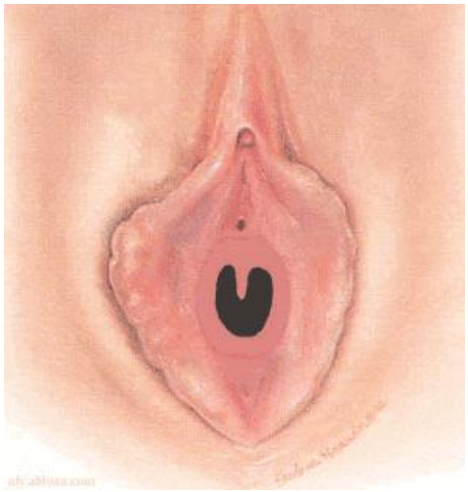


***Fig 5**: The very rare intact fimbriated hymen*[17]

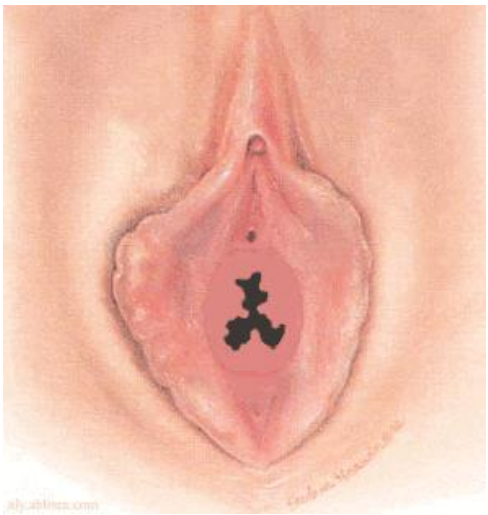


***Fig 6**: Stage I of hymeneal tearing : Irregularity between 3 and 9 o'clock*[17]

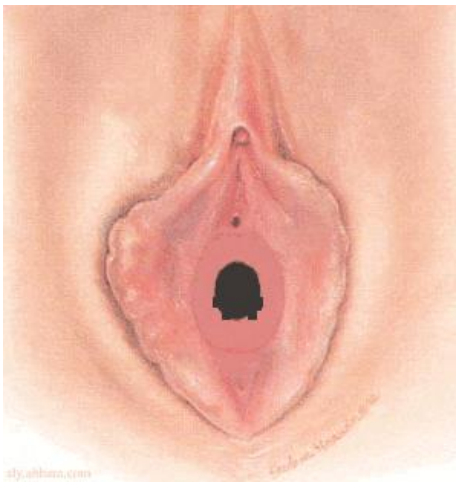
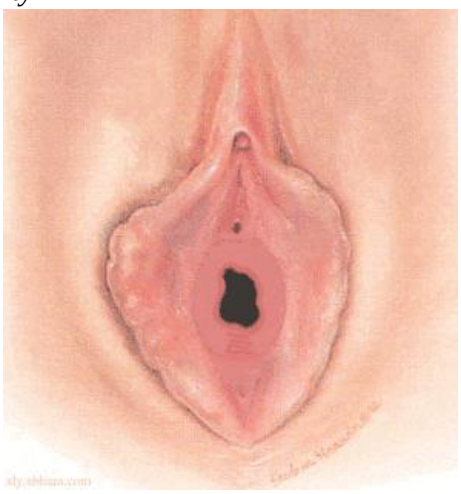


***Fig. 7**: Stage II of hymeneal tearing: Annular irregularity*[17]



Conclusion

The gynaecologist give a complete gynaecological examination as in an ordinary consultation in addition to bearing in mind the information requested by the Metropolitan Tribunal. The gynaecologist must retain his professional reserve which is not devoid of empathy so as not to alienate the patient. His words must be carefully chosen –comforting a patient distressed by the finding of a ruptured hymen with words such as "Your hymen is ruptured but that does not prove intercourse" must be avoided. Whatever you say may be echoed by the patient's lawyer in the Tribunal. Remember that while you are bound by professional secrecy, your patient is not.

We also recommend diagrams or illustrations to clarify your findings and statements. Remember you are making a medical or anatomical statement to venerable members of the Curia who are experts in Church law but not medically qualified.

Illustrations are further especially important in cases of anatomical anomalies where visual assistance is invaluable.

It is not incorrect to draw the Tribunal attention's to new medical approaches and thinking e.g Goodman-Smith et al's article[13] on the loss of virinity and the use of tampon's. However it is incorrect to tie the Tribunal's hands, medically speaking by being over assertive– where indeed one may never be. Thus a statement such as "There is absolutely no doubt that in view of the intact hymen, definitely no penetration has ever taken place....." It would be folly indeed to swear what some body could have or could not have done. Especially if you bear in mnd that it is well recorded both from antiquity as well as contemporary times that a hymen may be elastic enough to allow coitus and rarely even childbirth, remain unruptured and return to more or less its normal state after. Although it should not worry you in the least, remember that a second or even a third

opinion may be easily resorted to by the Tribunal. You are not asked to confirm your findings under oath as per civil court but mentally you should be prepared to.

We also believe that the patient ought to know and understand the doctor's brief as set by the Metropolitan Tribunal and this should be made amply clear by the ecclesiastically approved lawyer of the patient. Legally your professional secrecy is lifted and you can communicate a specific amount of information you detect to a third party called the Metropolitan Tribunal. The patient agrees to this implicitly when she visit your consulting rooms. Our advice is to have a consent form stating that you will passing on certain information to the Tribunal and have the patient sign it in front of a witness such as a nurse or a receptionist. One may take this as legal nit-picking but the situation is a potentially legally loaded one. Hopefully no one will ever put it to the test of a civil court.

Further potential medico-legal nightmares.exist when incidental pathology is discovered. How much should the gynaecologist divulge to the Tribunal? Naturally if say a hymeneal or a vaginal anomaly is detected these would fall under the pertinent information owed to the Tribunal. If further facts are discovered and these facts do not bear directly on the information requested and impicitly agreed to by the patient. One may simply ask the patient if she agrees with putting all down in the report. If she agrees and the information is passed on then almost certainly the gynaecologist will never hear anymore of the matter. However take the case of the gynaecologist discovering say pelvic damage from a sexually transmitted disease like *chlamydia trachomais* or *neisseria gonorrhoea*, the patient allows the information to be passed on and later this information somehow or other proves harmful to her case or reputation. The patient decides to seek legal redress and compensation in the civil court but the gynaecologist is not too worried for after all the patient had agreed. But the plaintiff's lawyer hits the doctor hard on two points:

I. Was there written consent?
II. If there is (and worse still if there is not), how informed was this consent?

Now technically such incidentally found pathology could even help he patient e.g. finding thyroid dysfunction which might explain the patient's general and sexual attitudes. Yet in Medicine one hardly ever receives thanks – but when things go wrong, its different. The plaintiff's lawyer can easily make the point that without knowing the facts of the case before the Metropolitan Tribunal, the gynaecologist did not have a chance in blazes of knowing how the revealed information would be incorporated in the great legal machinery of the Church. Hence even if he did go for a signed informed consent, the information he/she imparted was flawed.

Hence our advice is to bear in mind the primary ethical obligations of professional doctor-patient secrecy. Anything not implicitly agreed to by the patient's attendance for your consultation must be well decribed and the patient allowed to decide on its transmission to the Tribunal. The gynaecologist must explain the implications of these abnormalities as known to him but also stress he is no position to predict whether this information would affect her case and how it may affect it. Furthermore prudence demans that a special consent form – planned, drawn and printed beforehand – is used in this situation and signed again in front of a witness. The gynaecologist must bear in mind that the autonomy of free exercise of professional judgement always be used primarily in the care and treatment of patients (Principle 1 of the World Medical Association Declaration of Madrid on Professional Autonomy and Self-Regulation. Adopted by the 39th World Medical Assembly, Madrid, Spain, October 1987 and editorially revised at the 170th Council Session, Divonne-les-Bains, France, May 2005.) However since care has become a double edged sword, the gynaecologist in this situation must also safeguard his/her medico-legal position.

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Review of the risks and/or benefits of thyroxine treatment in 'mild' subclinical hypothyroidism

Rachel Agius

Abstract

Subclinical hypothyroidism (SCH) is a form of mild thyroid failure and is a commonly encountered condition in clinical practice. It denotes the presence of a raised serum thyroid stimulating hormone (TSH) and normal serum free thyroid hormone concentrations (tri-iodothyronine [T3] and thyroxine [T4]). 'Mild' subclinical hypothyroidism is associated with a TSH level between 4.5-9mIU/L (0.4-4.2) whereas patients with a serum TSH level ≥10mIU/L are classified as having the 'severe' form. The clinical significance of this condition has aroused a lot of interest over the last decade, especially its effects on various health outcomes (namely cardiovascular disease, lipid metabolism, fertility, pregnancy outcomes and fetal neurocognitive function).

Unfortunately the unavailability of adequately powered, double-blind randomised controlled studies precludes the availability of clear cut guidelines as to how one should treat subclinical hypothyroidism. This review looks at the available evidence for and against treatment of SCH with levothyroixine. Most authors agree on the use of clinical judgement as well as individualising management based on the underlying unique patient characteristics when it comes to formulating a management plan for this condition.

Keywords

Subclinical hypothyroidism, prevalence, management, heart, lipids

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Introduction

The term subclinical hypothyroidism (SCH) is used to describe the finding of a raised serum thyroid stimulating hormone (TSH) level above the defined upper limit of a reference range in conjunction with normal concentrations of free thyroid hormones [1-3]. By virtue of its very nature and due to the fact that patients with SCH exhibit few or no signs or symptoms of thyroid failure the diagnosis is a biochemical one. Thus, detection of SCH relies critically on the upper limit of the TSH reference range. Over the past few decades, the emergence of increasingly sensitive 3rd generation TSH immunometric assays have revolutionised thyroid testing, such that the upper reference limit has declined from about 10mIU/L to around 4.0-4.5mIU/L[1,4-5]. This reflects improved functional sensitivity and specificity of the immunometric assays used, the recognition that normal TSH values are log distributed and also improvements in the sensitivity and specificity of the thyroid antibody tests used to pre-screen subjects. In fact the third National Health and Nutrition Examination Survey (NHANES III),[6] specified a serum TSH range of 0.45-4.5mIU/L using the 2.5th -97.5th percentiles, however there are still controversies regarding the upper normal limit. The National Academy of Clinical Biochemistry, for example, has indicated that 95% of euthyroid volunteers have a serum TSH level of between 0.4-2.5mIU/L and thus argue that the upper TSH limit should be decreased to 2.5mIU/L.[1] Of course this is not without repercussions as lowering the upper limit for normal serum TSH values would increase the number of patients diagnosed with SCH and the economic burden of therapy as well as the possibility of overtreatment. Moreover, there are no studies to suggest that patients with a serum TSH of between 2.5 and 4.5mIU/L are at increased cardiovascular morbidity and mortality. These patients are at the very earliest stage of hypothyroidism and that apart from appropriate follow-up there is no compelling evidence stating the benefits of thyroxine treatment in such cases.[5] Thus the American Thyroid Association and the American Association of Clinical Endocrinology (ATA/AACE) guidelines advise that when reference ranges of 3rd generation TSH assays are not available, the clinician should use the NHANESIII reference population range.[1]

Prevalence and Aetiology

The prevalence of SCH varies between 4 and 20% of the adult population. This wide range reflects differences among the population studied with respect to age, race, gender, dietary iodine intake as well as the TSH cut off value used to define SCH.[3,7] In the Colorado study (which defined SCH as serum TSH >5.1mU/L), serum TSH concentrations were elevated in 9.5% of subjects, and it was found that this percentage increased with each decade of age in women but not in men. [3,9-11]

Around 60-80% of subjects with SCH have positive thyroid peroxidase antibodies making chronic autoimmune thyroiditis the commonest cause of SCH in iodine-replete communities.[9] It has also been shown that obese individuals, healthy elderly patients and the white population have higher serum TSH levels and this should be taken into consideration when interpreting thyroid function tests in these cohorts of patients.[3-4,7, 9,13] Thus, several authors recommend that serum TSH measurement should be repeated within 3 to 6 months after initial assessment (together with a free thyroxine [T4] level) in order to confirm the presence of a raised TSH level.[2-3,9]

It has been necessary to categorise SCH as either 'mild' in patients who have serum TSH levels of between 4.5-10mIU/L, and 'severe' if patients have a serum TSH of >10mIU/L.[2,7-8] This is important for a number of reasons. Patients with the severe form of SCH are at an increased risk of progressing to overt hypothyroidism, are more likely to be symptomatic and more likely to have adverse cardiovascular end points such as coronary heart disease, congestive heart failure and cardiovascular mortality.[7,14-16] In view of this, treatment with levothyroxine is generally recommended for patients with serum TSH levels 10mIU/L.[3,7] However, review of the literature shows conflicting data with regards to evaluation and management of mild SCH. While it is known that the majority of patients will have the mild form of SCH[7,9-10] and that thyroid hormone action has major effects on the cardiovascular system as well as lipids and other tissues [4], the available data shows conflicting results with respect to management of mild SCH.[2,4,7,9,11] These inconsistencies stem from the fact that the diagnosis of SCH is arbitrary, with different studies varying in their definition of SCH resulting in a wide degree of thyroid failure examined as well as heterogeneity with respect to age, gender and ethnicity of the examined subjects [8]. Thus several authors and expert panels recommend using clinical judgement as well as an individualised approach, taking into account the individual's unique situation when it comes to deciding the need for treatment of this condition.[1]

Natural history and progression of subclinical hypothyroidism

Both spontaneous recovery as well as progression towards overt hypothyroidism have been documented in several studies in patients with mildly raised serum TSH. The presence of antithyorid antibodies, female sex as well as higher serum TSH levels (≥10mIU/L) are associated with increased risk of progression.[3,4,18-19] In the 20 year follow-up of the Whickham study, the annual rate of progression to overt hypothyroidism was around 4% in females with a raised serum TSH level and positive antibodies, 3% if only serum TSH levels were raised and 2% in those with only positive antithyroid antibodies. At the 20-year follow up the respective cumulative rates of hypothyroidism were 55%, 33% and 27%.[15,20] On the other hand another study showed that in subjects older than 55 years with SCH and no previous history of thyroid disease. 37.4% of patients normalized their serum TSH level and only 26.8% developed overt hypothyroidism, with the only significant factor for progression to overt hypothyroidism being the serum TSH concentration. [18] These findings consolidate our knowledge that whilst some subjects do progress to overt hypothyroidism, a significant number will not and hence obviate the need for T4 treatment.

Subclinical hypothyroidism and its effects on cardiovascular disease and metabolism

The various effects of thyroid hormone on the cardiovascular system and metabolism are well known and hence it is reasonable to expect adverse cardiovascular effects in patients with SCH.[14] SCH has been associated with increased systemic vascular resistance, altered endothelial function, atherosclerosis, arterial stiffness, dyslipidaemia and altered coagulability. However, the association between SCH and coronary heart disease (CHD) events remain to be debated due to the divergent results of several observational studies.[3,12,14,21-23] The Rotterdam study found that SCH was an independent risk factor for aortic atherosclerosis and myocardial infarction and the risk was comparable to the known major risk factors for cardiovascular disease (such as smoking, diabetes and dyslipidaemia).[7,21] Also, a recent re-analysis of the original Whickham Survey (which defined SCH as a serum TSH between 6-15mIU/L and normal T4 levels) showed a positive association between SCH and the risk of CHD events and mortality and also suggests that treatment with thyroxine may reduce mortality as well as CHD events. A meta analyses has suggested that the incidence and prevalence of CHD events and mortality were modestly increased in participants with mild thyroid failure younger than 65 years of age but not in older individuals and that while prevalent CHD

was higher in both genders, it was statistically significant only in women.[24] Thus, it can be inferred that SCH is associated with an increased risk of CHD events and mortality particularly in those patients with a TSH concentration of 10mIU/L or greater.

Another important feature of SCH is its effects on cardiac function. SCH is associated with impaired left ventricular diastolic function at rest (often the earliest manifestation of heart disease in this setting) and systolic dysfunction on effort which may be associated with poor exercise capacity and impaired quality of life.[7,9,25] In the Cardiovascular Health Study of 3044 adults aged ≥ 65 years of age, an increased incidence of heart failure was only recorded in those patients with a TSH of ≥10mIU/L.[19] This risk was not increased in older subjects with TSH levels between 4.5 and 9.9mIU/L. Studies evaluating reversibility of cardiac dysfunction following levothyroxine therapy were positive suggesting that thyroxine therapy can normalise the hemodynamic alterations due to SCH, however, most of them were not blinded or placebo-controlled.[3,12]

The metabolic abnormalities linked with SCH include an increase in total and LDL cholesterol, but data on its effects on HDL cholesterol, triglycerides and lipoprotein(a) is still somewhat conflicting.[2,7,27] One meta-analysis showed that the beneficial effects of T4 therapy was proportional to the degree of hypothyroidism and the serum lipid level, such that reduction in serum lipids was significant in those with a TSH level >10m/IU/L and in those whose baseline serum cholesterol was >6.2mmol/L.[3,9,15,27-28] However, other studies did not show any relationship between SCH and raised cholesterol levels.[24,28]

Effects of replacement therapy

When it comes to the effects of treatment on symptoms, hypothyroid symptoms tended to improve only when the TSH level exceeded 10mIU/L.[29-30] In the Colorado study, patients with SCH reported more symptoms than euthyroid subjects but fewer symptoms than in the overtly hypothyroid patients.[10] Taking this into account, the available data does not confirm clear-cut benefits for routine thyroxine therapy in patients whose serum TSH level is <10mIU/L but serial monitoring of TSH levels at 6- to 12-month intervals with a 'watch-and-wait policy' is prudent and instituting therapy if the TSH levels worsens or if the patient has symptoms compatible with hypothyroidism.[2-3,9]

Subclinical hypothyroidism and pregnancy

Another important issue to consider is the finding of SCH in pregnant women or those women contemplating pregnancy. The importance of thyroid hormone (especially in the first trimester) for foetal brain development and maturation is well known. [3,31] It has been shown that the prevalence of SCH in women of reproductive age is between 0.5-5%.[3,6,10,17] Trimester-specific reference ranges for TSH should be applied, this is because there is strong evidence in the literature to suggest that both the upper and lower normal limits of TSH levels are lower in the pregnancy state when compared to the non-pregnant state.[32] Several studies have shown an association between SCH and increased risk of adverse pregnancy outcomes. However, even here data is also conflicting. The commonly reported adverse effects include increased rates of miscarriages, placental abruption, preeclampsia and premature delivery.[31,33-34] One study found an association between inadequately treated women with SCH and foetal neurocognitive development. This study (which mainly recruited overtly hypothyroid pregnancies) demonstrated a reduction in intelligence quotient as well as delays in motor, language and attention in off-spring of mothers with thyroid hormone insufficiency. Thus, the ATA taskforce state that the available high-quality evidence is enough to associate SCH with increased risk of adverse pregnancy outcomes.[32] Overall, these data show that the potential benefits of levothyroxine treatment outweigh the risks in pregnant women and hence justify its use.

Risks of replacement therapy

Finally one should also keep in mind the risks of thyroxine therapy. It has been shown that around 50% of patients on thyroxine replacement have serum TSH levels either above or below the reference range, implying that a considerable number of patients are either under- or over-treated.[10,15,20] The consequences of over-treatment are iatrogenic hyperthyroidism which has been associated with two important adverse outcomes, namely osteopenia and atrial fibrillation.[2,18,36] Two meta-analyses of cross-sectional studies on postmenopausal women both found that suppressed TSH values with thyroxine treatment were associated with significant reduction in bone mass. On the other hand, in the Framingham study, the risk of developing atrial fibrillation in patients with low serum TSH levels was increased threefold in subjects aged ≥60 years compared to those with normal TSH levels.[8,20] Moreover, in elderly subjects with mild SCH, treatment is not always beneficial.[3] As has been stated previously, mild increases in serum TSH levels in elderly subjects does not always imply true thyroid hormone deficiency and that mild thyroid failure may be associated with longevity.[2,7] Studies have also shown that CHD events and mortality were lower in older patients with mild SCH.[24] Hence, routine treatment with thyroxine in elderly subjects is not advocated by

many authors and that treatment should be individualised based on the presence of associated co-morbidities, symptoms, cognitive function and overall quality of life.[3,7] When treating this cohort of patients, lower doses of thyroxine therapy are often adequate and clinicians should set higher target serum levels for TSH then in younger subjects in a bid to mimic physiological values.

Another important issue to consider when contemplating thyroxine replacement in patients with autoimmune thyroid disease is hypocortisolaemia. The association of autoimmune thyroid disease and Addison's disease is well described. Thus, it is prudent to exclude adrenal insufficiency before starting thyroxine replacement in order to avoid a potentially fatal adrenal crisis. Moreover, it has also been shown that adrenal insufficiency per se may be associated with raised TSH levels which normalise when glucocorticoid deficiency is corrected. [37]

Conclusion

SCH is a commonly encountered condition in clinical practice. However, as one can see the myriad of differences encountered in study results as well as the paucity of evidence in certain situations makes management of SCH somewhat difficult. Most authors advise use of clinical judgement as well as individualising management on a case-by-case basis. Until the availability of large, double-blinded randomised controlled trials upon which to base unequivocal recommendations, clinicians should base their management strategy on the underlying unique patient characteristics (such as age, gender, presence of hypothyroid symptoms, cognitive, metabolic and cardiovascular risk factors as well as quality of life) in order to have sufficient grounds for or against treatment.

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Original Article

National mapping survey of indoor radon levels in the Maltese Islands (2010-2011)

Christine Baluci, Karen Vincenti, Bhikha Tilluck, Stephen Conchin, Saviour Formosa, Dorianne Grech

Abstract

Aim: To conduct a national geographically based survey to determine the distribution of the mean annual indoor radon gas concentration levels in dwellings in the Maltese Islands and map these levels; to identify any areas with annual mean indoor radon gas concentrations higher than the current proposed WHO reference level of 100 Bq/m^3; to determine an advisory national reference level for radon concentration in buildings.

Method: Radon measurements were carried out in 85 buildings distributed over the Maltese Islands between November 2010 and November 2011 using alpha-track radon detectors. Retrieved detectors were analysed by a Health Protection Agency-accredited laboratory in the UK. The overall annual arithmetic and geometric mean indoor radon gas concentrations for the Maltese Islands were calculated.

Results: The mean annual indoor radon concentration for the Maltese Islands was 32 Bq/m^3, with a geometric mean of 25 Bq/m^3 (standard deviation (SD) 25). The maximum level measured was 92 Bq/m^3 and the minimum 11 Bq/m^3. A radon map of the Maltese Islands was produced using the geographic mean annual indoor radon gas concentration level for each building.

Conclusion: The mean annual indoor radon concentration in Malta was found to be well below the lowest proposed WHO reference levels with no dwellings having a mean annual indoor radon gas concentration above 100 Bq/m^3. This national mapping survey for mean annual indoor radon gas concentration in the Maltese Islands indicates that the current proposed reference level of 100 Bq/m^3 by the WHO may be adopted as the national reference level for the Maltese Islands.

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Keywords

Radon, national radon survey, mean annual indoor radon gas concentration, national radon reference level

Introduction

Radon-222 (^{222}Rn) is a naturally occurring radioactive nuclide and is one of the decay products of uranium-238.[1] Uranium is present in variable quantities in the earth's crust and radon therefore occurs in soil, groundwater, natural gas and building materials. The International Agency for Research on Cancer (IARC) classifies radon as a Group 1 human carcinogen.[2] The link between lung cancer deaths in miners exposed to elevated concentrations of radon at work has been confirmed[3], as is the link between residential radon and lung cancer[3-6]. Studies have shown that residential radon is considered to be the second most common cause of lung cancer after cigarette smoking[7] and is responsible for approximately 2% of all deaths from cancer in Europe, particularly in smokers and recent ex-smokers.[8]

Soil, sand, and rock underneath the home are the primary sources of indoor radon gas. Radon permeates into indoor environments from the ground through pressure-driven flows of radon-rich air via cracks in the bottom slabs and cellar walls of buildings. Certain

types of bedrock and soil contain higher quantities of uranium. The inflow of radon gas is also dependant on the permeability of ground materials, the pressure difference between soil air and indoor air and the radon exhalation rate of the underlying soil. Building materials made from soil or rock such as alum shale concrete, volcanic tuff, gypsum waste, may also be a source of radon indoors as these may contain low levels of uranium. However, the subsequent levels of radon in the building that are attributable to such sources are not typically high and in general, no action needs to be taken concerning traditional building material.[1] Climatic factors and human behaviours, especially those effecting ventilation of indoor habitats, lead to significant daily and seasonal variations in radon levels. Outdoor radon levels are known to be low and to have no major impact on health.[1,7]

Radon surveys

The aim of radon surveys is to identify areas that are susceptible to high radon levels. This can be achieved by carrying out geographically based surveys, the results of which can be used to develop national radon risk maps and identify radon prone areas.

In 2005, the Institute for Environment and Sustainability of the Joint Research Centre published an overview of radon surveys carried out in Europe.[9] This overview has revealed a lack of harmonization between methodologies, data and mapping at European level that makes it difficult to compare data between Member States.

Radon reference levels

The European Commission recommendation on the protection of the public against indoor exposure to radon (90/143/Euratom)[10] sets reference levels above which remedial action should be taken. These levels correspond to an annual average indoor radon gas concentration of 400 Bq/m^3 for existing buildings and an annual average radon gas concentration of 200 Bq/m^3 for future constructions.

Research has concluded that lung cancer risk increases linearly with long term radon exposure, with no evidence for a threshold below which there is no cancer risk.[8] The increase in risk is statistically significant for annual average indoor radon concentrations even below the recommended level of 200 Bq/m^3.

To minimise the health effects of indoor radon exposure, the World Health Organization (WHO) proposes a reference level of 100 Bq/m^3 where this is possible under prevailing country conditions.[7] A national reference level represents the maximum accepted average annual radon concentration for residential dwellings established by countries at national level above which actions to reduce the radon concentration are recommended.

A WHO survey of 36 countries found that almost all countries have determined national reference levels for their existing housing stock between 200 Bq/m^3 and 400 Bq/m^3.[10] In the UK, the National Radiation Protection Board (NRPB) has recommended an annual average of 200 Bq/m^3 Action Level for radon in homes. It has further defined Radon Affected Areas as those geographic areas with 1% or more homes above the Radon Action Level.[11]

Local studies

Two local studies investigating the levels of indoor radon were conducted between 1994 and 1995, and 1997 and 1998 respectively. In the earlier pilot study carried out by Mifsud et al[12], 24-hour continuous air sampling was carried out using a portable electronic radon monitor (alpha guard) in 68 different localities in Malta and Gozo. Radon measurements were expressed as time weighted averages (over 24 hour periods). The arithmetic mean value for all sites was reported at 55 Bq/m^3 with a geometric mean of 40 Bq/m^3 (SD 2.3).

The second study by Mifsud and Sammut[13] utilised passive etched track detectors placed in 21 dwellings for one year duration (2 consecutive exposure periods between May and October 1997 and November 1997 to April 1998). The computed geometric mean was reported as 32 Bq/m^3 (SD 2).

Method

Radon measurements were carried out in 85 buildings in Malta over a period of 1 year. A 5 x 5 km grid map of the Maltese Islands was supplied by the Information Resources Unit at the Malta Environment and Planning Authority (MEPA). This grid map was based on the local base map sheets alignment and in the local geographical projection known as Truncated UTM ED50. Five buildings, which included one school, one public building and three private residences, were selected from each inhabited 5 x 5 km quadrant on this grid map. The buildings thus selected included 53 private residences, 17 schools, 13 Local Council offices, 1 hotel, 1 restaurant and 1 government office building. Although the focus of the survey was residential dwellings, representing the greatest number of buildings on the island, consideration was also given to radon exposure in workplaces by the inclusion of these schools and public buildings.

The radon monitors used were alpha-track (passive type) detectors using Kodak LR115 film, validated by the UK National Radiation Protection Board (NRPB). Each monitor was identifiable by bar code and number. Such monitors are compact in size

(measuring 40 mm x 53 mm x 2.5 mm), causing minimal nuisance effect. They are non-hazardous both in use and in disposal. Other advantages related to the use of such monitors include their relatively low cost, they do not require power to operate, may be safely transported through the mail and are easily deployed by suitably trained personnel. These detectors are also suitable for the long term monitoring as required by this study.

Two radon detectors were placed in different rooms in each identified building by trained Environmental Health Officers (EHOs) and exposed for a period of 6 months (November 2010 to May 2011). The detectors were placed in frequently used rooms on ground floors (e.g. living rooms), with good air circulation. They were positioned at head height or if this was not possible, at least 50 cm above the floor, 10 cm from other objects, 30 cm from an exterior wall and 92 cm from an outside window, in an area with least possible disturbance by inhabitants. The placing of monitors near excessive heat, such as fireplaces or in direct sunlight, and areas of high humidity was also avoided as indicated by the suppliers' directions. EHOs were provided with a checklist to document the monitors and their surrounding environmental conditions.

The detectors were retrieved from each location and replaced by another two monitors for the next consecutive 6 months (June 2011 to November 2011). Retrieved detectors were analysed in the UK by a laboratory accredited by the Radiation Protection Division of the Health Protection Agency (UK).

The monitoring period between November 2010 and May 2011 was considered to be the winter semester while the period May 2011 to November 2011 was considered as the summer semester. The arithmetic and geometric means for the separate winter and summer periods, as well as the arithmetic and geometric mean annual indoor radon gas concentration for each building were calculated.

Each sampling point was plotted in a spatial construct through the use of a Geographic Information System (GIS) software (Mapinfo Professional, 2012, version 11.04, Piney Bowes Inc. USA) where the radon attribute data was subsequently collated to the corresponding sample location point. The use of GIS for such a study enables the analysis of both spatial and attribute (non-spatial) data in an integrated system that allows the analysis of the data based on the location they are found in. Initially, the study sought to carry out a hotspot analysis employing the Nearest Neighbour Analysis (NNA) method to review those highest ranging areas. However, whilst the method depicts a comparative approach based on the highest and lowest registered values, it mainly represents the location of the reading and spreading the value to the nearest point. Since the number of data capture locations is too coarse for a clear understanding of the intervening areas, the outcomes of this method was used as a verification tool of the final map spatial analysis.

Results

By the end of the survey period, 334 out of a total of 340 monitors installed in buildings selected over the Maltese Islands were collected and analysed. Six monitors were lost or damaged and therefore excluded from the analysis. The arithmetic mean annual indoor radon gas concentration for the Maltese Islands (Malta, Gozo and Comino) was 32 Bq/m^3 with a geometric mean of 25 Bq/m^3 (SD 25). If Malta, and Gozo and Comino were to be considered as two separate areas, the mean annual indoor radon gas concentrations are 31 Bq/m^3 (SD 25) for Malta and 36 Bq/m^3 (SD 26) for Gozo and Comino (Table 1).

Analysis of measurements from the first batch of detectors, corresponding to exposure during the winter semester, indicated an arithmetic mean of 37 Bq/m^3 and a geometric mean of 31 Bq/m^3 (SD 27). The arithmetic and geometric mean for the summer semester was 27 Bq/m^3 and 21 Bq/m^3 respectively (SD 22) (Table 2).

The highest annual mean radon levels were registered in Qala, Gozo and Pembroke, Malta (92 and 91 Bq/m^3 respectively) and the lowest at B'Bugia and Luqa, Malta (8 and 10 Bq/m^3 respectively). The lowest annual mean radon concentration recorded in Gozo was 17 Bq/m^3 in Xlendi.

The arithmetic mean annual indoor radon gas concentration in buildings classified as residences was 33 Bq/m^3, while that of schools and public buildings was 31 Bq/m^3 and 30 Bq/m^3 respectively.

Fig. 1 illustrates the location of the selected buildings (sampling points) superimposed on a 5 x 5 km grid map of the Maltese Islands and the geometric mean annual indoor radon gas concentration value range for each sampling point. The resulting thematic map illustrates these findings showing each sampling point colour-ranged according to the relevant geometric mean value. The relevant grids are also colour-coded according to the mean of results obtained from each sampling points falling within the particular grid. Having this data digitally inputted into a GIS system provides the possibility of producing a visual representation of the spatial sampling points spread around the Maltese Islands divided into 5 x 5 km grid map.

***Table 1**: Annual Arithmetic and Geometric Mean Indoor Radon Gas Concentration Levels (Bq/m^3)*

	Measurements in Bq/m^3				
	Mean	**Geometric Mean**	**Standard Deviation**	**Minimum**	**Maximum**
Maltese Islands	32	25	25	8	92
Malta	31	24	25	8	91
Gozo & Comino	36	28	26	17	92

***Table 2**: Annual Arithmetic and Geometric Mean Indoor Radon Gas Concentration Levels (Bq/m^3) for Summer and Winter periods.*

		Measurements in Bq/m^3		
	Measurement Period	**Arithmetic Mean**	**Geometric Mean**	**Standard Deviation**
Winter semester	November 2010 to May 2011	37	31	27
Summer semester	June to November 2011	27	21	22
Annual	November 2010-November 2011	32	25	25

***Figure 1**: Thematic map output showing the 5x5 km grid map with corresponding geometric mean annual indoor radon gas concentration values for each sampling point*

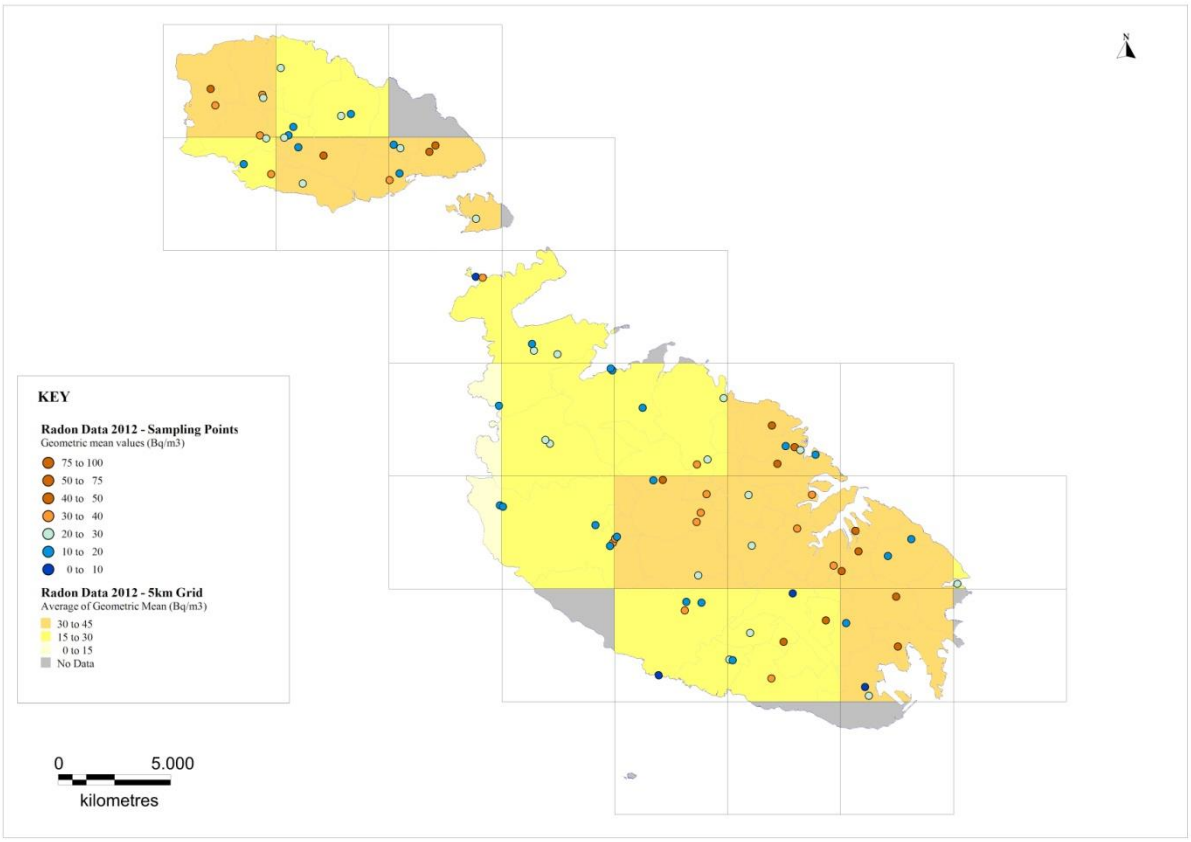
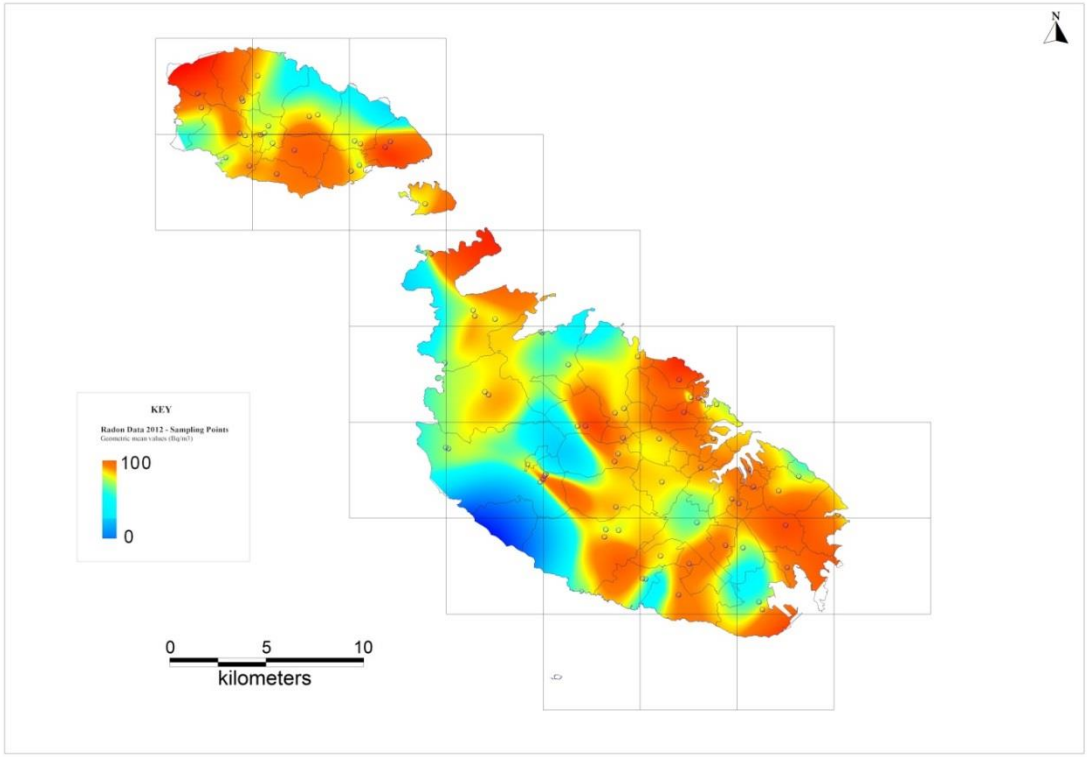


***Figure 2**: Thematic map output showing the Nearest Neighbour Analysis (NNA) radon gas concentration range based on each sampling point*



A Natural Neighbour Interpolation (NNA) map (Fig. 2) was plotted to indicate the highest-lowest range. This method creates natural neighbourhood regions for each data point and each grid cell. Cell values were derived using a point weighting system based on the area of overlap of the grid cells natural neighbourhood region and the regions of surrounding data points. This map gives an indication of the potential levels in between the locations. However, since in some cases the points are located considerable distances apart, such a map calls for further study based on a smaller point distance. This would refine the relationships between the points.

Discussion

Average radon levels vary widely within and between countries. Based on a review of European national radon surveys carried out by the Joint Research Centre (JRC) of the European Commission, the reported levels for mean annual indoor radon gas concentrations in European countries range from around 20 Bq/m^3 to 100 Bq/m^3.[9] Countries with mainly sedimentary soils (e.g. the Netherlands, Poland and the United Kingdom) present lower or equivalent averages, whereas those with old granite soils (e.g. the Czech Republic, Serbia-Montenegro and Finland) are more prone to radon emissions. Since outdoor radon concentrations are known to be low, most countries in the European region have concentrated radon monitoring in dwellings in order to assess human exposure.

Measurements for indoor radon surveys are usually carried out at ground floor level because radon seeps via ground, accumulates inside the building and is heavier than air. Various types of monitors are used for different time intervals in different countries making direct comparisons between country radon levels difficult to interpret. However, large scale surveys are usually carried out using alpha-track monitors for convenience of use.

Considering the linear exposure/response relationship between radon and lung cancer risk, the arithmetic mean annual indoor radon gas concentration is used to estimate the impact on public health[8], while the geometric mean is used to describe the geographical distribution of radon concentrations.[1] The geometric mean annual concentrations of the individual buildings were used in this survey to produce a national radon map in order to identify possible areas with higher than acceptable levels of radon.

The arithmetic mean annual indoor radon gas concentration for the Maltese Islands as established by this study is 32 Bq/m^3 which is below the proposed 100 Bq/m^3 WHO reference level. No single building in the study exceeded this level. Thus, when applying the NRPB criterion for identifying Radon Affected Areas (i.e. where the number of dwellings with concentrations higher then 200 Bq/m^3 exceeds 1%), no area in the Maltese Islands can be classified as radon-prone. Considering local geology and as indicated by the findings of the two previous local studies, this result was expected.

Diurnal and seasonal fluctuations in radon levels are also known to occur, again resulting mainly from the different indoor ventilation patterns one would expect during the everyday use of the site. The use of air-conditioning and fans also lowers the concentration of indoor radon by increasing air exchanges and movement. The division of the monitoring period into two 6-monthly intervals allowed an insight in the seasonal variations of radon concentrations. As expected, the mean annual indoor radon gas concentrations were lower during the summer period than those measured during the winter period (27 Bq/m^3 and 37 Bq/m^3 respectively). This difference is however small in magnitude. The climate in Malta is mild and frequent ventilation of buildings during the colder months is not unusual.

The high standard deviation of the mean values reported can be attributed to the high fluctuations in the mean annual indoor radon gas concentration normally found in inhabited buildings caused by behaviours such as level of ventilation and activity.

Ensuring strict adherence to supplier instructions regarding the placement of the two monitors in each location over each 6 month period was considered to be an important factor in this study, in order to ensure comparable radon exposures both between and within single buildings. However, due to the long exposure period, unwarranted movement of detectors by residents and users of the buildings surveyed could not be excluded.

Reference levels represent the maximum acceptable annual radon concentration in dwellings and are established at a national level. Two reference levels are usually set, one for existing dwellings and a separate one for future dwellings.[11] National authorities need to establish whether measures to reduce the indoor radon levels where these have been exceeded should be statutory or not.

Increasing the ventilation rate of the building or the use of air conditioning are effective ways of lowering radon levels in indoor air. Other mitigation measures include sealing cracks in floors and walls, under-floor sumps and extraction methods. Prevention of radon exposure in new buildings can be implemented through appropriate provisions during the construction phase.

Conclusions and recommendations

The mean annual indoor radon gas concentration for the Maltese Islands was determined by this study at 32 Bq/m^3 which is well below the proposed 100 Bq/m^3 WHO reference level. No single building in this study exceeded this recommended annual mean indoor radon gas concentration level.

This national survey of indoor radon gas concentrations in the Maltese Islands indicates that the proposed reference level of 100 Bq/m^3 currently being recommended by the WHO may be adopted as the national reference level for the Maltese Islands. This reference level may be used for consideration of the application of simple but effective remedial actions as described earlier should radon levels exceed this limit.
As mentioned earlier, a reference level does not specify a rigid limit below which there is no cancer risk. Although low level exposures can still lead to lung cancer, the risks at these levels are low and can be reduced further in both new and old buildings by simple mitigation measures aimed at reducing radon levels.

The authors of this study recommend the periodic repetition of an indoor radon national survey using new locations in order to be able to review and ascertain the validity and applicability of the national reference level for the mean indoor radon concentration for the Maltese Islands as proposed by this study.

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Original Article

Lifestyle, prevention, change & support: the views & attitudes of patients in Maltese family practice

Mario Sammut

Abstract

Introduction: General practitioners (GPs) are advised to consider their patients' views and attitudes in order to facilitate the success of preventive and health promotion interventions. This study explored patients' views and beliefs about the importance of lifestyle and preventive interventions, and assessed their readiness to make lifestyle changes and to receive support from GPs.

Methodology: Ten Maltese GP practices participated in a cross-sectional survey conducted by the European Network for Prevention and Health Promotion in Family Medicine/General Practice across 22 European countries during 2008-9. From each practice, 40 consecutive patients stratified by gender and age (10 males and 10 females aged 30-49 years, and 10 males and 10 females aged 50-70 years) were asked to complete a purposely-designed and piloted questionnaire.

Results: Seventy-seven per cent of smokers, ~60% of unhealthy eaters, inadequate exercisers and those with abnormal weight, but only 11% of excessive drinkers thought they needed to improve their unhealthy lifestyles. Thirteen per cent of smokers, 30% of excessive drinkers, and ~50% of patients with problems of diet, exercise and weight were confident they would succeed. Sixty per cent of patients with diet, exercise and weight problems, 50% of smokers and just 8% of excessive drinkers would have liked GPs' support.

Conclusion: GPs and healthcare professionals need to discuss risky lifestyles with patients to help them personalise such risks, and should offer their support to those wishing to change so as to improve their confidence and chances of success. Such discussion and support are especially important for excessive drinkers.

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Key Words

Family practice; health promotion; health knowledge, attitudes, practice; health behavior; Malta

Introduction

An important core competence of the family doctor / general practitioner (GP) is the promotion of health and well-being by applying appropriate strategies, which include patient empowerment and self-management.[1] GPs have been advised to consider their patients' views in order to facilitate the success of health promotion interventions.[2] In fact, the Ottawa Charter for Health Promotion defines health promotion as "the process of enabling people to increase control over, and to improve, their health".[3]

This study attempted to substantiate the importance of patient involvement in GPs' health promotion initiatives by exploring patients' views and beliefs about the importance of lifestyle and disease prevention, and their readiness to make lifestyle changes and to receive support from GPs.

Rationale & Purpose of Study

EUROPREV - the European Network for Prevention and Health Promotion in General Practice / Family Medicine (http://www.europrev.woncaeurope.org/) is a network organisation within WONCA (World Organisation of Family Doctors) Region Europe – The European Society of General Practice / Family Medicine. The network was set up in 1996 with the aim of promoting evidence-based prevention and health promotion in general practice, and the encouragement of multicentre research and educational programmes as one of its objectives.[4]

Following a EUROPREV survey on the views of European GPs regarding prevention and health promotion in clinical practice[5] carried out in 2000, the EUROPREVIEW patient study was undertaken during 2008-9 with the objectives of exploring the views and beliefs of patients about the importance of lifestyle and preventive interventions, to assess their readiness to make changes to their lifestyle (diet, physical activity, weight loss, quitting smoking and safe alcohol consumption) and to assess their willingness to receive support from GPs.[6]

Method

The EUROPREVIEW Study consisted of a cross-sectional survey of 7947 patients in 22 European countries, namely Austria, Belgium, Croatia, Cyprus, Finland, France, Georgia, Germany, Greece, Hungary, Ireland, Italy, Lithuania, Malta, the Netherlands, Poland, Portugal, Slovakia, Slovenia, Spain, Sweden and Turkey. A purposely-designed questionnaire was developed in English and piloted in each participating country, being translated to the local language where necessary (Maltese in the case of Malta).

The questionnaire was made up of four sections as follows:

1. Demographic and clinical data (10 questions);
2. Information on patients' lifestyle (13 questions);
3. Information on patients' views regarding health promotion and disease prevention (5 questions);
4. Information about the care provided by the GP/team (2 questions).

Research assistants asked forty consecutive patients from each of ten practices in every country to complete the questionnaire. The ten GP practices from Malta were divided equally into five private practices (in Żebbuġ, Luqa, Tarxien - all solo - and Żabbar - one solo and one group practice) and five government health centres (Rabat, Mosta, Qormi, Ġzira and Floriana). The patients consisted of ten males and ten females within the 30-49 year age-group and another ten males and ten females from the 50-70 year age-group. Patients were selected on different days of the week, and from more than one week in a month if necessary, in order to reach the proposed sample size.

Data from the completed questionnaires were entered into a secure webpage for analysis at the EUROPREV centre in Barcelona, Spain. The Maltese data underwent further Chi-Square statistical analysis using the software SPSS (Statistical Product and Service Solutions).

Ethical considerations

Eligible patients were asked to read a patient information sheet providing details about the study and assuring them that the data was being gathered anonymously for analysis under the supervision of EUROPREV. Before filling in the questionnaire, patients agreeing to take part were asked to sign an informed consent form. Research ethics permission was provided in Malta by the University of Malta Research Ethics Committee.

Results

To attain the target of 400 patients in Maltese GP practices, 494 participants were asked to participate, giving an 81% response rate. Of the 94 participants who declined to participate, 51 (54%) were female.

Demography

Out of the 205 patients (51.3%) in the 30-49 year age-group, 106 (51.7%) were women, while from the 195 patients (48.8%) within the 50-70 year age-group, 101 (51.8%) were females. Three hundred and twenty-two (80.5%) of the participants were married, 257 (64.3%) had a secondary level of education, while 183 (45.8%) were employed and 119 (29.8%) were housewives.

Patients' clinical data and lifestyle

Ninety-eight (24.5%) and 159 (39.8%) of participants declared that they visited their GP 3 to 4 times and 5 or more times respectively during the previous year. Figure 1 depicts the ailments by gender as reported by the patients taking part, while participants' reported lifestyles are shown in Table 1.

Patients' views regarding health promotion and disease prevention

Questions on the views of participants regarding prevention and health promotion were based on the stages of change in the trans-theoretical health behaviour model devised by Prochaska & DiClemente[7] as follows:

- Pre-contemplation: How important for your health is …?
- Contemplation: Do you think you need to …?
- Preparation: Do you plan to change your …?
- Action: How confident are you that you can …?
- Maintenance: Would you like to receive support/advice from your GP to …?

Details of the replies to these questions may be seen in Tables 2 to 6.

Care provided by the GP/team

Participants were asked if their GP/team ever initiated a discussion about their health behaviours: their answers are revealed in Table 7. Table 8 shows what kind of support participants would like to receive from their GP/team if such support was desired.

Figure 1: *Participants' reported ailments by gender (percent)*

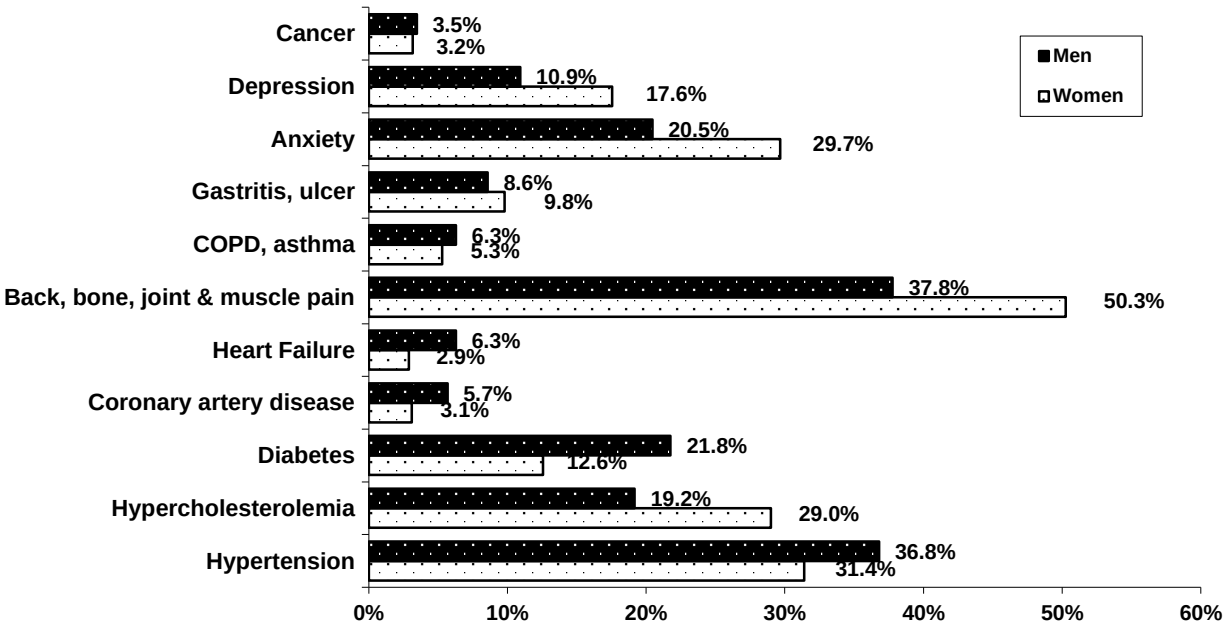

Table 1: *Participants' reported lifestyle (percent)*

Smoking					
Never		*Past*		*Present*	
60%		18%		22%	
Alcohol					
Nil	*<1 x / month*	*2-4 x / month*	*2-3 x / week*	*4+ x / week*	*Missing answer*
52%	10%	10%	17%	10%	1%
Eating					
Very healthy	*Healthy*	*Relatively healthy*	*Rather unhealthy*	*Very unhealthy*	
9%	40%	28%	21%	2%	
Exercise					
2-3+ x / week		*<2 x / week*		*Never*	
64%		8%		28%	

Table 2: *Participants' replies to the question 'How important for your health is …?' (percent)*

	Important / very important	*Slight importance*	*Not important*	*Missing answer*
Not smoking	88%	4%	5%	3%
Safe / no alcohol use	88%	3%	5%	4%
Healthy eating habits	94%	4%	1%	1%
Regular physical activity	87%	7%	5%	1%
Normal body weight	92%	5%	1%	2%

Table 3: *Participants' replies to the question 'Do you think you need to …?' (percent)*

	Yes	*Don't know*	*No*	*Missing answer*
Stop smoking (if smokers)	77%	10%	11%	2%
Reduce alcohol use (if excessive)	11%	3%	82%	4%
Improve eating habits	50%	3%	45%	2%
Do more physical activity (if <90 min / week)	69%	1%	28%	2%
Improve body weight (if not normal)	56%	2%	40%	2%

Table 4: *Participants' replies to the question 'Do you plan to change your ...?' (percent)*

	Currently changing	*Next 6 months*	*Don't know*	*No intention*	*Missing answer*
Smoking habit (if smoker)	9%	19%	29%	36%	7%
Alcohol use (if excessive)	14%	16%	12%	32%	26%
Eating habits (if not controlled)	26%	28%	11%	30%	5%
Physical activity (if <90 min / week)	15%	45%	12%	21%	7%
Body weight (if not normal)	34%	33%	11%	16%	6%

Table 5: *Participants' replies to the question 'How confident are you that you can ...?' (percent)*

	Confident / very confident	*Doubtful*	*Not at all*	*Missing answer*
Quit smoking (if smoker)	13%	44%	40%	3%
Reduce alcohol intake (if excessive)	30%	27%	27%	16%
Improve eating habits (if not controlled)	56%	29%	11%	4%
Increase physical activity (if <90 min / week)	49%	32%	14%	5%
Improve body weight (if not normal)	47%	36%	10%	7%

Table 6: *Participants' replies to the question 'Would you like to receive support/advice from your GP to …?' (percent)*

	Yes	*Don't know*	*No*	*Missing answer*
Give up smoking (if smoker)	50%	19%	28%	3%
Reduce alcohol use (if excessive)	8%	5%	83%	4%
Improve eating habits (if not controlled)	65%	8%	22%	5%
Increase physical activity (if <90 min / week)	61%	9%	26%	4%
Reach a normal weight (if not normal)	62%	10%	22%	6%

Table 7: *Participants' replies to the question 'Has your GP/team ever initiated a discussion about your …?' (percent)*

	Yes	*Don't know*	*No*	*Missing answer*
Smoking habits	18%	1%	66%	15%
Alcohol use	10%	1%	75%	14%
Eating habits	47%	1%	49%	3%
Physical activity	47%	3%	47%	3%
Body weight	42%	2%	52%	4%

Table 8: *Participants' replies to the question 'If you want support, what kind would you like to receive from your GP/team?' (percent; replies possible to multiple categories)*

	Information leaflets	*Individual counselling*	*Group counselling*	*Referral to special care*	*No answer*
Give up smoking	40%	27%	17%	18%	18%
Reduce alcohol	23%	5%	5%	8%	61%
Improve eating	46%	23%	8%	13%	21%
Increase activity	41%	26%	9%	13%	21%
Normalise weight	43%	26%	7%	13%	23%

Statistically-significant associations

A number of significant relationships were found between patients' contemplation for lifestyle change and provision of support. Patients who took part in the survey were more likely to think they needed to improve their eating habits if the GP/team initiated a discussion about their body weight (p=0.025) or their blood pressure (p=0.028). Smokers were more likely to think that they needed to quit if the GP discussed their smoking habits (p=0.000), while drinkers were more likely to think that they needed to reduce their alcohol use if this was discussed (p=0.000).

Other significant relationships were noted between contemplation for change and the type of support preferred. Patients who thought they needed to improve eating habits preferred individual counselling (p=0.002), group counselling (p=0.025) and information leaflets (p=0.029). Smokers who thought they needed to quit preferred individual counselling (p=<0.001), group counselling (p=0.001), information leaflets (p=0.003) and referral to special care (p=0.018).

Discussion

Nine out of 10 patients believed that not smoking, safe/no alcohol use, healthy eating habits, regular physical activity and normal body weight are important for their health. However fewer patients thought they needed to tackle their harmful lifestyles (77% of smokers; 69%, 56% and 50% of inadequate exercisers, those with abnormal weight and unhealthy eaters respectively; and 11% of excessive drinkers). The most striking difference was for alcohol, with a 77 percentage-point disparity between the importance given by patients to safe or no alcohol use (Table 2) and users of excessive alcohol thinking they need to cut down (Table 3). This discrepancy was also evident, although less striking at 53 percentage points, with reference to alcohol in the EUROPREVIEW Europe-wide survey.[6] Similarly, in a study of primary care patients in the U.S.A., while over 90% drank more than they should, only 24% contemplated changing their alcohol use.[8]

Twenty-eight per cent of smokers, 30% of excessive drinkers and 54%, 60% & 67% of patients with problems of diet, physical activity and weight respectively were changing, or planning to change within 6 months. But in the majority of health behaviours – three out of five – they were less confident they would succeed (13% of smokers, 30% of excessive drinkers, and 56%, 49% & 57% of patients with problems of diet, physical activity and weight respectively). The biggest discrepancy between planning to change (Table 4) and confidence in succeeding (Table 5) was for smoking at 15 percentage points, which was nearly double the 8 percentage-point difference found in the EUROPREVIEW study.[6] This lack of confidence echoes the findings of a Maltese study of applicants to smoking-cessation clinics during 1991-96, where 87% reported a feeling of heavy dependence on tobacco and 84% declared one or more prior attempts to stop smoking.[9]

While just over 60% of patients with diet, physical activity and weight problems and 50% of smokers would appreciate their GPs' support, only 8% of excessive drinkers request their help (Table 6). Similarly, while about 45% of GPs initiated discussions with patients about eating, physical activity and weight, just 18% of GPs discussed smoking, and only 10% brought up alcohol use (Table 7). The European data from the EUROPREVIEW survey showed less evident but still appreciable discrepancies between alcohol use and the other behaviours regarding users' desire for support and their GPs actually providing it.[6] Prior studies from both sides of the Atlantic had also revealed that doctors in the primary care setting talked to patients about alcohol use less often compared to other health behaviours.[10,11,12] One possible reason for this could be doctors' own drinking habits (only 37% of Maltese GPs have declared that they do not drink alcohol[13]) in view of the finding that GPs have found it hard to help patients with behaviours that they themselves struggle with.[14] Other causes postulated by GPs for their reluctance to discuss alcohol use with patients include shortage of time and fear of negatively affecting the doctor-patient relationship.[15]

In 2000, Maltese GPs reported that they advised patients to perform physical exercise, lose weight, quit smoking and drink less alcohol in 59-62%, 60-61%, 61-66% and 60-62% of cases respectively.[13] On the other hand, Maltese patients questioned in this 2008-9 survey stated that GPs discussed these topics less often (Table 7): in 47% of cases regarding physical activity, 42% re body weight, 18% for smoking and only 10% regarding alcohol use. Therefore it seems that patients have a more negative perspective on how often doctors give advice regarding health behaviours, with the biggest divergence of opinion being for advice given regarding alcohol use.[6] This apparent lack of support provided by GPs to patients with unhealthy behaviours is quite unfortunate given the statistically-significant link revealed by this study between doctors' discussion of body weight and alcohol use and patients' contemplation for improving eating habits and reducing alcohol use respectively.

Limitations of study method

One limitation of this study is that replies to the questionnaire are based on patients' recall rather than on documentation, with another limitation being that participants could have under-reported their unhealthy lifestyles in order to avoid giving a negative impression. Furthermore, certain behaviours such as alcohol intake may have been more difficult to quantify than others such as cigarette smoking.

Despite the high 81% response rate and the

distribution of questionnaires to patients in both government health centres and private practices, the results may not be representative of all practices in Malta as those that accepted to participate might have had a greater interest in prevention / health promotion activities than others that did not.

Concluding Recommendations

While patients do recognise the importance of unhealthy lifestyles, GPs and healthcare professionals (HCPs) need to discuss risky lifestyles with patients to help them personalise such risks. Motivational interviewing using the trans-theoretical method, based on a good relationship between the patient and doctor/HCP, are crucial in helping patients to recognise the need for a change in their health behaviours and to implement advice that is provided.[13,14]

Furthermore, GPs and HCPs should also offer their support to patients planning to change their unhealthy lifestyles in order to improve their confidence and chances of success. Healthcare professionals may play an important role here through providing such assistance given the heavy workload of general practitioners.[13]

The provision of discussion and support by GPs/HCPs is especially important for excessive drinkers in helping them realise their problem and in tackling it (as long as they are willing to do so), particularly as brief screening and advice during clinic visits have long been proven to be successful in reducing alcohol use.[16,17]

While the apparent reluctance of GPs to engage problem drinkers may be overcome by the provision of appropriate training[12,15], additional research into alcohol abusers' poor insight into their predicament and their lack of desire for support could shed some light on these problems and help in the formulation of appropriate solutions.

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Crusted (Norwegian) scabies treated with oral ivermectin: A case report and overview

Charmaine Apap, Tonio Piscopo, Michael J.Boffa

Abstract

Crusted (Norwegian) scabies is a severe and highly contagious form of infestation caused by the mite *Sarcoptes scabiei* var. *hominis*. It occurs in a subgroup of patients who are either immunocompromised or physically or mentally debilitated. Due to its atypical clinical presentation as well as difficulties associated with its management it presents a number of challenges both from a therapeutic aspect as well as from public health perspective. Failure to diagnose this condition may give rise to a massive epidemic when the patient is in an institutional setting.

We describe a case of crusted scabies which occurred in a nursing home leading to an institutional outbreak. She received a combination of oral ivermectin and topical scabicidal with good results.

This case highlights the importance of being alert to the possible diagnosis of crusted scabies and gives an overview of the condition as well as management strategies.

Keywords

Crusted scabies, *Sarcoptes scabiei*, ivermectin, institutional outbreaks

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Introduction

Scabies is an inflammatory disease of the skin caused by the burrowing mite *Sarcoptes scabiei* var. *hominis*. It is a common worldwide problem affecting as many as 300 million people worldwide annually.[1-2] Data collected by the Royal Infirmary of Edinburgh from 1815 to 2000 indicate a prevalence of about 5%, with rising incidence and prevalence during war-time.[3] In a recent study carried out in the UK, the mean prevalence was 2.27 in 1000 for boys and men and 2.81 in 1000 for girls and women.[4] It occurs in all age groups, races and socio-economic groups, although institutionalization, poverty, poor hygiene, overcrowding, undernourishment and sexual promiscuity have been proposed as significant risk factors.[4] It has a history as long as mankind as has been described by Aristotle (384 BC – 322 BC) and in the Old Testament.

Crusted scabies was originally called Norwegian scabies because the condition was first described in Norway in 1848 among patients with leprosy.[5] In fact, it may occur in any subject who is immunocompromised, malnourished, debilitated or has sensory impairment.

Case Report

A 92-year-old lady, resident in a home for the elderly, was admitted to Mater Dei Hospital because of an elevated INR greater than 10. On examination by the admitting firm she was noted to have a widespread, excoriated scaly eruption.

The patient had been bed-bound for several years and suffered from dementia and longstanding paresis, due to cerebrovascular disease. She was on long term bumetanide, warfarin, perindopril and iron supplements (Ferroglobin). Direct history taking was not possible because of her mental state. According to her carers the patient had had increasing skin scaling for several months, initially on the hands and scalp, gradually becoming more widespread. For some time she had been treated with topical steroid creams for presumed psoriasis with no improvement; more recently generalised erythema had appeared.

On examination there were large areas of warty crusting on the hands, feet and scalp with thickening and fissuring of the palms and soles (Figs 1,2). The fingernails were thickened and discoloured with scaly debris evident in the distal subungual spaces. In addition, there was generalised erythema with widespread excoriated papules,

particularly over the breasts, axillae and abdomen. No typical scabetic burrows were identified. The patient was visibly uncomfortable and constantly attempting to scratch her skin, although she was unable to do so effectively because of her neurological state and flexural contractures.

A clinical diagnosis of crusted (Norwegian) scabies was made and one application of 0.5% malathion lotion (Derbac-M®) applied. In view of the extent and severity of skin involvement a decision was made to transfer the patient to the Dermatology ward at Sir Paul Boffa Hospital for further management. She was treated systemically with oral ivermectin (Stromectol) 6 mg (equivalent to 200µg/kg). She was simultaneously treated topically with 2 applications of 5% permethrin cream (Lyclear® dermal cream) applied, 3 days apart, to all the skin surface, including the scalp, and left on for 12 hours. She was also given a one-week course of oral flucloxacillin in view of the generalised erythema thought likely to be secondary to staphylococcal skin sepsis. The patient was nursed in a single room and members of staff who came in contact with her were instructed to wear gloves and long-sleeved gowns to avoid infection. The fingernails were trimmed and subungual debris removed. The generalised erythema subsided within a few days. However, since after 1 week significant crusting was still present, especially on the palms and scalp, the patient was retreated with oral ivermectin 6 mg (2 doses 2 days apart) and a further application of permethrin cream. The skin eventually cleared completely and she was discharged back to her nursing home 2 weeks after admission. She remained clear when reviewed at the home 6 weeks later.

The case was notified to the Public Health Department. It transpired that other cases of scabies in residents of the same home had recently been reported. The home was visited by public health physicians and a dermatologist (MJB) and all residents, staff and contacts were treated. Ivermectin was prescribed to the most severely affected cases.

Discussion

Crusted scabies is a clinically distinct and highly contagious form of scabies. It presents several clinical challenges including diagnostic and therapeutic ones as well as posing a particular public health problem. Crusted scabies occurs when the host's response to the mite is altered or inadequate (Table 1). It may occur in immunosuppression due to disease such as HIV or lymphoproliferative disorders as well as iatrogenic causes including post-transplant patients and those on drugs which modify the immune response such as long-term corticosteroids. Given its increased use in dermatology, rheumatology and gastroenterology it is pertinent to note that there has been a report of a case of scabies occurring during treatment with infliximab.[6] Inappropriate use of potent topical steroids may predispose to this condition as well. In addition it may develop in the context of severe systemic illness or when there is neurological disease which either causes immobility and a reduced ability to scratch and thus dislodge the mites or gives rise to reduced sensation.

***Table 1**: Factors predisposing to crusted scabies*

- Immunosuppression
  - Post-transplant patients
  - HIV/AIDS, HTLV-1
  - Leukaemia, lymphoma
  - Drugs e.g. corticosteroids, immune modulators
- Severe systemic disease
  - Rheumatoid arthritis or other severe arthropathy
  - Systemic lupus erythematosus
  - Epidermolysis bullosa
- Neurological disease
  - Paresis
  - Dementia
  - Mental illness
  - Down's syndrome
  - Sensory neuropathy

In these patients there is a reduced reaction to the mite due to failure of the skin immune system to mount an effective response. It has been reported that in such cases there is a predominance of infiltrating CD8+ T lymphocytes in the dermis with minimal helper T lymphocytes (CD4+) and an absence of any B cells.[7] There may also be a reduced physical response to the mite (i.e. diminished scratching) or both these factors working in tandem. This results in absent or diminished symptoms (only about 50% of patients with crusted scabies have an itch) as well as giving rise to atypical and exaggerated clinical signs.

Due to the altered host response to the mite, the clinical presentation differs considerably and this may give rise to difficulty in diagnosis with resultant delay in proper treatment. In cases where the patient lives in an institution this poses a public health risk as this form of scabies is highly contagious due to the fact that there may be hundreds of thousands of mites present on the host, whereas there are usually only 10-20 females in classical scabies.[8] Such patients shed large amounts of scale which contain vast quantities of mites.

Crusted scabies presents as a hyperkeratotic eruption particularly marked on the palms and soles which may be

fissured and/or warty. This may be accompanied by erythema and scaling on the face, neck, scalp and trunk which may become generalized. There is frequently an accumulation of scaly debris under the nails. It occasionally presents as erythroderma as in this case. *Staphylococcus aureus* colonizing burrows might play a part in initiating the erythroderma.[9] Secondary infection may also occur with other organisms, commonly *Streptococcus pyogenes* and this leads to increased mortality in this subgroup of patients.[10] Patients may also have generalised lymphadenopathy and frequently exhibit eosinophilia and elevated total IgG and extremely elevated IgE levels (up to ten times normal levels).[7]

As it mimics other common dermatoses such as psoriasis, eczema and contact dermatitis the diagnosis of scabies should always be kept in mind particularly when examining patients in the at-risk categories who, in addition, may be unable to give a proper history. It is frequently misdiagnosed as "senile pruritus" by primary caregivers and is treated with topical corticosteroids which aggravates the condition and leads to further delay in treatment.

Treatment

Crusted scabies presents a treatment challenge for several reasons. The huge burden of infestation usually requires several treatments and relapse is common. Although treatment with a combination of topical and oral treatment is generally recommended[11-12] the presence of a compromised skin barrier function may lead to a greater risk of toxicity through increased skin absorption. In addition local side-effects such as skin irritation and a burning sensation may be exacerbated in this situation.

The Centers for Disease Control and Prevention (CDC) currently recommends combined treatment with a topical scabicide and repeated treatment with oral ivermectin 200μg/kg on days 1, 2, 8, 9, and 15. Additional treatment on days 22 and 29 might be required for severe cases. Ivermectin should be combined with the application of either 5% topical benzyl benzoate or 5% topical permethrin (full body application to be repeated daily for 7 days then 2 times weekly until release from care or cure).[11] This is in contrast to classical scabies which usually only requires 2 applications, one week apart, of a topical scabicide.

Ivermectin binds selectively to receptors in the peripheral motor synapses of the mite, blocking chemical transmission of g-aminobutyric acid (GABA)-gated chloride channels localized in the CNS. This stimulates the discharge of GABA at the nerve endings of endoparasites, increasing the affinity of GABA in the receptor at synapses and causing interruption of the nerve impulses, producing paralysis and death of parasites.[13] Ivermectin is relatively safe. Reported adverse reactions include fever, headache, chills, arthralgia, rash, eosinophilia, and anorexia. However, many of these symptoms are thought to result from the death of parasites rather than as a reaction to the drug.[14]

There are several advantages to using oral ivermectin over standard topical scabicides.[15] These include high efficacy, ease and rapidity of application and avoiding the irritation caused by topical treatments. It also mitigates to some extent for improper/inadequate application of topical agents (this may apply in particular to institutional outbreaks where staff may have to deal with many cases concurrently). It is thus convenient for persons who are bedridden and immunocompromised.

In crusted scabies, topical scabicides should be applied from head to toe including the scalp, face, ears and flexures and left in contact with the skin for the recommended amount of time (usually 12 hours for permethrin and 24 hours for malathion). Several treatments are usually needed. Special attention should be paid to the nails as they are frequently a haven for mites and thus a source of recurrence/treatment failure. Nails should thus be clipped short and any subungual debris removed. Topical agents should then be applied to the subungual space and nailfolds.

Secondary bacterial infection should be treated with appropriate antibiotics as this is a major cause of morbidity and even mortality.

Since topical treatments tend to cause irritation and xerosis of the skin they should be followed by the liberal use of emollients. A sedating antihistamine may be necessary for a few days to control the itching and allow for undisturbed sleep.

Other control measures

In cases where an institution is involved, environmental control measures should include patient isolation until therapy is completed, barrier precautions with long-sleeved gowns and gloves, and screening and synchronous treatment of infected caregivers and close contacts. Visitors should be limited to reduce opportunity for spread.

The bedding and clothing used by a person with crusted scabies should be collected and transported in a plastic bag and emptied directly into washer to avoid contaminating other surfaces and items; all items should be machine-washed and dried using hot water and high heat cycles (temperatures in excess of 50°C for 10 minutes will kill mites and eggs); laundry personnel should use protective garments and gloves when handling contaminated items. Items that cannot be washed should be sealed in a plastic bag for 72 hours.[12]

Public health officials should be involved as soon as the diagnosis is made to guide the institution regarding best practice in this situation as well as to monitor the outbreak

and make sure all contacts are traced and treated. Moreover, when the patient has been harbouring the infestation for many months (as in this case) it is essential to trace any staff that may have left for another job in the meantime. This is important both for the individuals involved as well as to avoid transfer of the infestation to other institutions. Similarly, this should also be applied to any residents that may have recently left the facility.

Conclusion

Crusted scabies is a distinct form of scabies affecting patients who are debilitated and it is a severe form of infestation with the mite *Sarcoptes scabiei* var. *hominis*. It often poses a challenge as it is frequently misdiagnosed for other dermatoses. Once diagnosed there are also pitfalls in the treatment due to the number of organisms present as well as to general conditions affecting this subgroup of patients. A combination of topical and systemic treatment is necessary for adequate control and this must be accompanied by public health measures. This case clearly demonstrates the consequences of a delay in diagnosis as well as the highly contagious nature of crusted scabies as it resulted in a large outbreak affecting many of the residents as well as members of staff and took several months to be completely eradicated. It is therefore very important for healthcare staff to be aware of the possibility of such a diagnosis and maintain a high index of suspicion, if necessary referring early for specialist dermatological review so that timely treatment may be instituted.

Figure 1*: Crusty plaques on scalp.*

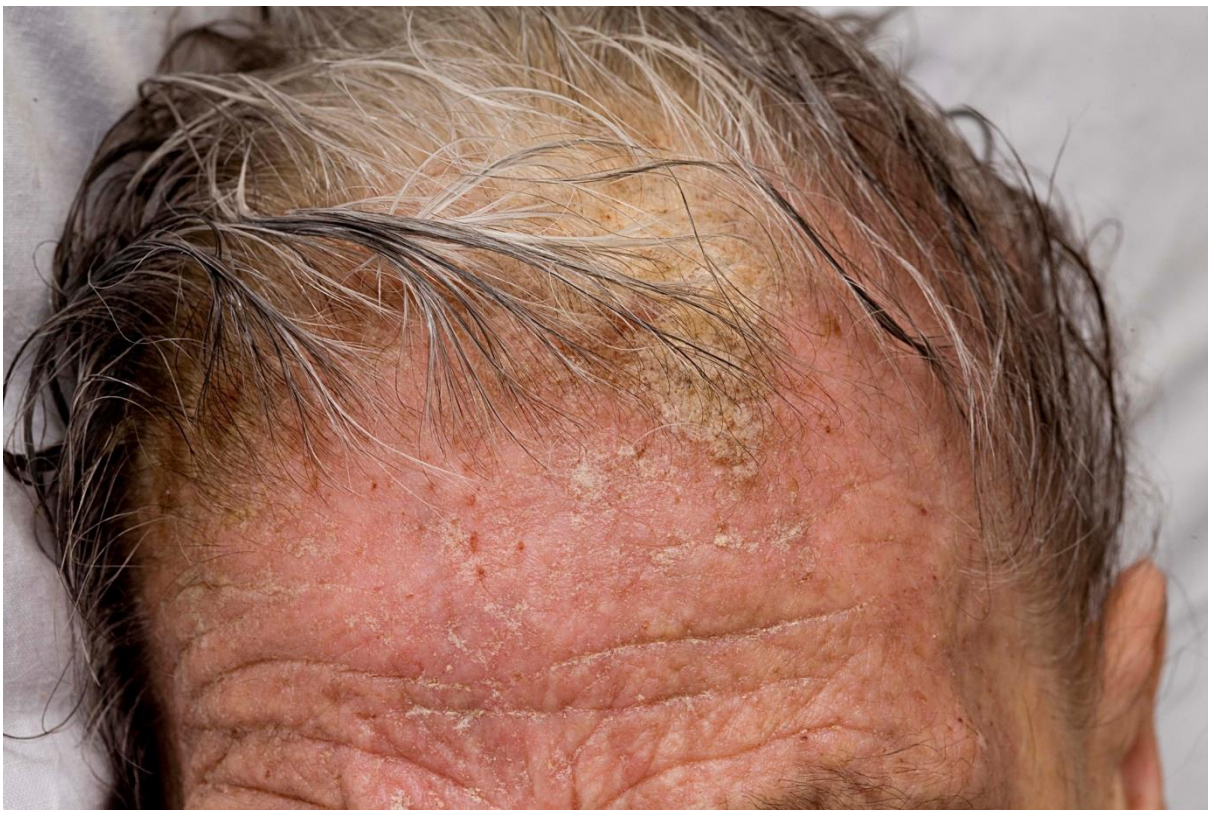
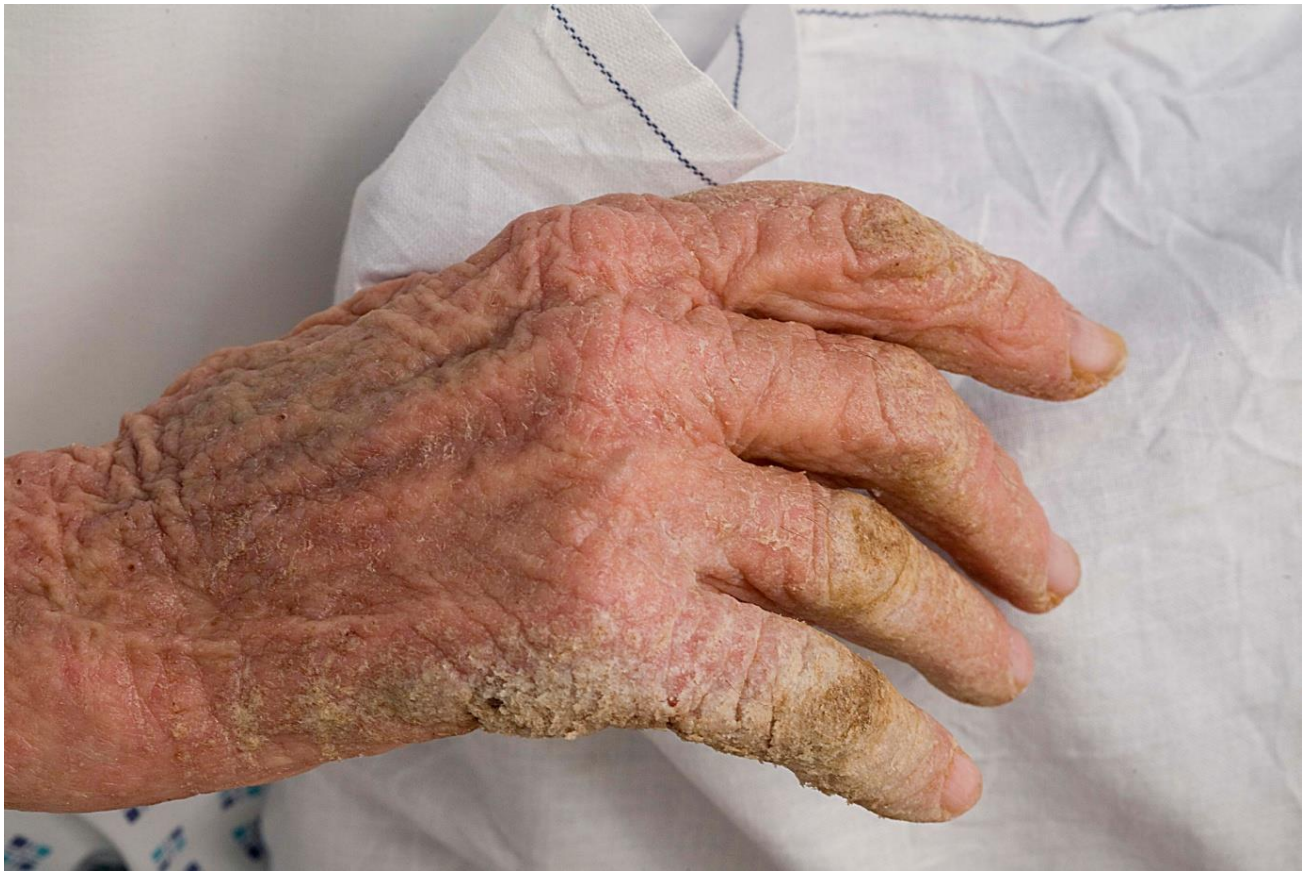


***Figure 2**: Hyperkeratotic, fissured hands*



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Original Article

Arterial access site in the catheterisation lab – Is radial the way to go?

Mark Philip Cassar

Abstract

Aim: With radial access increasing in popularity in the United States and the United Kingdom, this literature review explores whether radial access in coronary angiography and percutaneous coronary intervention is superior to femoral access, focusing on access site complications and mortality.

Methodology: Articles were acquired using:

Pubmed. The keywords used were: bleeding, complications, femoral access, radial access, radial artery catheterization, angiography, radial versus femoral, access site, and mortality.

The European Society of Cardiology (ESC) website
The National Library of Medicine
A retrospective audit, comparing radial access utilisation in Malta for the years 2011 and 2013 (1/1/2013 – 23/8/2013) was carried out using data from the cardiac catheterisation suite in Mater Dei Hospital.

Results: Radial access was associated with fewer access site complications, decreased mortality, and quicker patient mobilisation post-procedure. The success of radial access was associated with a learning curve, and heavily operator dependent.

Radial access utilisation in Malta for the years 2011 and 2013 (1/1/2013 – 23/8/2013) increased over three fold.

Conclusion: The routine use of the radial approach in patients undergoing coronary intervention should be encouraged.

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In recent years, radial access has garnered support among cardiologists, and for good reason; in 2012, Tavris et al. found bleeding and vascular complications to be the most common non-cardiac procedure-related adverse event in percutaneous coronary interventions (PCIs) performed via femoral access.[1] Combined with the difficulty in the application of effective compression to the femoral artery, radial access seems to be an attractive alternative.

History of radial access

Radial artery use for coronary angiography was first described in 1989, in the hope that an alternative to percutaneous cut-down arteriotomy of the brachial artery and percutaneous axillary and femoral techniques could be found, since these procedures were associated with rare vascular complications that frequently required surgical intervention. Campeau L attempted percutaneous radial artery catheterisation in 100 patients, achieving a success rate of 90%.[2] Only 2 patients suffered complications, neither associated with ischaemia of the hand.

Reducing access site complications

Radial access has the inherent advantage that the radial artery is easily compressible, allowing for effective control of haemorrhage. Moreover, no major nerves are located in its vicinity, minimising the risk of inadvertent nerve injury. Finally, the patient is able to mobilise immediately after the procedure, permitting early discharge. However, one must question whether radial access, with the above mentioned advantages, does translate into better outcomes in patients.

In 2004, a meta-analysis was published by Agostoni et al.[3] This involved 3224 patients, comparing radial and femoral approaches for interventional and diagnostic procedures. The primary clinical outcomes were major adverse cardiovascular events [MACE – death, myocardial infarction, emergency PCI or coronary artery bypass graft (CABG)], entry site complications (including bleeding – defined as requiring transfusion, prolonged hospital stay or surgery) and procedural failure. The results were far from encouraging – Transradial and transfemoral access yielded similar rates of MACE, with the transradial approach having a significantly higher number of procedural failures. Interesting to note was that the most recent trials showed no difference in procedural

failure between the two techniques, suggesting that operator skill plays a major role in the success rates of radial catheterisation.[4,5] The transradial approach was, however, advantageous in virtually abolishing entry site complications (5 vs 32 in the femoral access group).

The effect of bleeding on mortality

In 2006, Eikelboom et al. published a data analysis of over 30,000 patients enrolled in the OASIS, OASIS-2 and CURE trials.[6] The results showed that major bleeding in patients with acute coronary syndromes was associated with a 5 fold increase in the risk of death, remaining evident after adjustment for baseline characteristics. There was also an incremental relation between severity of bleeding and death.

With radial access reducing access site complications, and the observed relationship between major bleeding and death, the next step was to investigate whether radial access reduced major bleeding and/or death. With 3,224 patients, the initial meta-analysis may have been underpowered to show a reduction in mortality in the radial arm.

In 2008, results from two studies were published; the M.O.R.T.A.L retrospective study by Chase et al. looked at the relationship between transfusion requirements and access site choice,[7] whilst Jolly et al. looked at the relationship between major bleeding (defined as fatal bleeding, intracranial haemorrhage, bleeding associated with ≥3 g/dL haemoglobin drop, or requiring transfusion or surgery) and access site, and whether decreased bleeding may be linked with fewer deaths and ischaemic events.[8]

In the M.O.R.T.A.L study, radial access halved the transfusion rate and was associated with a statistically significant reduction in 30-day and 1 year mortality.
Jolly et al. only found a statistically significant reduction in major bleeding. Despite fewer occurrences in the radial access group for the composite of death, MI or stroke (2.5% vs 3.8%), statistical significance was not reached. The data did not favour radial access; procedural times were significantly longer, although there was significant heterogeneity, again suggesting operator experience being crucial in radial access.

Radial access and mortality

The M.O.R.T.A.L study, a retrospective analysis, could only propose a hypothesis of decreased mortality with radial access. The next stage of research was predictable: in 2011, the RIVAL study by Jolly et al. was published, comparing radial versus femoral access for coronary angiography and intervention;[9] 7,021 patients with ACS were randomly assigned to radial or femoral artery access. The primary outcome was a composite of death, MI, stroke, or non-CABG related bleeding at 30 days. Radial access did not significantly reduce the primary outcome, but significantly reduced vascular access complications compared with femoral access. Possible reasons cited for the absence a statistically significant reduction in non-CABG related major bleeding with radial access include:
-Rigorous criteria for a complication to qualify as a major bleed (fatal/hypotension requiring inotropes/surgical intervention/severely disabling sequelae/intracranial or intraocular/Hb drop of at least 5 g/dL).

Operators in RIVAL were high volume cardiologists (median PCI volume of 300/year), which may have led to the much lower observed risk of bleeding than anticipated in femoral artery access.

Despite these limitations, sub-group analysis did show a significant decrease in the primary outcome in procedures performed by high volume operators (operators performing >142 radial PCIs per year), as well as a reduction in the secondary outcomes of death, myocardial infarction, stroke and overall mortality in patients with STEMI.[9] This suggested that outcomes with radial access might be linked to expertise and operator volume, findings echoed in previous studies.

In the setting of high volume operators and STEMI patients, would radial access be expected to deliver statistically significant results? In 2012, the RIFLE study addressed this question.[10] 1,001 acute STEMI patients were randomised to radial or femoral access, all treated at high volume centres, with less rigorous bleeding criteria than in RIVAL (any bleeding not related to CABG with 3g/dl decrease in Hb or more).
The results were dramatic – radial access showed a significant lower incidence of death (43% lower mortality), together with a lower risk of access site bleeding and transfusion requirements. In contrast with previous studies showing prolonged procedural times, the RIFLE trial showed no differences in the symptom-to-balloon and door-to-balloon times, attributable to operators being familiar with the procedure. Hospital stay was also shorter in the radial group (3 days vs 4 days). This, together with the reduced need for transfusions, may render radial access more attractive from the cost point of view.

The push for radial access

Responding to this mounting evidence, guidelines for the treatment of ST segment elevation myocardial infarction were published by the European Society of Cardiology in 2012,[11] advocating radial in preference to femoral access for primary PCI, when performed by an experienced radial operator (class IIa, level B evidence).
A position paper in 2013, published by the European Association of Percutaneous Cardiovascular Interventions and Working Groups on Acute Cardiac Care and Thrombosis of the European Society of Cardiology[12] states: 'Compared to femoral access, radial access has been shown to cause fewer complications at the vascular access site, allow more rapid ambulation, offer greater

postprocedural comfort for the patient and be cost effective'. A default radial approach was deemed feasible in routine practice.

The latest and largest meta-analysis, published this year, included 29,194 STEMI patients undergoing primary angioplasty via radial or femoral approach.[13] Radial access was associated with a significant reduction in mortality (5.2% vs 10.3%) and major bleeding (1.9% vs 4.7%). The conclusion encouraged routine use of radial approach in STEMI patients.

Incidence in Malta

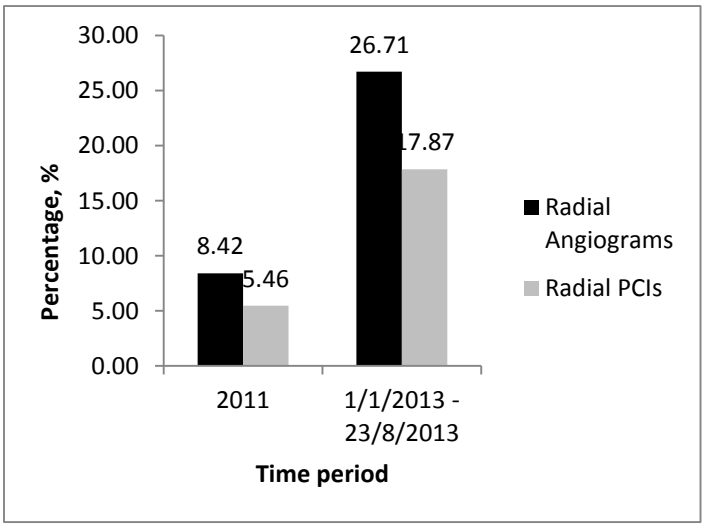
With the mounting evidence favouring radial access, has its utilisation increased in Malta?

A retrospective audit was carried out, using data obtained from the cardiac catheterisation suite at Mater Dei Hospital. The number of coronary angiograms and PCIs performed in 2011 and 2013 (1/1/2013 – 23/8/2013) were compared; the data was categorised according to the type of access site used. The following results were observed:

Table 1*: Table showing number of angiograms and PCIs performed in 2011 and 2013 (1/1/2013 – 23/8/2013)*

NUMBER OF PROCEDURES:		
	2011	**1/1/2013 - 23/8/2013**
Femoral Angiograms	2089	823
Radial Angiograms	192	300
Femoral PCIs	398	354
Radial PCIs	23	77

Figure 1: *Graph showing number of angiograms and PCIs performed in 2011 and 2013 (1/1/2013 – 23/8/2013) according to access site.*



With the percentage of angiograms and PCIs done via radial access increasing more than 3 fold over the time period studied, the findings were very encouraging.

Compared to other countries, Malta fared well; in the United States, the radial approach accounted for 16% of all PCI procedures in 2012.[14] The United Kingdom however leads the way, with >50% radial access utilisation in the year 2011.[15]

Conclusion

What does the future hold for radial access? The evidence is difficult to ignore; the radial approach is associated with reduced mortality, access site complications and hospital stay, with comparable door-to-balloon times.

Trials in progress will contribute further to our knowledge regarding radial access; the RADIAL-CABG trial[16] will provide information about the role of radial access in bypass graft angiography and intervention, whilst the EXPERT trial[17] will investigate whether experienced operators can perform angiography via both approaches with similar radiation exposure.

In conclusion, the routine use of the radial approach in patients (both stable and unstable) should be strongly considered, bearing in mind the learning curve associated with the technique. Femoral access should, however, not be abandoned; when radial access is impossible, the groin is the way to go.

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Original Article

Audit on follow-up of patients with primary Osteoporosis

Rachelle Asciak, Carol Attard, Ramon Casha, Patrick Barbara, Bernard Coleiro

Abstract

Aim: To document the frequency of Dual-energy X-ray absorptiometry (DEXA) scanning and Rheumatology clinic follow-up visits of patients with primary osteoporosis, and compare these with recommended guidelines.

Method: Medical notes of all primary osteoporotic patients attending a hospital Rheumatology clinic were reviewed over a period of four months. Data was collected on age, gender, frequency of follow up visits, frequency of DEXA scanning, osteoporosis treatment, any changes in such treatment during the last visit, and comparison of the last two DEXA scan results. Frequency of follow up DEXA scans was compared to Group Health Osteoporosis Screening Diagnosis and Treatment guidelines.[1]

Results: Eighty-two patients were included, 6 males (7.3%) and 76 females (92.7%). The age range was 35-87 years (mean age was 68.6 years).

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In total, 42.7% of all the patients were on combined calcium and vitamin D, with added Bisphosphonates, Strontium ranelate, or Denosumab. During their last clinic visit, 61% showed improvement in T score since their previous result, and 64.6% of patients had no change in treatment. In this audit, 29.3% were being followed up on a 13 monthly basis, and 72% had annual bone mineral density scans or more frequently

Conclusion: According to the guidelines, none of the patients included in this audit should have had a repeat DEXA scan within less than two years. Patients attending the clinic have too frequent DEXA scans and therefore, too frequent follow up appointments.

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Introduction

Rheumatology clinics are busy and time-consuming for patients, doctors and nurses alike. This results in substantial healthcare costs as well as hidden costs for patients and their relatives in travelling and time taken off work to attend the clinic appointments. The importance is placed on the need to identify ways to improve efficiency of the clinics and minimise visits to a frequency which best satisfies the needs of the patient.

A substantial number of patients attending these clinics are being followed up for osteoporosis. Table 1 is from the Group Health Osteoporosis Screening Diagnosis and Treatment guidelines[1] for follow-up and monitoring of patients who have low bone mineral density (BMD) but who have not sustained a fracture, and who are not at high risk of osteoporosis due to medications or chronic conditions.

According to these guidelines, most patients do not require Dual-energy X-ray absorptiometry (DEXA) scans more frequently than every two years, especially since osteoporosis medications take about two years to be effective. In addition, DEXA scanning can give errors in measurement. Degenerative disease, which is common in elderly patients can be responsible for artefactual measurements, especially in the spine. As a result, a minimum of 3 to 4% improvement in BMD is required to be able to identify any benefits from therapy, as such change in BMD is more likely to exceed errors in measurement. Moreover, some studies have shown that if during the first year of treatment there is some loss in BMD, and the medication the patient is on remains unchanged, BMD may be gained in the second year of

treatment. This means that even if there is some loss of BMD during the initial period of treatment, medications should not be changed on the basis of such results. Therefore, there is no point in repeating a DEXA scan before two years[2].

Aim

The aim of this audit was to document the frequency of DEXA scanning and Rheumatology clinic follow-up visits of patients with primary osteoporosis, and compare these with recommended guidelines, in order to identify ways in which to improve efficiency of Rheumatology clinics.

Method

Consent was obtained from the Mater Dei Hospital's Data Protection Officer to access the medical notes of all primary osteoporotic patients attending a hospital rheumatology clinic of one of the rheumatology consultants. The medical notes were reviewed and patients with predisposing factors for secondary osteoporosis, including patients on long term steroid treatment, were excluded, as were patients with osteopenia.

Over a period of four months, data was collected on age, gender, frequency of follow up visits, frequency of DEXA scanning, osteoporosis treatment at last visit, any changes in such treatment during the last visit, and comparison of the last two DEXA scan results. In this audit, any improvement in T score, even slight, and in either hip or spine, was classified as an improvement in T score, and any deterioration in T score or same T score when comparing the last two DEXA scans was classified as no improvement in T score.

Data was collected and analysed using Microsoft Excel®.

Frequency of follow up DEXA scans was compared to Group Health Osteoporosis Screening Diagnosis and Treatment guidelines.[1]

Results

A total of 82 patients were included in this audit, and one patient had passed away in the period between the last clinic visit and the data collection period. There were 6 males (7.3%) and 76 females (92.7%). The age range was 35-87 years (average age excluding the patient who had passed away was 68.6 years; median age: 73 years, mode: 73 years).

History of a fracture was documented in the notes in 15 patients (18.3%), however it was not always clarified whether this was a fragility fracture or secondary to trauma.

Treatment

There were 35 patients (42.7%) on combined calcium and vitamin D supplements with added Bisphosphonates, Strontium ranelate, or Denosumab. Nine of these 35 patients (25.7%) were not compliant to the Bisphosphonates, Strontium ranelate, or Denosumab. On the other hand, 28.1% of patients were on calcium and vitamin D supplements only, and 15.9% were on Bisphosphonates, Strontium ranelate or Denosumab only. The remaining 2.4% of patients were on no treatment (Table 2 and Figure 1).

Changes in Treatment during the last clinic visit

In this audit, 48 patients (58.5%) had no change in osteoporosis treatment during their last clinic visit. Of these, 10 had a DEXA scan done at 24 months or less frequently, while 38 (79.1%) had had a repeat DEXA scan within less than 24 months. Twenty-seven of these 38 patients (71.0%) showed improvement in their T-score, while the remaining 11 patients (28.9%) showed no improvement in T-score and yet there was no treatment change during their last visit when reviewed with the DEXA scan result. Therefore, 38 patients had a DEXA scan done too early, and irrespective of whether there was deterioration in the T score or not, there was no change in treatment during the last visit.

There were 18 patients (22.0%) who had a change in their osteoporosis treatment, and of these, 11 (61.1%) showed no improvement in T score, which may have triggered the treatment change. In the remaining 7 patients (38.9%) who had shown improvement in T score, the reason for the osteoporosis treatment change was not identified. This could have been related to patients' preferences or side-effects which were not documented.

In a further 6.1%, osteoporosis treatment was documented to have been changed due to side-effects to the medication. In 60.0% of patients, no change in any medical treatment, including treatment for osteoporosis or for unrelated conditions, was made during their last follow-up visit. In 4.9%, compliance with osteoporosis medication was advised and documented in the medical notes. In 3.7% of patients, treatment change was advised but the patient decided not to go for the new treatment because of cost burden (Table 3 and Figure 2).

Improvement when comparing last two DEXA scan results

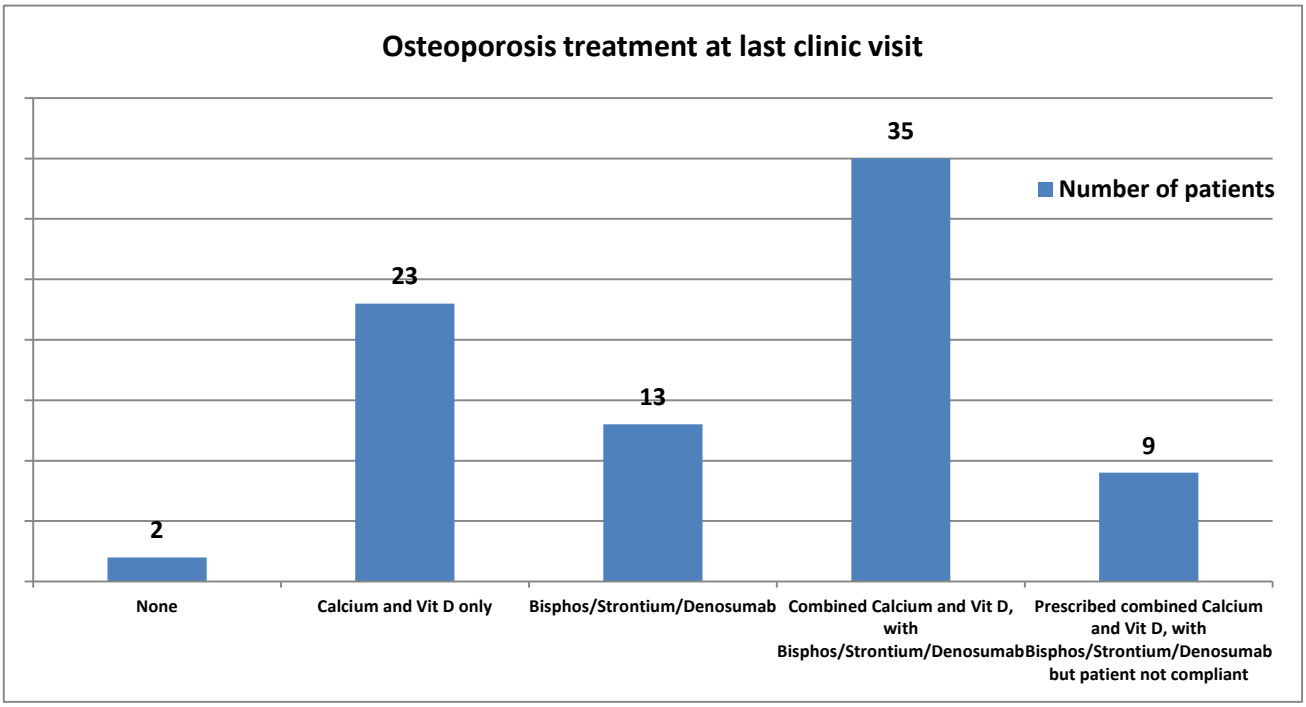
During the last visit, 61% of patients showed improvement in T score from the previous DEXA scan result documented in the medical notes. On the other hand, 30 patients (36.6%) did not show an improvement in T score, and in 2.4% it was not possible to make a comparison between the last two DEXA scan results because the results were both unavailable in the notes (Table 4 and Figure 3). Of the 30 patients with no improvement in T score, 17 (56.7%) received advice and had their osteoporosis treatment changed or adjusted during their last clinic visit. The other 13 patients (43.3%) showed no improvement in T score, however did not receive any treatment change and advice was not documented to have been given.

Treatment:

Table 2: *shows the osteoporosis treatment that patients were on during their last visit to the hospital Rheumatology clinic. Bisphos = Bisphosphonates; Strontium = Strontium ranelate*

Current treatment	Number of patients	Percentage
None	2	2.4
Calcium and Vitamin D supplements only	23	28.1
Bisphos/Strontium/Denosumab	13	15.9
Combined Calcium and Vitamin D, with Bisphos/Strontium/Denosumab	35	42.7
Prescribed combined Calcium and Vitamin D, with Bisphos/Strontium/Denosumab but patient not compliant to treatment	9	11.0

Figure 1: *shows the osteoporosis treatment that patients were on during their last visit to the hospital Rheumatology clinic. Vit D = Vitamin D; Bisphos = Bisphosphonate ; Strontium = Strontium ranelate*

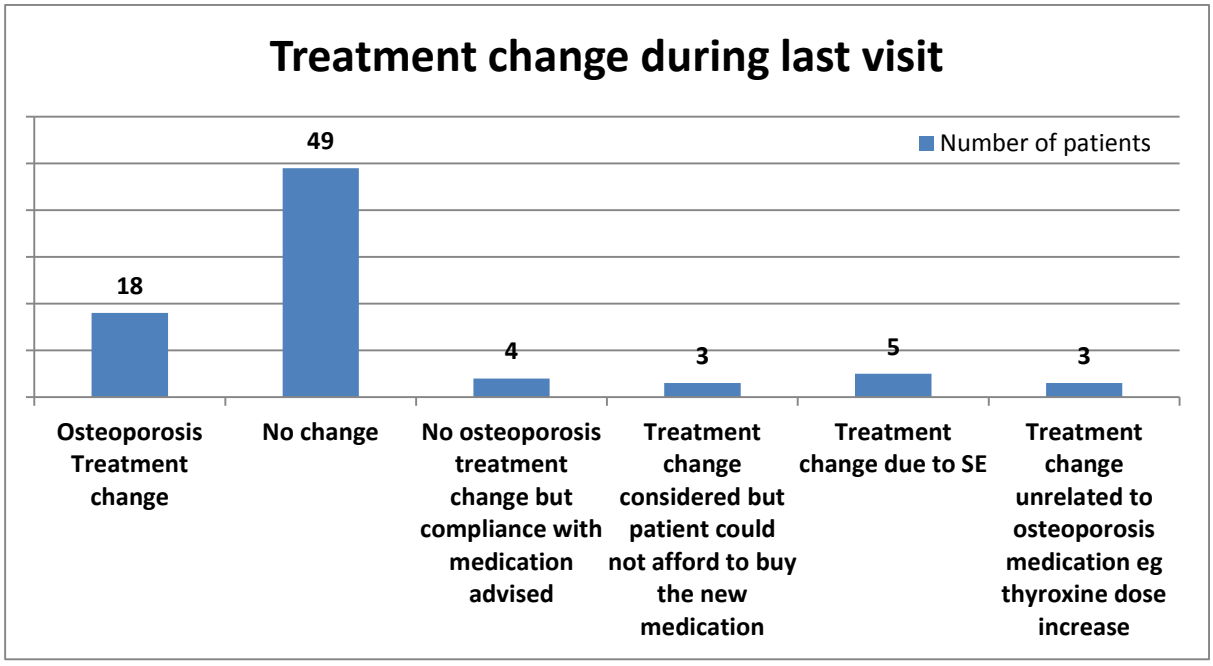


Changes in Treatment during the last clinic visit:

Table 3: *shows the number and percentage of patients with changes in osteoporosis treatment made during the last rheumatology clinic follow up visit.*

Changes in Treatment	Number of patients	Percentage of patients
Osteoporosis treatment change	18	22.0
No change in any treatment	49	60.0
No osteoporosis treatment change, but compliance with medication advised	4	4.9
Treatment change considered but patients refused in view of cost burden	3	3.7
Osteoporosis treatment was changed due to medication side effects	5	6.1
Treatment change during last clinic visit was unrelated to osteoporosis medication	3	3.7

Figure 2: *shows the number of patients with changes in osteoporosis treatment made during the last rheumatology clinic follow up visit.*

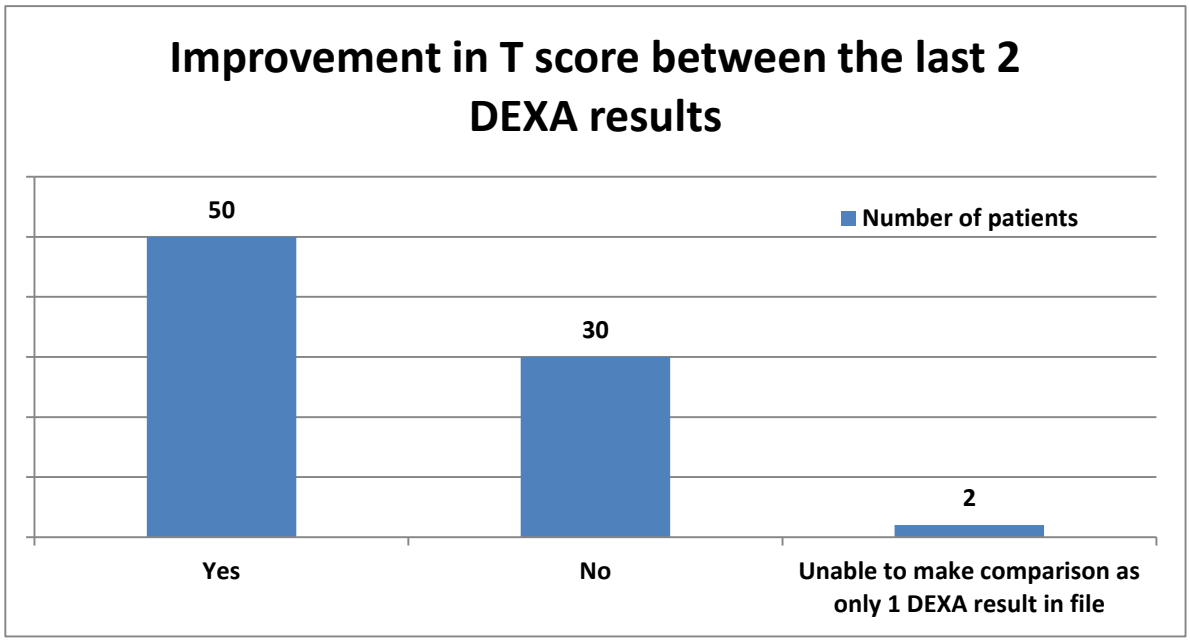


Improvement when comparing last two DEXA scan results:

Table 4: *shows the improvement in T score when comparing the last 2 DEXA scan results*

Improvement in T score	Number of patients	Percentage
Yes	50	61.0
No	30	36.6
Unable to make comparison as only 1 DEXA result in file	2	2.4

Figure 3: *shows the improvement in T score when comparing the last 2 DEXA scan results*



There are two bone densitometers at Mater Dei hospital, but the machine used for patients' bone density scan was not specified in the medical notes.

Compliance

There were 9 patients who were on combined calcium and vitamin D supplements with added Bisphosphonates, Strontium ranelate, or Denosumab, and documented to be non-compliant with treatment. Of these, 6 (66.7%) showed no improvement in T score, and all of these had clinic visits scheduled more frequently than 24 monthly, and there were 4 (44.4%) who had repeat DEXA scan more frequently than 24 monthly.

Frequency of follow up visits

Follow up visits to the clinic were 13 monthly in 29.3% of patients, while 52.5% were being followed up every 12 months or more frequently (follow-up visit after 12 months - 24.4%, 11 months – 15.9%, 10 months – 3.7%, 8 months - 1.2%, 7 months - 2.4, 6 months - 3.7%, 2 months - 1.2%). 1 patient (1.2%) was followed up after 1 month because of a deranged blood result unrelated to osteoporosis. Eleven percent of patients were followed up after 14 months, and 1.2% of patients were followed up after 15, 18, 19, 23 and 24 months each (Table 5 and Figure 4).

Frequency of DEXA scans

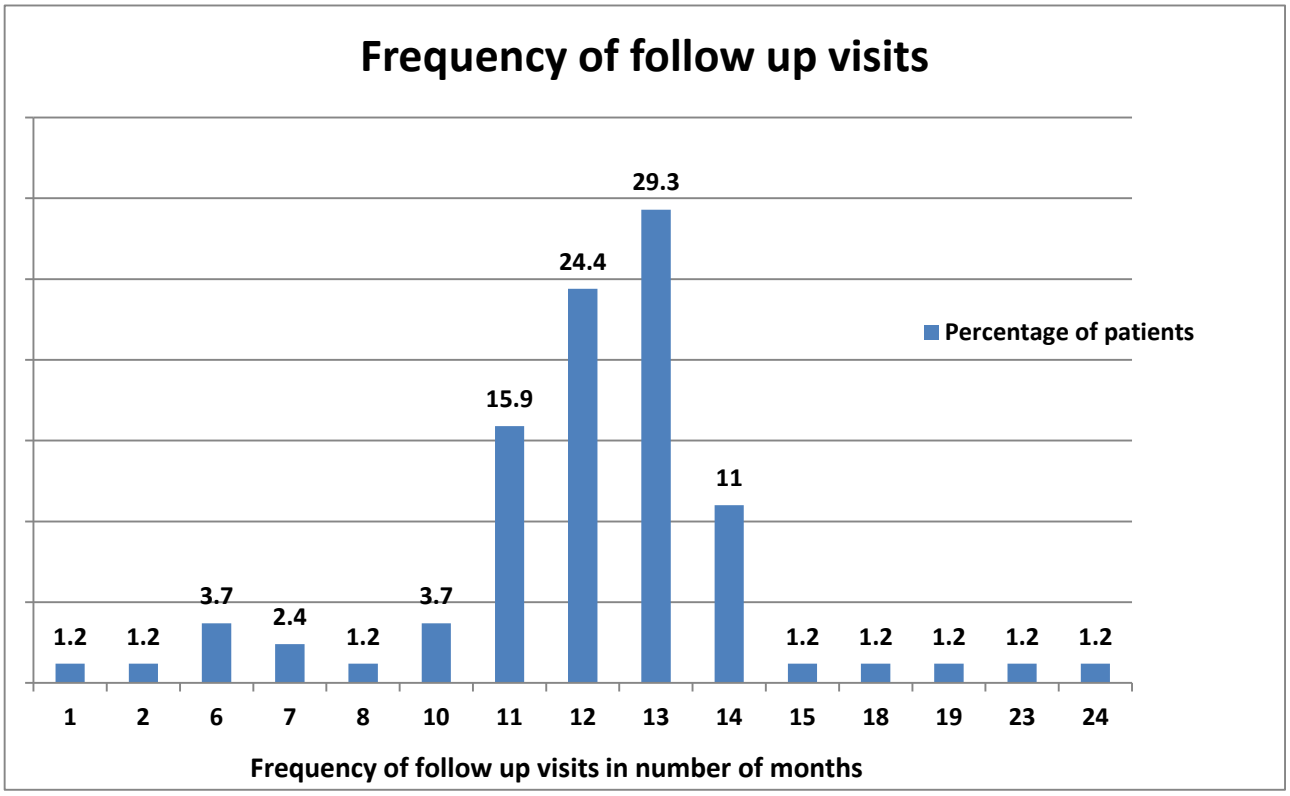
DEXA scan was repeated after 12 months in 65.9% of patients, while 6.1% of patients had more frequent DEXA scans (4.9% 11 months, and 1.2% 10 months). In this audit, 1.2% had a repeat DEXA scan after 13, 15, 18 and 36 months each, while 15.9% had a repeat DEXA scan after 2 years. In 7.3% of patients it was not possible to determine the frequency of DEXA scans because there was only a single DEXA scan result available in the notes (Table 6 and Figure 5).

Frequency of follow up visits:

Table 5: *shows the number and percentage of patients and their frequency of follow up visits in months. NB: the patient followed up after 1 month was given such an early follow up appointment because of deranged results not related to osteoporosis.*

Frequency of follow up visits in number of months	Number of patients	Percentage
1	1	1.2
2	1	1.2
6	3	3.7
7	2	2.4
8	1	1.2
10	3	3.7
11	13	15.9
12	20	24.4
13	24	29.3
14	9	11.0
15	1	1.2
18	1	1.2
19	1	1.2
23	1	1.2
24	1	1.2

Figure 4: *shows the percentage of patients and their frequency of follow up visits in months*

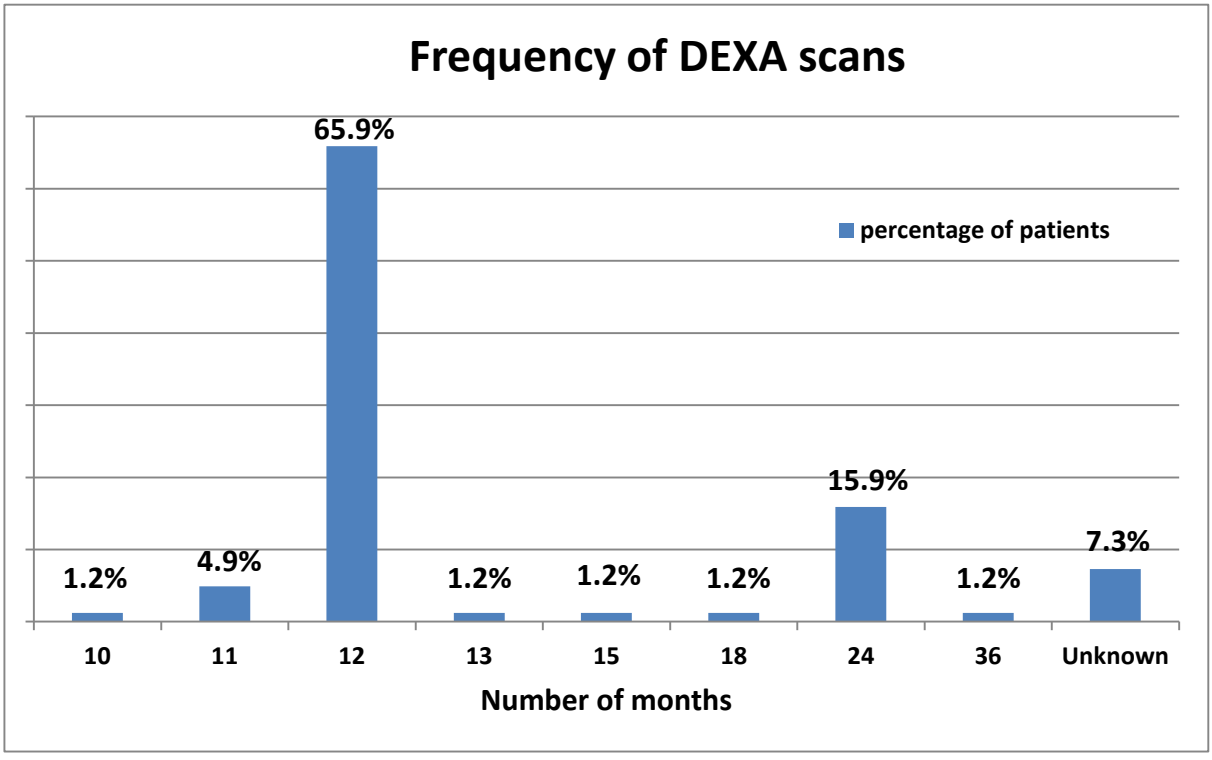


Frequency of DEXA scans:

Table 6: *shows the number and percentage of patients and the period of time between their last 2 DEXA scans. In 6 cases, there was only one available DEXA scan result in the notes, and so it was not possible to determine the frequency of DEXA scans.*

Number of months	Number of patients	Percentage
10	1	1.2
11	4	4.9
12	54	65.9
13	1	1.2
15	1	1.2
18	1	1.2
24	13	15.9
36	1	1.2
Unknown	6	7.3

Figure 5: *shows the percentage of patients and their frequency of DEXA scans (number of months between the last two DEXA scans.*



The relationship between frequency of outpatient visits and frequency of DEXA scanning

It was noted that in 16 patients (19.5%) there was a discrepancy between the DEXA scan frequency and the frequency of their follow-up appointments. Six of these patients (37.5%) had missed their DEXA scan appointment, or had not brought the DEXA scan result to the clinic visit. Seven patients (43.8%) were seen earlier then the next scheduled DEXA scan because of medical reasons, unrelated to osteoporosis. No reason for an earlier clinic visit was identified in two patients (12.5%). One patient (6.25%) had brought two past DEXA scan results, which were two years apart, to a new case appointment at the clinic. This same patient was then given a one-yearly follow-up appointment.

Discussion and Conclusions

The majority of patients suffering from primary osteoporosis are female, with a mean age of 68.6 years.
As documented in the last follow up visit, most patients (42.7%) being followed up were on combined calcium and vitamin D supplements together with a bisphosphonate, Strontium ranelate or Denosumab. When keeping in mind that the patients included in this audit were all being followed up at a hospital Rheumatology clinic, this raises the question of whether the rest (57.3%) of the patients, the majority of which were not even on bone anti-resorptive treatment, may be followed up by their GP and referred only if complications arise. This is further emphasised by the fact that only in 21.9% of patients was there a change in osteoporosis treatment during their last follow up visit. For the 6.1% in whom osteoporosis treatment was changed due to side-effects to the osteoporosis medication, waiting for the next follow-up clinic visit is unnecessary since a help-line is available to address such issues.

It is reassuring that in the majority of patients (61.0%), an improvement in DEXA was noted during the last visit, when compared with the previous visit's result. However, for the purpose of this audit, any amelioration in T score, however slight, was documented as improvement. This means that where there was deterioration in T score of the spine, but a larger improvement in T score of the hip, and vice versa, this patient was classified as having an overall improved BMD. Unfortunately, in view of poor documentation in the patients' notes and also the lack of official DEXA scan results available in the notes or on the hospital online system, where T score "hip" was documented, it was impossible to tell if this referred to the T score of the neck of femur or the total T score. It was also not possible to tell whether the same bone densitometer was used when comparing DEXA scan results, so it was not possible to exclude patients who had had different bone densitometers used. As a result, comparison of DEXA scan results may have led to inaccurate data.

Of the 30 patients with no improvement in T-score, 17 (56.7%) received advice and had their osteoporosis treatment changed or adjusted during their last clinic visit. The other 13 patients (43.3%) did not receive any treatment change and advice was not documented to have been given. This raises the question of whether this clinic visit could have been avoided.

According to Osteoporosis Screening, Diagnosis and Treatment Guideline by Group Health, patients who have never sustained a fracture, with a T score of -2.5 or less and taking no treatment, DEXA scans should be done every 2 years or less frequently (Table 1). For patients who are taking Bisphosphonates, DEXA scans can be repeated every 5 years. For patients who have sustained fractures, DEXA scans should be done 2-3 years after starting treatment. This is because medications are effective only 2 years after they have been started, and therefore fractures occurring during the first two years of treatment are unlikely to represent treatment failure.[1]
Given the fact that according to the guidelines, none of the patients included in this audit should have had a repeat DEXA scan within less than two years, it is important to note that 72% of patients whose notes were reviewed had 12 monthly DEXA scans or more. The patients then had a follow up appointment at the clinic to review the result and this led to increased unnecessary visits to the clinic, with most patients having an eleven to fourteen monthly follow up visit. This is further emphasised by the fact that most patients (64.6%) had no change in osteoporosis treatment during their last visit at the clinic.

A review of published research on strategies and processes involving primary care that influence the efficiency and effectiveness of outpatient services showed that discharging patients to primary care follow up results in improved access and reduced outpatient attendance, without adverse effects on the quality of care. This leads to overall reduced NHS costs, despite increased primary care workload. This however would require primary care physicians to be able to request and have access to the results of hospital based investigations.[4]

Limitations

Fractures had been documented in the patient notes in 18.3%, but it was not specified whether these were fragility fractures or not. Nonetheless, in many patients there was no documentation of whether the patient had had any past history of fractures or not.
There are two bone densitometers at Mater Dei hospital. Before any change in T-score is analysed and acted upon, it should be ascertained that the same bone densitometer is used for the patient's bone mineral density scan. In this audit it was not possible to assess whether this is being done during the clinic because the machine used for patients' bone density scan was not specified in the medical notes.

This audit highlights poor documentation of DEXA scan results and raises the concern that DEXA scan results are not available on the hospital online results system, meaning that results are often lost, or kept by the patient without a copy in the file, making quick access to results impossible.

Suggestions

DEXA scan results should be uploaded with the rest of radiological studies on PACs, making them readily available for all doctors caring for the patient, who need to access them and compare to previous results.

Table 1: *Group Health Osteoporosis Screening Diagnosis and Treatment guidelines[1] for follow-up and monitoring of patients who have low bone density.*
DEXA = Dual-energy X-ray absorptiometry scan

Baseline or most recent DEXA T score and/or clinical circumstances	Recommended screening interval
Higher than -1.5	Repeat DEXA scan only if the number of risk factors increases or there is a clinical concern regarding osteoporosis
-1.5 to -1.9	May choose to repeat DEXA scan in 5 years
-2.0 to -2.4	May choose to repeat DEXA in 2 years
-2.5 or lower, choosing no treatment	Repeat DEXA scan as clinically indicated but no more frequently than every 2 years
-2.5 or lower, choosing bisphosphonates	May choose to repeat DEXA scan in 5 years
Patients on chronic steroids	Repeat the DEXA scan 6 months after the initiation of corticosteroid treatment and annually thereafter (expert opinion)
Patients at high risk due to comorbid conditions, and patients with fractures	Repeat DEXA scan after 2–3 years of treatment

Burden on the rheumatology clinics can be lessened significantly if stable, mild, and uncomplicated cases of primary osteoporosis are followed up by their GP, and referred only if any deterioration or complications arise. This may be achieved by means of referral guidelines for primary care physicians. The load on the clinics can be further reduced, together with the patients' radiation-exposure, by following the latest guidelines on frequency of DEXA scanning and follow-up.

The World Health Organisation (WHO) fracture risk assessment (FRAX) score was not documented in the medical notes of any of the patients seen for osteoporosis. The FRAX tool is used to identify the ten year probability of fracture, and the aim of osteoporotic treatment is ultimately to reduce this risk. The setting up of specific osteoporosis clinics may allow more time and attention to be dedicated to calculating and documenting the FRAX score at every visit. This could be more beneficial as a guide to patient improvement or deterioration than the T score in isolation.

Unfortunately, it is not known whether using either FRAX or QFracture risk assessment tools can reliably estimate the risk of fractures in treated osteoporotic patients as in untreated patients. Further studies are required with regards to this issue[5].

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Review Article

Leadership, clinical freedom and cost-containment: lessons from recent history

Alexander Manché

"There is a need to sustain the doctor-patient relationship and then build a new and mutually supportive doctor-manager relationship if the NHS reforms are to work".
Duncan Nichol, Chief Executive of the NHS (Nichol 1991).

Introduction

Public Health provision, free at the point of contact, is espoused in many countries within the European Union. The method of funding, whether by direct taxation, or via insurance companies, is not so much a problem as the ever increasing cost of medical advances and are. Clearly structures need to be in place to manage this service, and the modern doctor is called upon to play an ever-increasing role. The British National Health Service has served as a template for our local health service, albeit with various divergences along the way. This article highlights the central role of the doctor, as leader and manager, in effecting constant change within the service.

Leadership: The patient-doctor-management relationship

A successful hospital management can only bring about change when its clients, the general public, understand and endorse the professed goals of the health provider. The doctor plays a pivotal role in the patient-doctor-manager line of communication and enjoys a unique status enabling him or her to effect change. This fundamental principle is essential to any hospital management strategy and may be applied in various structures serving particular hospitals' needs. The spark that ignites change rests with the leader of the medical or surgical unit, and the catalyst for progress lies in the respect and confidence that he or she gains from patients. In a new venture, such as the Maltese Cardiothoracic Department, the starting point is necessarily protracted and arduous, but positive initial results, timely publicized, can feed positively into a doctor-patient population relationship that is mutually respectful and dependent.

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Thus armed with patient support, the doctor can subsequently give direction to the mission of the unit and, together with management, implement the changes that become necessary.

The doctor-manager relationship is the other integral and essential entity in the implementation of change. Cultural differences are at the root of potential conflict.[1] Inappropriate language may amplify traditional fears that management would infringe on professional independence. Thus terms such as "performance review", and "efficiency" conjure a dread of service curtailment. Similarly, describing the patient as a "client" or "consumer" transforms the concept of a noble vocation into a commercial venture. Managers realize that medical advances are relentless, may not fall in line with the general needs of the hospital, and inevitably tax resources. They face the unenviable task of demonstrating that clinical freedom and impulsive actions by consultants must be tempered with responsibility for managing these finite resources. Doctors are taught to give their patients the best possible treatment, irrespective of effort or cost. Managers, on the other hand, tend to suppress individual interests in their implementation of the organisational long-term mission, making optimal use of limited resources. Luckily these stereotypes are not widespread, and many doctors and managers share a mutual esteem for each other's respective roles. Setting out common goals avoids misunderstanding and strengthens the doctor-management axis within the framework of change. Incentives are important when implementing change. Thus, efficiency savings are more likely to ensue if they are reinvested within the same department. Doctors can materially help managers by explaining the impact that planned clinical improvement could have on resources. Conversely effective lines of communication from management can transform a doctor who is simply informed of a change to one who actively participates in the team bringing about that change. Managers, as leaders, must be respected if they are to be followed. Within the Public Health Service doctors have been described as the best, the brightest, the leaders,[2] a concept that was

embraced early on in the UK [3] and subsequently at the Johns Hopkins Hospital where doctors were actively involved in management.[4]

Early British National Health Service management structures

The Cogwheel reports[5] represented an early attempt at management organisation by specialties, involving senior and junior medical staff periodically auditing services and methods of provision. The first report (1967) proposed that Chairs represent their Divisions within the Medical Executive Committee, working closely with Nursing and Administration.[6] The second Cogwheel report (1972) was able to report success of this scheme with improved communication, a reduction in waiting lists and better management of financial resources.[7] The third report (1974) introduced the concept of District Management Teams (DMT) as the principal players promoting collaboration between the hospital and community services, emphasizing the role of efficiency and medical audit.[8] In an effort to slim down bureaucracy and speed implementation, the doctors' Executive Teams were introduced at hospital level in 1979.[9] Further reforms in 1982 saw representative consultants and general practitioners elected to the DMT's by their peers.[10] Hospital doctors' dissatisfaction with this new consensus management led to the Griffiths report and the recommendation for a "top doctor", as lobbied for by the British Medical association, a position that was embodied in the Medical Superintendent prior to 1974.[11] The British government took the recommendations on board in 1989 with a concerted effort to involve doctors more comprehensively in decision-making and resource management, in their policy of "working for patients".[12]

In his book entitled "The National Health Service: a political history", Charles Webster argues that "every restructuring intended to make it more efficient made it less so".[13] Aneurin Bevan's mission of a publicly funded system through taxation still provided the cheapest option, but crisis struck in 1979 after years of under-funding, over-management and industrial action.[14] The Thatcher years saw a concerted effort to limit costs with the introduction of prescription charges and the contracting out of services. Sadly costs rose relentlessly and the public's perception was overwhelmingly one of service cuts. Further policy changes resulted in the fragmentation of the NHS, with the introduction of GP fund holders, hospital trusts and the internal market.

Resource management and clinical freedom

Prior to 1948 doctors and their Superintendents were constantly aware of costs, whereas the new breed of NHS managers demonstrated less enthusiasm at cost-containment within a service that was "free" at the point of contact.[15] Although it was impossible for any advanced health service to provide all that was possible, this shortfall nevertheless had to be managed. During the first 30 years of the NHS more was spent every year as hospital managers attempted to fund the medical advances recommended by doctors. Following these years of plenty, 1979 was a year of realisation that the traditional methods of managing the NHS no longer applied. Cash limits dictated that, within an equitable system, each doctor had to be accountable for his or her actions, and this was partially achieved by involving doctors in resource management. Griffiths suggested that doctors' clinical freedom came with managerial responsibility, which meant that doctors were formally charged with liability for their decisions and were unequivocally accountable to their manager.[11] This system failed to reach its objectives because of indistinct management structures and too hasty an implementation.[16] Efficiency, as measured by an increased output with fixed resources, did not tackle the cash shortfall and was not rewarded. Henceforth the new objective would be savings.[17] Resource Management was a new initiative set up in 1986 that invested more power with doctors and nurses, at the same time introducing medical audit and benchmarking, comparing outcomes between diverse practices.[18] Doctors were to fill the new posts of Clinical Director (sometimes referred to as Clinical Chair), supported by a Business Manager and Nurse Manager. Whilst the remit for these new entities was comprehensive, including decentralization, communication, quality control and evaluation of outcomes, in many instances the primary motivation appeared to be cost reduction.

Clinical freedom is at the centre of health care provision. It assumes that autonomy in matters of clinical judgment and responsibility for patient care is not supervised by outside entities.[19] Members of the medical profession feel that they ought not to be managed by others outside their own profession. Politicians and managers have sought to curtail this autonomy in their quest to reduce costs. Various strategies including restructuring and redefining management roles have not guaranteed a more efficient health service. The main impedance to change is the fact that doctors are professionals, they are autonomous, and consequently they have not been significantly affected.

In 1983 Professor Hampton announced the death of clinical freedom.[20] He argued that the increasing influence of evidence-based medicine relegated individual practitioners to a subsidiary role in the clinical decision process. This view is not widely held in current practice where therapeutic options are chosen in the light of meta-

analyses and economic evaluations performed by bodies such as the National Institute of Clinical Excellence (NICE).[21] Clinicians are encouraged to keep abreast of guidelines and to apply them judiciously and appropriately to the individual patient who may share characteristics with a subset of a particular study population. It is just as important for clinicians to take heed of guidelines as it is for evidence-based medicine to embrace doctors' judgment, patients' needs and society's expectations.

Autonomy and management: The early years of the Maltese cardiothoracic program.

Prior to the establishment of the local cardiothoracic programme, patients were either sent for treatment to the United Kingdom, or were operated on in Malta by visiting UK teams. Doctors evaluated their patients for referral to foreign specialist units, and civil servants organized the travel arrangements for patients and visiting teams. The local referring doctors formed part of a board vested with the authority to send patients abroad. Decisions were corporate and there was no single Clinical Director in overall charge. The Hospital Administrator fulfilled the functions of a Business Manager and was in charge of communications with foreign entities, overseeing all the administrative work that made the program possible.

The established structures were utilized to set up and develop the local cardiothoracic programme. Prior to April 1995, local nurses travelled to the Northern General Hospital, Sheffield to gain work experience. The recently appointed local team performed the first forty operations in Malta in conjunction with four visiting by teams of anaesthetists and nurses from the same Sheffield unit. Subsequently the programme was run entirely by local staff except for a foreign perfusionist. The Administrator, under the direction of the Hospital Superintendent, provided all the necessary arrangements for these visits. As no Nursing Manager existed at the time, the Chief Surgeon collaborated closely with the Hospital Matron, both in strategic planning and in the day-to-day running of the programme. This nuclear Clinical Management team, borne out of necessity, and consisting of the Chief Surgeon, Hospital Administrator and the Hospital Matron, was the driving force behind the fledgling unit. In many ways the success of this team lay in the common goal of its participants: that of providing a comprehensive and high quality service to local patients without the necessity of foreign help.

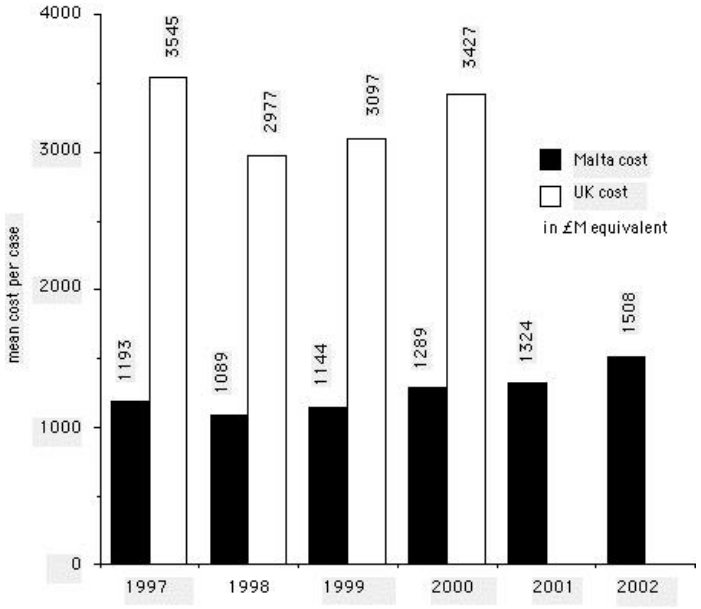
Cost reduction

The resources that had previously been allocated to treating patients abroad were a largely unknown entity. The new team quantified this cost and demonstrated substantial savings in a financial audit that was drawn up after the first years of service. [22] In doing so, the local programme fulfilled the goals of corporate responsibility as laid out in the Griffiths report, whilst preserving clinical freedom. An important goal of cost reduction was also achieved.

Comparing local costs with those in UK centres remains an inaccurate exercise. In 1999 Professor DJ Wheatly presented the cost of a cardiac surgery package at the Glasgow meeting of the Society of Cardiothoracic Surgeons of Great Britain and Ireland. The figure of £7021 (£M4560) for 1997 did not include any profit margin, which would be charged to a purchaser contracting out services. Health Care Navigator 2000 quoted the cheapest price for a private coronary bypass operation in the UK at £9500 and this yardstick was used for comparisons. [23] Yearly financial reports were compiled and presented to the health and finance ministers. During the first eight years 2813 cardiac operations were performed with estimated savings of £M10.3 million.[24] More recent cost comparisons for coronary surgery support our estimations. [25]

A cost-comparison exercise was carried out with UK NHS figures derived from information given in Parliament by Lord Hunt of King's Heath in reply to a question put forward by Lord Colwyn.[26] Trends were parallel but the UK cost was more than double the local cost (figure 1).

***Figure 1**: Cost comparison (UK figures for 2000 and 2001 not available)*



Discussion

The Maltese experience provides a management model that may be relevant to other start-up units in cardiothoracic surgery. Firstly by nature of its island status and high population density the Maltese model is relevant to small and medium sized units aspiring to function in a sustainable and independent fashion. The pillars of this model include a small but effective management structure, clinical freedom practiced within the constraints of expertise and services, and a mission to provide quality treatment in a patient-centred practice.

Leadership was initially provided by the surgeon and, with subsequent expansion of services, morphed into progressive tiers of management. Thus the embryonic command structure of chief surgeon, hospital administrator and matron, directing doctors, nurses and paramedics, subsequently lead to one comprising a chairman of cardiac services, answerable to a medical director, in turn reporting to the hospital chief executive officer. Nurses and paramedics, with separate professions in their own right, developed independent management structures, working alongside doctors, in many instances fulfilling roles and responsibilities of nurse practitioners.

The perceived constraints on clinical freedom were repeatedly challenged as diverse services were constantly introduced. The validation of this strategy was strengthened by public support for the programme coupled with the demonstration of substantial economic savings when compared with the cost of the previous overseas service. An important point of consolidation for the programme was the continued follow-up and support patients received after their surgical intervention. This continuity of care was not possible with an overseas visiting programme because of its inherent episodic nature and diverse teams. A corollary advantage was that of a rapidly growing support base provided by an ever-increasing cardiac population.

Clinical freedom translated into an expansion of services that would not have been possible within the constraints of larger health services. In contrast, the rationalisation of transplant units in the UK was driven by a perceived need to concentrate expertise within a few centres serving large catchment areas.[27] This policy not only limited the number of units offering this service, but, by way of the prevailing philosophy, discouraged any visiting team from offering this service to Malta. Soon after the establishment of the local programme, cardiac transplantation was performed successfully.[28] Similarly, other procedures that were offered by specialist centres, such as mitral valve repair and trans-catheter aortic valve implantation, were also performed locally, albeit in small numbers.[29] These examples illustrate that clinical freedom can flourish unabated when the machinery of bureaucratic constraint is under-developed. In the setting of an organisation such as the British National Health Service such diversity of services would not be sanctioned in a small unit.

Conclusion

Local experience supports a philosophy of keeping things simple and involving a small team of leaders with a common mission.

Sixty-five years after the establishment of the British National Health Service, lively debate and accelerated change are relentless. Although tremendous strides have been made in the delivery of a modern technological medicine, publicly funded health services are creaking under the weight of ever-increasing patient expectations in an ageing population. Long waiting lists and perceived inefficiencies are highlighted when public service provision is compared with various fabulously expensive private health care systems. Yet global life expectancy has increased from 48 years in 1995 to projected a 73 years in 2025. [30] Let us not underestimate the progress achieved.

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Original Article

The management of patients positive to hepatitis C virus antibody in Malta

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Abstract

Hepatitis C virus (HCV) infection is one of the main causes of chronic liver disease and hepatocellular carcinoma worldwide and is an important public health concern. A retrospective analysis of the demographics and management of patients who had a positive anti-HCV detected by enzyme immunoassay test done at Mater Dei Hospital was carried out to analyse the epidemiology of HCV infection in Malta and assess our management when compared to the European Association for the Study of the Liver (EASL) guidelines. 72% of patients were male. The majority of patients were aged 21-50 years. The main mode of infection was via intravenous drugs use, accounting for 68% of cases.

Only 56% of patients found to be HCV Ab positive had a scheduled appointment with an infectious diseases specialist or gastroenterologist documented on the MDH online appointment system. 58% of patients had HCV RNA testing done and 45% had genotype testing. 7.3% with HCV infection were given treatment, of which 43% had a Sustained Virological Response (SVR).

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Keywords

Hepatitis C virus, EASL guidelines, management, treatment

Introduction

The Management of Patients Positive to Hepatitis C Virus Antibody in MaltaHepatitis C virus (HCV) infection is one of the main causes of chronic liver disease worldwide.[1] WHO estimates that about 150 million people are chronically infected with HCV and that every year more than 350 000 people die from HCV-related liver diseases.[2]

HCV is a single-stranded enveloped RNA virus belonging to the Flaviviridae family. The outcome of HCV infection on the liver may range from minimal changes to acute or chronic hepatitis, cirrhosis and hepatocellular carcinoma. 75-85% of patients infected with HCV will not clear the virus by 6 months, thus developing chronic HCV infection. Cirrhosis develops in approximately 10- 15% of individuals with chronic HCV infection over twenty years.[3] The European Association for the Study of the Liver (EASL) has issued guidelines on the management of patients infected with HCV. In this study we have audited the management of chronic HCV with respect to the EASL guidelines.

Method

The audit is a retrospective analysis of the demographics and management of patients who had a positive HCV Antibody detected by EIA test done at the Virology Laboratory at Mater Dei Hospital. The time period studied was between January 2008 and May 2012, during which there were a total of 1,074 unique positive tests. Of these, 538 patients could not be identified as the tests were coded and 25 patients never had a file created or their file was misplaced. The remaining 506 files were viewed at medical records. This is a limiting factor of the study since not all the files could be traced. The following data pertains to these 506 patients.

Results

Demographics

72% (363) of patients were male. The age distribution of the patients with a positive HCV antibody test is shown in Graph 1. 77.7% of patients who tested positive were aged 21-50 years. This model of infection suggests that the risk for HCV infection was greatest in the relatively recent past and primarily affects young adults. Table 1 describes the nationality of individuals with a positive HCV antibody test, with 81% of patients being Maltese.

***Figure 1**: Age distribution of patients*

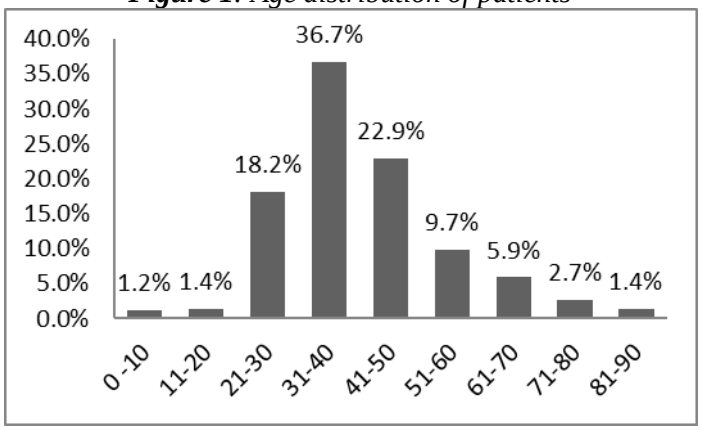


***Table 1**: Nationality of individuals with a positive HCV antibody test*

Nationality	Percentage
Maltese	81%
African & Eastern countries	11%
West Europe	6%
Other	2%

The residing locality of the patients was documented to analyze the distribution of HCV in Malta. The population estimate for each locality was obtained from The Malta Government Gazette (Number 18,789 published on Tuesday 9th August, 2011).[4] The number of patients infected with HCV living in a particular locality was multiplied by 10^6 and divided by the population living in that location thus allowing us to compare localities (Table2).

The highest ranking localities are mainly Harbour or Inner Harbour areas or localities associated with recreation.

***Table 2**: Highest Ranking Relative Prevalence Rates according to localities*

Rank	Locality	No. of people with HCV in the locality	Population[4]	Relative Prevalence No./Population X10^6
1	COSPICUA	30	5658	530
2	VALLETTA	23	6966	330
3	ST.VENERA	18	6939	259
4	FLORIANA	5	2335	214
5	ST.JULIANS	22	10573	208
6	HAMRUN	18	9649	187
7	VITTORIOSA	5	2758	181
8	GZIRA	15	8392	178
9	MSIDA	16	9227	173
10	KALKARA	5	2999	167

Mode of Infection

Chart 1 shows the alleged mode of infection. 68% of patients were known IVDU. In 2% of cases, the alleged mode of infection was via blood transfusions infected with HCV prior to the introduction of blood screening. In these cases, blood transfusions were the only risk factor documented in the notes. Vertical and sexual transmission accounted for 1% each whilst there was only one case (0.2%) of a needle stick injury resulting in infection. In 27% of cases, no risk factors were documented.

Investigations

Diagnosis of ongoing HCV infection requires the presence of HCV RNA, which is detected by molecular assays such as PCR. In our study, only 58% of patients had HCV RNA checked with 46% being positive and 11% negative. A negative HCV RNA in a patient who has a positive HCV Ab could be due to previous successful treatment, neonates who received the HCV Ab via transplacental transfer of the antibody, spontaneous clearance of the virus, a low viral load that is below the limit of detection of the laboratory or a false positive HCV Ab.

HCV is divided into six genotypes with numerous subtypes. Genotype 1, with subtypes 1a and 1b is the most prevalent genotype worldwide. Genotype 3a is highly prevalent among European IVDU[5] whilst genotype 1b is associated with blood transfusions.[6] In our study, it was shown that genotype testing was done in 20.5% of patients, with genotype 1a accounting for 45% of cases. (Chart 2). HCV genotype testing should be assessed in patients prior to starting antiviral therapy as it is important to decide treatment duration and dose of ribavirin.

***Figure 2**: Alleged mode of Infection*

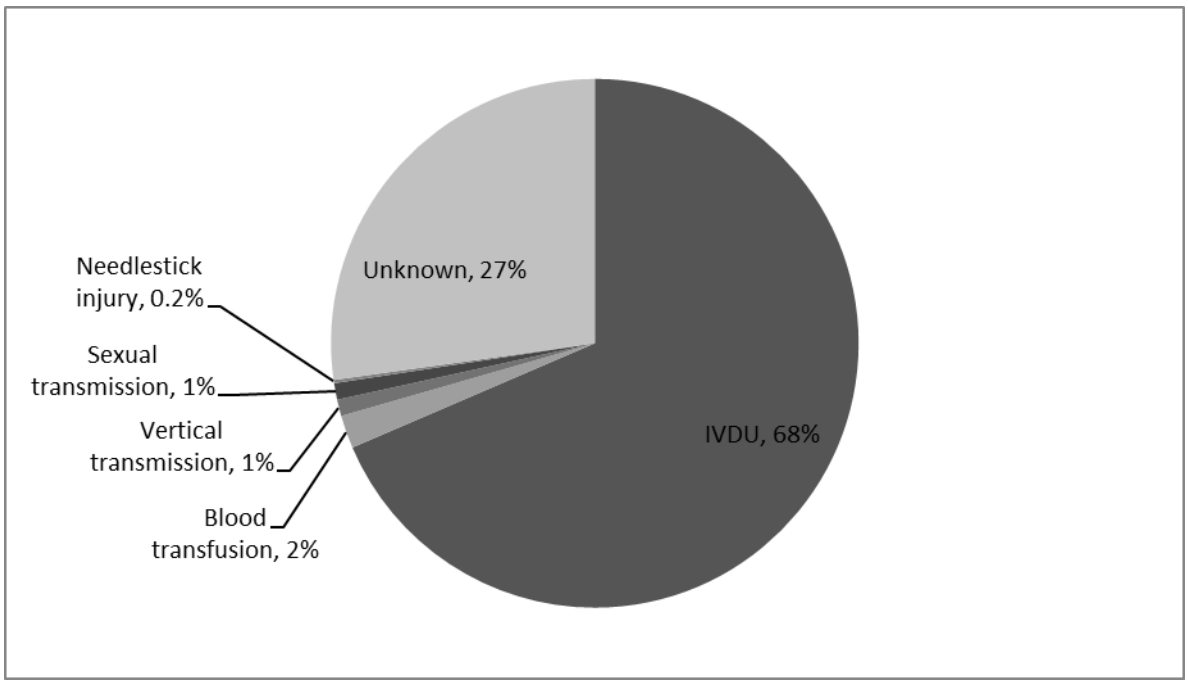
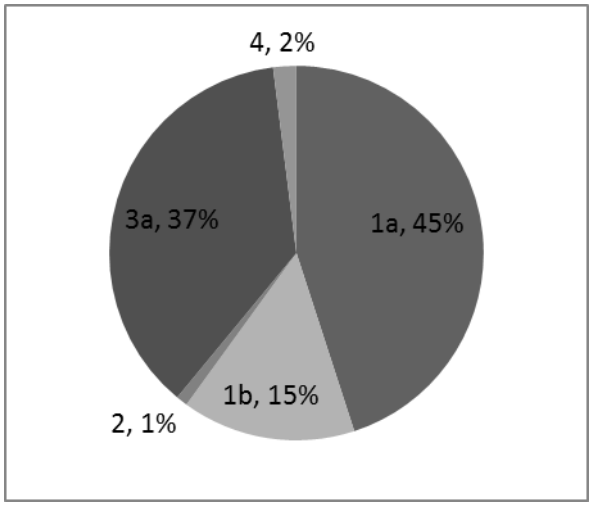


***Figure 3**: Distribution of Genotype*



EASL guidelines recommend that assessment of liver disease should include alanine aminotransferase, aspartate aminotransferase, gamma-glutamyl transpeptidase, alkaline phosphatase, bilirubin, INR, albumin, gammaglobulins, full blood counts and an abdominal ultrasound.[1] Having low platelet counts, high INR, low albumin and high bilirubin is highly suggestive of underlying cirrhosis. (Table 3)

***Table 3**: Blood Tests*

Value	Percentage of patients	Number of patients tested
Platelets < 150 x10^9/L	21%	n=499
INR > 1.3	10.5%	n=416
Albumin < 35g/dL	14.5%	n=343
Bilirubin > 30µmol/L	10%	n=454

An ultrasound was done in 51% of patients. The finding of a nodular liver (suggestive of liver cirrhosis) was present in 9%. Ascites, which is indicative of liver failure, was found in 9%. Splenomegaly (suggestive of portal hypertension) was found in 18%.

HCV infection is associated with a 15 to 20-fold increase in hepatocellular carcinoma (HCC). The rate of HCC among patients with HCV infection ranges from 1-3% over 30 years.[7] In our study, HCC was found in 4% of patients who underwent an US abdomen, 80% of who were male.

A liver biopsy is done locally to assess the severity of liver disease, unless the patient is already has established liver cirrhosis. EASL guidelines state that a liver biopsy is regarded as the reference method to assess the degree of inflammation and fibrosis.[1] A standardized scoring system is used to report the grade, which is the

degree of inflammation and stage, which is the degree of fibrosis. Both values range from 0 being no inflammation or fibrosis, progressively worsening with a higher grade or stage until 4 is severe inflammation or fibrosis (termed liver cirrhosis). Assessment of the severity of hepatic disease is important in decision making with regards to treatment as patients with cirrhosis are less likely to respond to therapy and have a worse prognosis post-treatment[1]. In this study, 47 patients (9%) underwent a liver biopsy (Charts 3 and 4). 80% of patients have either no, minimal or mild inflammation and fibrosis which a good prognostic factor for treatment. Alternative non-invasive methods such as transient elastography can also be used to assess liver fibrosis in patients with chronic HCV[1]; however this non-invasive test is not available locally.

***Figure 4**: Distribution of Grade of liver biopsies*

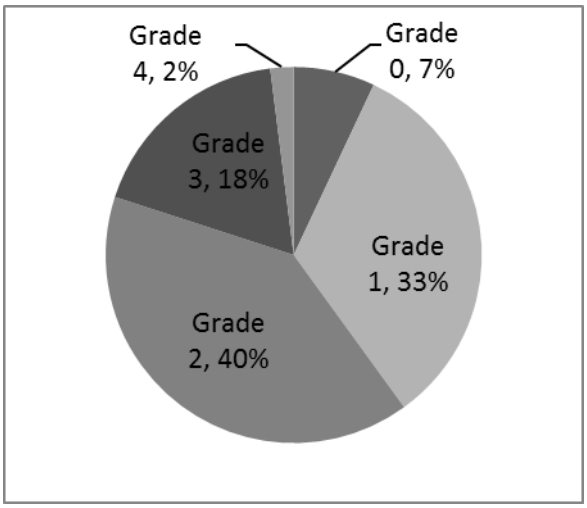
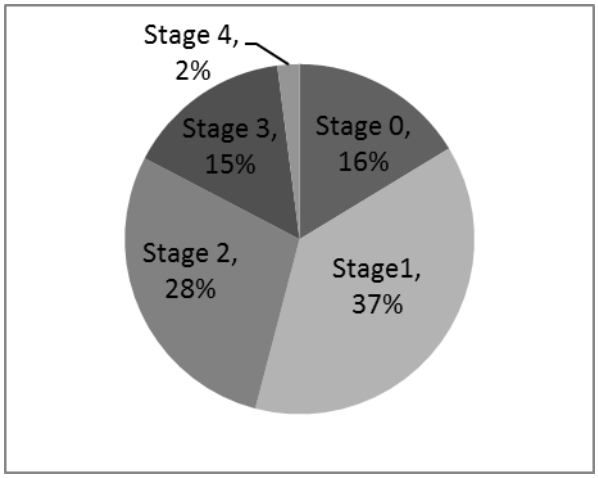


***Figure 5**: Distribution of the Stage of liver biopsies*



Referrals

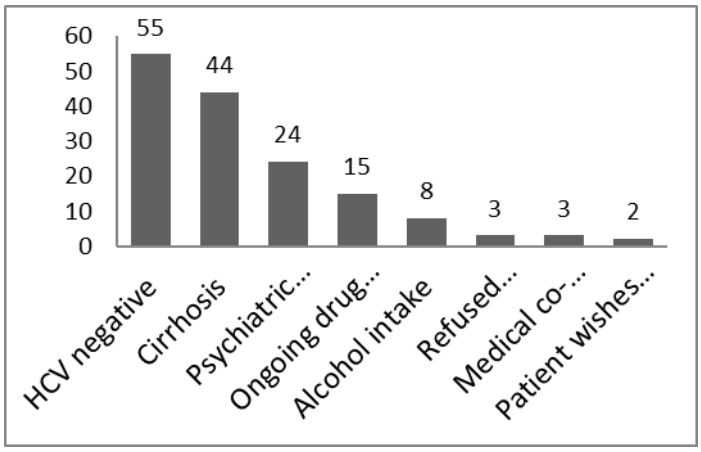
56% of patients found to be HCV Ab positive had a scheduled appointment with an infectious diseases specialist or gastroenterologist documented on the MDH online appointment system.

Treatment

Prior to the introduction of combination therapy, monotherapy with alpha interferon (IFN) was used. When combination therapy of pegylated interferon IFN-α (PEG IFN) and ribavirin was introduced, it became the standard treatment. Single therapy is nowadays only used if the patient cannot tolerate dual therapy due to side-effects.

37 out of the 506 patients audited (7.3%) were treated with either both PEG IFN and ribavirin or else with IFN alone. 55 patients (10.9%) were HCV RNA negative, and therefore treatment was not needed whilst 44 patients (8.7%) were in liver cirrhosis, so treatment was not given due to the risk of decompensation. 24 patients had an uncontrolled psychiatric condition and thus treatment was contraindicated. Chart 5 describes all patients who were deemed ineligible for treatment.

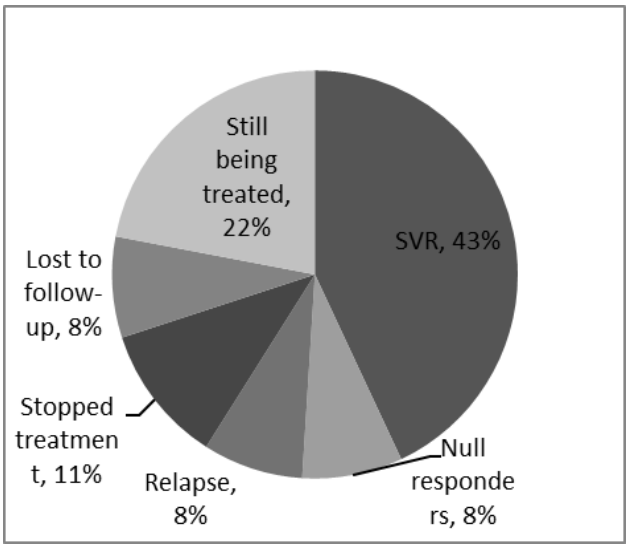
***Figure 6**: Ineligibility for treatment*



Sustained virological response (SVR) is defined as an undetectable HCV RNA level (<50 IU/mL) 24 weeks after cessation of treatment. Null response is defined as failure to achieve a decline of 2 logs HCV RNA IU/mL after 12 weeks of treatment or failure to achieve undetectable HCV RNA during treatment of a minimum duration of 24 weeks. Relapse is defined as having achieved undetectable HCV RNA at the end of treatment but HCV RNA is detected after stopping treatment[1].

Out of the 37 patients who were treated with either PEG IFN and ribavirin or IFN alone, 43% went into SVR, 8% were Null responders, 8% relapsed, 8% were lost to follow-up and 11% had to stop treatment due to side-effects (Chart 6).

***Figure 7**: Response to Treatment*



Discussion

HCV is one of the leading causes of liver disease, cirrhosis and HCC and one of the most common indications for liver transplantation.[3] It is estimated that the prevalence of HCV infection is approximately 2.2-3% worldwide.[9]

Presently the main mode of transmission of HCV is via sharing of devices used for illegal drug use. These include both IVDU and nasal drug use. Measures have been instituted to attempt to decrease the risk of HCV transmission by providing free new syringes from health centres. It is of utmost importance to draw attention of the risks of sharing needles and apparatus to drug users at every visit and to educate the general public via national education campaigns. This study indicated the highest ranking localities where patients resided and these areas should be particularly targeted.

Some of the reasons for shortcomings in HCV management in Malta are due to the fact that the patient population can be difficult to work with as most patients are IVDU and there is stigma associated with both drug use and HCV infection. The disease is also clinically silent and so patients will present late unless the infection is picked up by screening blood tests. Inadequate referrals to appropriate specialists may occur because of lack of awareness amongst doctors of the rapid advances in management of HCV over the past years and the current success rates. Patients should also be encouraged by their GPs to attend Outpatients appointments and undergo the necessary investigations. In order to receive treatment patients frequently depend on funding from NGOs since the medications are not available on the NHS and are relatively expensive. This might also partly account of the small percentage of patients who were treated.

Once a patient is then referred to the appropriate specialist, the management is then of high standards and success rates are good. In clinical trials, SVR was achieved in 40-54% of patients infected with HCV genotype 1 who were given PEG IFN and ribavirin combination therapy and in 65-82% of patients infected with genotype 2 or 3.[1] SVR rates with monotherapy are lower. In the study population, 43% of patients (all genotypes included) went into SVR when treated with either combination therapy or IFN alone. IFN was used prior to the introduction of combination therapy. Thus, especially taking into account that both monotherapy and combination therapy are included, SVR rates for patients with HCV in Malta are favourable when compared to SVR rates in clinical trials.

Trials have shown that relapse rate after treatment with combination therapy varies between 15-25%.[1] In our study, 8% of patients relapsed on either monotherapy or combination therapy. In clinical trials, 32-53% of patients who relapsed after being given IFN alone then responded to combination therapy with PEG IFN and ribavirin.[1] Thus, patients who relapsed should be reassessed with an aim to give combination therapy.

4-14% of treated patients will not respond to combination therapy.[1] In our study population, 8% of patients treated with monotherapy or combination therapy were non-responders.

Recent studies have shown that boceprevir or telaprevir in combination with PEG IFN and ribavirin (triple therapy) result in substantially higher sustained virological response rates in both treatment-naïve as well as in previous non responders with genotype 1 HCV chronic hepatitis. Triple therapy is however associated with increased side effects, increased drug interactions, increased cost and reduced cost effectiveness.[8]

This article highlights the need to refer all patients with positive HCV antibody tests to a gastroenterologist or an infectious disease physician for assessment of hepatic function and suitability for treatment. Management of these patients at Mater Dei Hospital mirrors the results obtained from international studies and therefore this treatment offers the best hope of a cure for these patients.

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