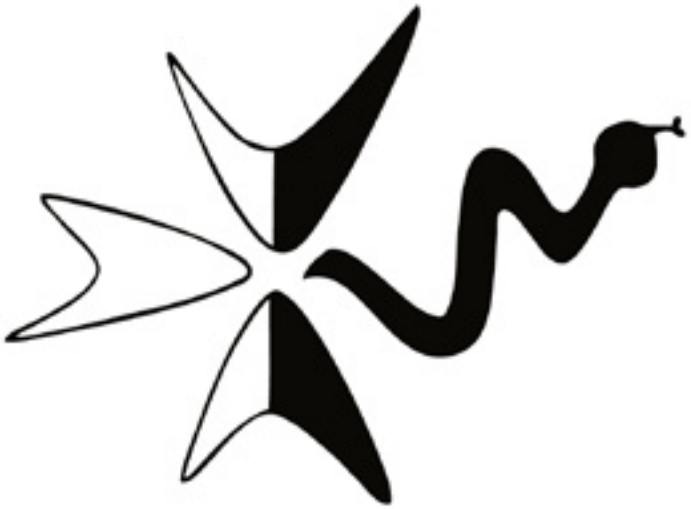
Minima Medicamenta



MMSA

Malta Medical Students' Association

L-Għaqda tal-Istudenti tal-Mediċina ta' Malta

www.mmsa.org.mt

Message from
The Minister for Health,
the Elderly and Community Care

The MMSA is here providing evidence of its commitment to maximise the quality of medical education, and to enhance patient care delivery.

In compiling this series of case studies in a publication, a valid educational resource has been established. I trust this resource would be made available to, and tapped into, by all relevant parties, within the medical profession, and beyond across the interdisciplinary health care team. Minima Medicamenta will contribute towards the development of health care professionals, and thus towards their potential to deliver optimal care.

I congratulate the MMSA for this useful initiative and augur success in its distribution and utilisation.

Hon. Dr. Joe Cassar
The Minister for Health, the Elderly and Community Care

Message from the Dean

The Malta Medical Students' Association (MMSA) has this year embarked on the publication of Minma Medicamenta, which is a compilation of unusual clinical cases that students have come across during ward rounds. This project, recognised by the International Federation of Medical Students' Associations, provides an opportunity for the students to have a hands-on approach at developing skills in presenting and reasoning out patient cases. The students who have participated in this exercise, have drawn on cases in the areas of oncology, orthopaedics, surgery, neurology, infectious diseases, and intensive care.

The participation in the Minima Medicamenta project is an educational experience. Reading through the compiled cases is also an effective way for medical students to enhance clinical reasoning skills and reinforce clinical knowledge that is developed during the course in medicine.
I congratulate MMSA and the students who contributed to this project and thank colleagues who supported the students in the compilation of the cases.

Professor G. LaFerla
Dean, Faculty of Medicine & Surgery

Foreword

Dear reader,

It gives me great pleasure to write this foreword for the first edition of Minima Medicamenta - a new publication by the Malta Medical Students' Association (MMSA).

One of the MMSA's top priorities is the constant improvement of medical education. We believe in the holistic development of medical students in their journey to becoming great doctors and we strive to work towards this through a number of seminars, campaigns and representation at faculty-level and beyond. Through Minima Medicamenta, we wanted to achieve this in the following number of ways. On one hand, we wanted to give medical students the opportunity to share academic resources with their peers in the form of case reports, written up by the medical students themselves, as a testament to their commitment to their medical education. Additionally, it served to broaden students' knowledge about the subject, allowing students to fully appreciate what caring for a patient truly entails.

I invite you to read through the following pages with interest. I hope you will find the publication both resourceful and that it compliments your formal learning.

Regards,

Ann Victoria Farrugia
MMSA President '11 - '12
Malta Medical Students' Association

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Special thanks goes to
Chris Cremona
3rd year medical student

Preface

Minima Medicamenta is a project recognised by the International Federation of Medical Students' Associations (IFMSA), and has been locally launched as a new initiative by the Malta Medical Students' Association (MMSA). It aims to encourage the involvement of students in the publication of a scientific paper as well as the dissemination of medical and scientific knowledge. Minima Medicamenta will serve as a new means by which students will learn how to question cases, write out reports and last but not least, learn from each other's educational experiences. The student that creates and finally publishes a case report shows great dedication and training, thus giving visibility and credibility to the course of Medicine and Surgery at our University.

Since Minima Medicamenta aims to collect unusual clinical cases from every field, it allows the reader to gain medical knowledge and also observe the characteristics of the different approaches and diagnostic tools taken.

I hope you find this publication worthwhile reading, there's a team of hardworking students behind it!

Elizabeth Gialanze`

The students behind this publication:
Simon Micallef, Sarah Vella,Christine Vella, Andrea Vella Baldacchino, Keith Pace, Stephanie Magri, Daniele Lauretta Agius, Caroline Attard, Franklin Abela, Anthony Dimech, Lauren Abela, Keith Borg Xuereb, Gabriella Sammut DeMarco and Fabrizia Cassar

Case Report 1
Metastatic Pancreatic Cancer

Simon Micallef & Sarah Vella
Reviewed by: Dr. Norbert Vella MD FRCP (London)

Case Summary:
A 69-year-old Caucasian woman who had recently been diagnosed with pancreatic cancer presented with severe low back pain associated with weakness and paresthesiae in her lower extremities. She had also developed urinary retention. She was diagnosed with spinal cord compression at T10-11 secondary to vertebral and epidural metastasis. In view of the poor prognosis, the patient was referred for palliative care.
This case documents spinal cord compression secondary to bone metastasis, a rare complication of pancreatic cancer.

Presenting Complaint:
A 69-year-old woman with known pancreatic cancer was admitted to hospital with severe low back pain as well as weakness and sensory disturbance in her lower limbs.
History of Presenting Complaint:
The patient developed the lower lumbar back pain about two weeks earlier but it became so severe that it was waking her up at night. Movement exacerbated the pain which would sometimes also radiate from her back to her legs.
Two days prior to her admission she began experiencing weakness and numbness in her lower extremities such that she began finding it hard to bear her own weight. She was also finding it increasingly difficult to completely void her urinary bladder.

Past Medical and Surgical History:
The patient suffers from Type II diabetes mellitus, hypertension and congestive heart failure (CHF). At 57 years of age she underwent spinal surgery for a herniated disc.
Two months prior to her last hospital admission she presented with epigastric pain, nausea and vomiting, melaena, loss of appetite and weight loss. A CT scan revealed a mass causing gastric outlet obstruction which was later shown to be a pancreatic tumour whilst the patient was undergoing a gastrojejunostomy. There is no documented adverse reaction to anaesthesia.

Drug History:
On admission to hospital, the patient was on the following medications:
- Glucophage and Glibenclamide for her diabetes
- Omeprazole and Metoclopramide to control the gastric symptoms
- Lisinopril and Carvedilol for her hypertension and CHF
- Pancrelipase (Creon) as a substitute for pancreatic digestive enzymes
- Protifar as a high protein feed supplement
- Ketoprofen for her back pain
- Palliative chemotherapy

She has no known drug allergies.

Family History:
Her sister had breast cancer.

Social History:
The patient never smoked, and has no past history of alcohol or drug abuse.

Systemic Enquiry:
Non-contributory.

Current Therapy:
Soon after being admitted to hospital the patient was put on oral Dexamethasone in an effort to decrease the oedema surrounding the metastatic lesion and thus protect the spinal cord from further injury. She was also on oral Etoricoxib (Arcoxia) to try and relieve her back pain, but its effect was minimal.

Physical Examination & Discussion of Results:
On admission to hospital, the patient had a Glasgow Coma Scale of 15. She was afebrile but appeared pale and dehydrated. There was no sign of jaundice, clubbing or dependant oedema. Her pulse rate was 72 beats per minute and regular, the blood pressure was 119/58 mmHg, and her heart sounds were normal. Chest auscultation elicited a few sparse wheezes over the left lung apex associated with decreased air entry.
Inspection of the abdomen revealed a supraumbilical midline laparotomy scar. On palpation the abdomen was soft but there was mild tenderness in the left iliac fossa. There was dullness to percussion over the suprapubic region which turned out to be a distended urinary bladder. No costo-vertebral tenderness was elicited. The bowel sounds were normal. Digital rectal examination revealed the presence of haemorrhoids.
On examination of the musculoskeletal system, the patient had normal tone and power in her upper extremities, but was found to be weak in both her lower limbs, proximally 2/5 and distally 5/5. There was also evidence of sensory impairment in both legs. Straight leg raising was limited by pain to 10° bilaterally.
The back pain along with the weakness and decreased sensation in the lower extremities and the urinary retention, were highly suggestive of spinal cord compression.

Differential Diagnosis:
- Vertebral metastasis from the pancreatic tumour
- Osteoarthritis
- Rheumatoid arthritis (usually affects cervical and not lumbar spine)
- Paget's disease of bone
- Psoriatic arthritis
- Ankylosing spondylitis (unlikely as first symptoms usually appear during one's twenties)

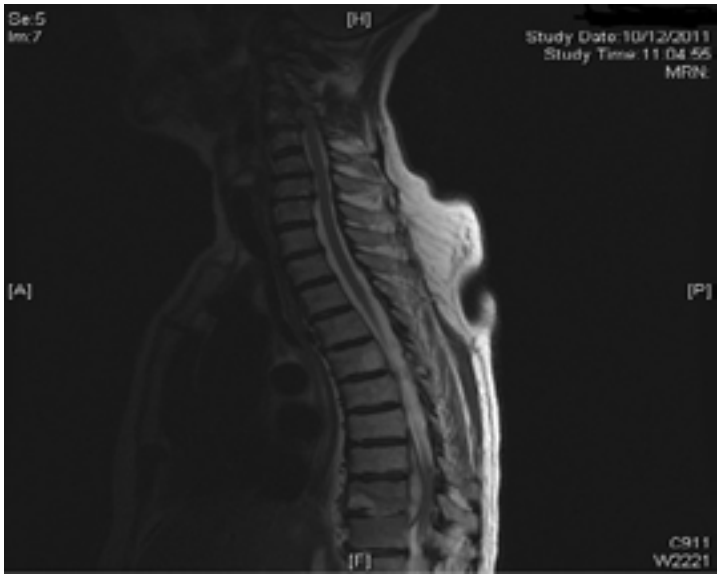
A diagnosis consisting solely of referred pain to the back due to the pancreatic tumour was unlikely considering the patient's other symptoms which included weakness and numbness in the lower limbs.

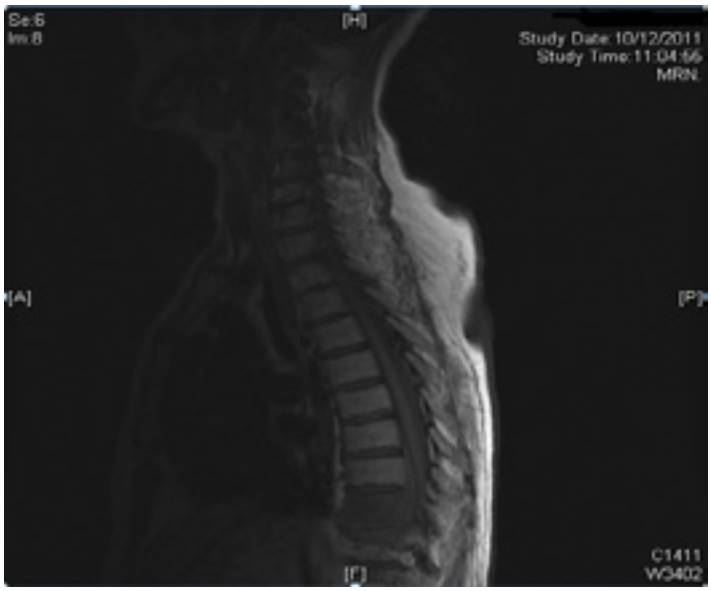
Diagnostic Procedures:
a) Laboratory tests:
The white cell count was high at 14.3x109/L with 13.3x109neutrophils/L. The lymphocyte count was low at 0.46x109/L as was the red cell count at 3.2x1012/L. This blood picture could be explained by the recent chemotherapy. It was also found that the patient had low levels of amylase (24u/l), calcium (1.91mmol/L) and sodium (132mmol/L). Random blood glucose was also taken as patients with pancreatic cancer may sometimes suffer from hyperglycaemic episodes but the result came back normal (8.03mmol/L). In conclusion, these blood test results, especially the anaemia with a haemoglobin level of 8.6g/dL, were suggestive of bone metastasis. Moreover, although not a very sensitive marker for bone secondaries, the alkaline phosphatase level was high at 223U/L.

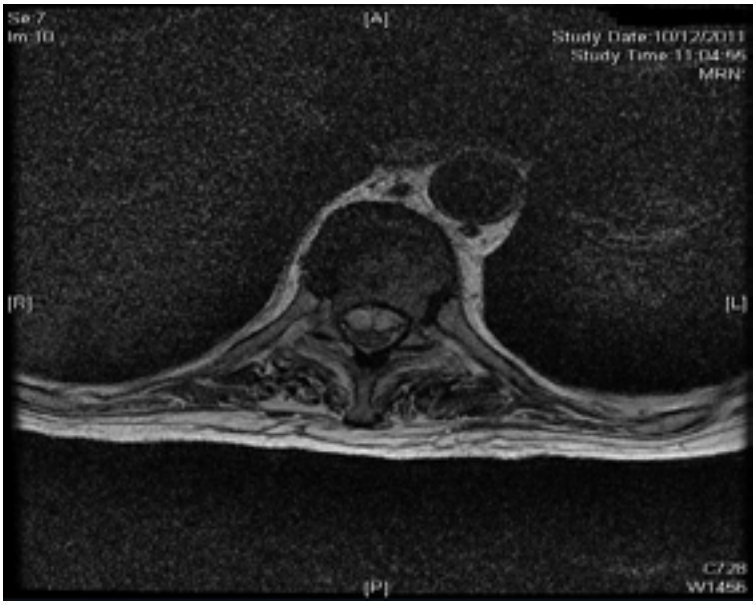
b) Imaging Studies:
Plain radiograph of the lumbar spine showed severe degenerative changes.

The thoracic spine MRI revealed an epidural mass, 5 x 1cm, extending from the rostral aspect of the T10 vertebra down to the caudal aspect of T11. The spinal cord appeared to be displaced at the level of these 2 vertebrae, and the vertebral marrow signal was altered suggesting infiltration by neoplastic tissue. There were no signs of vertebral collapse or of intervertebral disc protrusions.
MRI of the cervical spine showed severe stenosis due to the degeneration of the intervertebral discs and the presence of osteophytes. A change in the intensity of the cord signal at the level of the C3 and C4 vertebrae indicated possible myelomalacia.

The patient's brain CT was normal.







Diagnosis:
The patient was diagnosed with spinal cord compression at the level of the T10 and T11 vertebrae, secondary to vertebral and extradural metastases from a previously diagnosed pancreatic tumour. Prognosis for this patient was poor with an average life expectancy of less than six months.

Further Management:
Following discussions with the patient, her immediate relatives, the neurosurgeons and the oncologists, it was decided that the patient could only be offered palliative care, including radiotherapy to her spine, for pain control.

Case Discussion:
Pancreatic cancer is the fourth leading cause of cancer-related deaths in North America. The most likely reason for this is that once patients present to their physician they are often already in the advanced stages of the disease rendering it virtually impossible to cure. Pancreatic cancer is more likely to affect men than women. The most common type is adenocarcinoma of the pancreas which affects the organ's exocrine glands. The endocrine part of the pancreas gives rise to a completely different type of cancer which is referred to as pancreatic neuroendocrine carcinoma or islet cell tumour.

The exact aetiology of pancreatic carcinoma is unknown but it has been found that the risk is higher in people who smoke, drink large amounts of alcohol or coffee, or ingest a lot of dietary fats. Also, recent studies have shown that there is a relationship between mutation of the BRCA2 gene and the incidence of pancreatic cancer as well as that of breast cancer. In our case, one could speculate that there could have been a common BRCA2 gene mutation between the patient and her sister who had suffered from breast cancer.

The clinical features of pancreatic cancer depend on the part of the pancreas that is affected. Tumours of the head of the pancreas usually present with painless jaundice which could also be associated with pruritus and anorexia. Jaundice occurs as a result of compression of the common bile duct in its course through the head of the pancreas. This type of obstructive jaundice can be distinguished from jaundice resulting from gallstone disease because the latter presents with a history of typical biliary colic. Moreover, Courvoisier's law states that, in the presence of gallstones, chronic inflammation and fibrosis prevent distension of the gall bladder such that it is not palpable. On the other hand, cancer of the head of the pancreas often distends the gall bladder rendering it easily palpable. Cancer affecting the body or tail of the pancreas presents with epigastric pain which often radiates to the back as well as loss of appetite and weight loss. The patient may also complain of nausea which could be the result of intestinal obstruction by the tumour. Diabetes mellitus and clinical depression are two conditions that can be associated with pancreatic carcinoma, either antedating it or occurring as a result of the cancer. Cases of patients diagnosed with either of these two conditions, and months or even years later developing pancreatic cancer, are currently being studied. The association with diabetes is due to the tumour affecting the insulin-producing β-cells of the pancreas resulting in hyperglycaemia. In our case, the patient was a long-time sufferer of type II diabetes mellitus but her blood glucose was well controlled with two oral hypoglycaemic agents. The relationship between pancreatic cancer and clinical depression is as yet unknown.

Like many other tumours, pancreatic cancer can spread directly to contiguous tissues or else metastasize via the blood or lymphatic systems. Direct spread may involve the common bile duct. Haematogenously, cancer cells may spread to the liver and, in rare cases, from the liver to the lungs. Lymphatic spread commonly reaches the regional lymph nodes, namely, the nodes in the paraduodenal peritoneum as well as the nodes of the celiac axis, porta hepatis, lesser and greater curvatures of the stomach, and the hilum of spleen.

It is rare for pancreatic cancer to spread to bone so much so that in patients diagnosed with pancreatic cancer and bone metastasis one may have to look for another primary tumour. Bone metastasis is not only diagnosed through the use of imaging but also by looking at blood test results for signs of anaemia or hypercalcaemia. The latter normally occurs as calcium is released from the bone into the bloodstream. If untreated, malignant hypercalcaemia may cause encephalopathy, coma and death. In bone metastasis, the uncoupling of the regulation of osteoclasts and osteoblasts leads to bone malformation. This, along with the lowering of the pH that occurs in the extracellular matrix surrounding the osteoclasts, activates nociceptors (pain receptors) in the bone and surrounding tissue, thus giving rise to the dull, chronic pain that these patients often complain of.

If spinal cord compression secondary to neoplastic disease is not reversed, the patient is likely to end up with irreversible paraplegia. In our case, the patient had not yet reached the point of complete compression of the spinal cord but there was evidence of cord damage at the level of the vertebral and epidural metastasis. This included weakness and numbness in the lower limbs, below the level of cord compression, and difficulty in emptying the urinary bladder completely.

In advanced cases of pancreatic carcinoma, where there has been extension to other nearby organs and involvement of the retroperitoneal nerves, the patient experiences severe pain. In fact, severe and continuous pain is one of the clinical features of end-stage pancreatic cancer, and is usually described as being 'deep' and 'gnawing'. There have even been recorded cases of suicide due to the excruciating pain. The pain tends to be more severe on lying down, and is poorly relieved by analgesics. However, it may be lessened by leaning forward in a sitting position.

Pancreatic cancer patients usually present with non-specific symptoms so a number of investigations may be necessary before rendering a diagnosis. An abdominal ultrasound detects a pancreatic abnormality in 75% of cases. If an anomaly is suspected on ultrasound, one would proceed to an abdominal CT scan. A pancreatic mass, which can be easily missed on physical examination, can be picked up on CT. A biopsy would often be taken to confirm that the mass is malignant. Apart from these radiological studies, suspicion of pancreatic cancer may arise due to elevation of the CA 19-9 tumour marker in the blood. However, CA 19-9 is not specific for pancreatic carcinoma as a number of other cancers can also raise it. CA 19-9 also has a low sensitivity for detecting pancreatic cancer. There have been several documented cases of pancreatic cancer whose CA 19-9 remained within the normal range. However, its level may help in monitoring treatment response as a progressive increase in the CA19-9 level may suggest that the administered treatment is not having the desired effect.

Pancreatic cancer is relatively resistant to medical treatment and the only potentially curative treatment is surgical. Once diagnosed, the cancer is 'staged' with stage I being the earliest stage of the disease and stage IV being the most advanced with evidence of metastatic disease. Patients with pancreatic cancer are also grouped into three classes. Class I includes those patients with local disease (equivalent to stage I or II), class II patients have locally advanced unresectable disease (stage III), and those with metastatic disease are included in class III (equivalent to stage IV). Patients with stage III and stage IV cancer have little to no chance of being cured.

Resectable pancreatic cancer is cured surgically. The surgical procedure most commonly performed is a Whipple procedure (pancreatico-duodenectomy). This involves removing the distal half of the stomach, the entire duodenal loop, the head and body of the pancreas and the lower end of the common bile duct. The tail of the pancreas, the hepatic duct and the remainder of the stomach are then anastamosed to the jejunum. This procedure is preferred to total pancreatectomy as this would result in the patient suffering from brittle diabetes for the rest of his/her life. Following this procedure, patients are started on chemotherapy for six months to lower the risk of recurrence.

In locally advanced unresectable disease, the cancer would have already invaded important local structures such that it cannot be resected surgically. However, since the cancer would have not yet metastasized, other forms of treatment are still available, although the chances of the patient being cured at this stage are minimal. Treatment may include low dose chemotherapy to decrease the probability of metastasis together with radiotherapy to the pancreas and surrounding tissues to minimize further local progression and thereby decrease the patient's symptoms. In metastatic disease, chemotherapy is used as a form of palliative care so as to enhance the patient's quality of life.

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Case Report 2
Hip Arthroplasty

Christine Vella & Andrea Vella Baldacchino
Reviewed by: Mr. Stephan Grech MD, MRCS(Ed)

Case Summary :
A 68- year old gentleman presented to outpatients clinic complaining of pain in his right hip, 10 years after undergoing a total hip replacement. Following a thorough history, physical, lab and radiographic investigations, aseptic loosening of the hip prosthesis was diagnosed. One-stage revision surgery was carried out and the patient is currently undergoing rehabilitation and being followed up.

Aim:
This report will review the history, examination, investigations and management of a case of aseptic loosening of a total hip arthroplasty (both acetabular and femoral components). It will also serve as an excellent illustration of the various examination techniques and other investigations which are made use of for the diagnosis of hip (and other orthopaedic) conditions. Apart from describing the main surgical therapy required in this case i.e. revision arthroplasty, the case report will also deal with the complex yet equally essential perioperative drug management which complements the surgical treatment. Moreover, this case highlights the holistic approach to patient care, requiring a multidisciplinary team (including proper nursing, physiotherapy etc.).

Case Presentation

Presenting Complaint:
The patient was complaining of right hip pain which was worse on exertion and increasing in intensity over the past few months. Pain was limiting his activities of daily living and was persisting during the night, altering his normal sleep pattern. He described recent onset of limping.

History of Presenting Complaint:
The patient had been experiencing this pain for the past one and a half years. He describes it as being discomforting and intermittent. He had felt severe pain following some exercise. He started using a crutch on the left side in order to try and reduce some of the pain.

Past Medical History & Surgical History:
Medical:
Well-controlled non insulin dependent diabetes
Septicemia post-prostate biopsy two years ago

Surgical:
Right hip replacement in March 2000 due to a dislocation of the right femoral head following a traffic accident.
Left inguinal hernia repair
Open hip biopsy done in March 2011; no infection was found.

Drug History:
Vitamin B complex – 1 tablet
Combodart – 1 tablet
Metformin – 500mg bd
No known drug allergies

Family History:
Father had pacemaker

Social History:
A married pensioner.
Patient smokes 7 cigarettes per day.

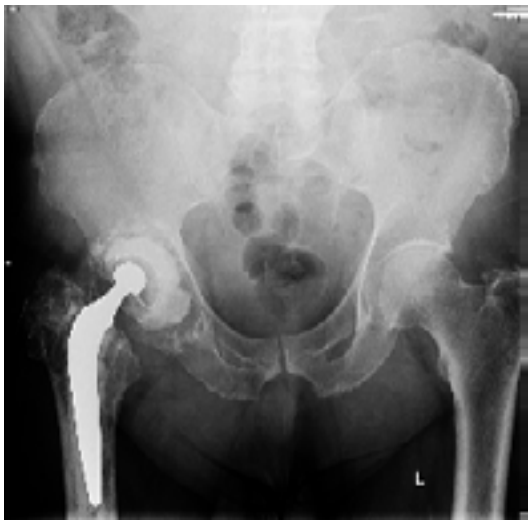
Systemic enquiry:
Shortness of breath only on severe exertion
Cough especially in the morning
Sputum in morning only
Numbness in both hands
Nocturia: woken up 4 to 5 times every night
No urgency or dysuria

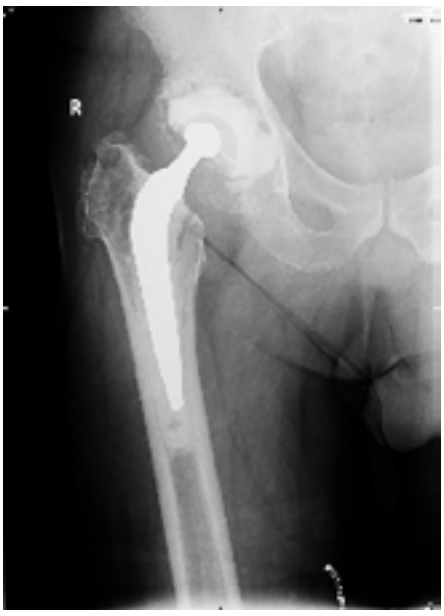
Physical examination:
Patient being a mild smoker has SOB on mild exertion with cough and sputum.
The right lower limb was found to be slightly shorter than the left. There was minimal tenderness on deep palpation of right groin. The hip could be fully extended and flexed. There was tenderness on internal rotation, but none on external rotation. The left hip was found to be normal.
The left and right knee were completely normal.
Antalgic gait was observed on the right side.
Trendelenburg test was found to be positive on right side, while Thomas' test was negative both for left and right.

Differential diagnosis:
- Septic hip
- Aseptic loosening
- Muscular pain
- Back pain

Investigations
a) Lab exams
Bone biopsies were taken from acetabulum and femur before and during the operation. Both turned out to be negative (no bacteria were cultured).
Bone scans (three-phase bone scintigraphy of the femur following IV administration of Tc 99m MDP) were performed to check for any infection present. Moderate increase in tracer uptake was noted around the right hip prosthesis (particularly in the intertrochanteric points), in all three phases in keeping with ongoing bone re-modelling. Active sepsis was excluded.
Blood tests were also carried out:
CBC: WBC: 16.6x109 /L
Haemoglobin: 12.7
Urea: 5.60 mmol/L
Na+: 141.0 mmol/L
K+: 4.05 mmol/L
Creatinine: 60 µmol/L
APTT: 26.1 s
PT: 12.00 s
INR: 1.14 ratio
Random blood glucose was also taken as the patient was diabetic. 8.2mmol/L

(b) Plain radiographs:





Findings on X-rays pre-op:

- Radiolucent lines between cement and femoral stem (areas of osteolysis).
- Radiolucent lines between cement and acetabular cup (areas of osteolysis).
- Migration of femoral stem into varus position (distal end pointing medially).
- Head off centre in cup - wear in acetabular cup plastic
- An old Charnley monoblock hip prosthesis

Treatment

Surgical Therapy

Pre-op :

A standard clinical examination was carried out, and a complete history was taken. Pre-op investigations included blood tests; (CBC, U&E, RBG, CREAT, INR and APTT). An ECG and CXR were also performed together with a pelvis X-Ray.

Operation:

An antero-lateral skin incision was made, over the previous incision, together with a radical capsulectomy. Excess soft tissue was excised. The loose cemented Charnley cup was removed en masse with cement in situ. There was moderate residual bone stock present in acetabulum but a large cavity was in place. The mesh over the superior lip of acetabulum was reinforced and held with two screws. The acetabulum was filled with impaction grafting (using autograft) to accept a52mm cup. There was good containment from all areas. Antibiotic-impregnated cement (with rifampicin) was used. The femoral site was prepared and extraction of the Charnley prosthesis with the surrounding cement was carried out, using ultradrive. The membrane was removed as well. A size 16 standard offset Corail femoral stem was used. Trial (zero) head was placed and the joint relocated. There was stable reduction with no telescoping. Routine closure was carried out with vicryl and skin clips.

4 units of blood were transfused in theatre.

Drugs:

Vitamin B complex
Combodart (dutasteride/ tamsulosin) – for benign prostatic hyperplasia
Metformin
Rivaroxaban - for 5 weeks
Gentamycin
Flucloxacillin – 3 doses after operation
Paracetamol, Morphine & Diclofenac
Prochlorperazine
Actrapid – Short-acting insulin

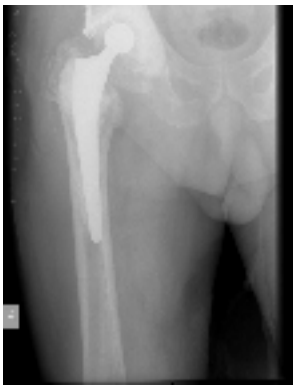
Outcome and Follow-up

Immediately postoperatively, analgesia was administered to relieve pain. Blood pressure and temperature were recorded. Pressure areas were checked 2 hourly while the wound was checked hourly. Intravenous infusions (including 5% Dextrose in 0.45% N/saline and 5mLs KCl set up at 100mL/ hr), were started and fluid balance were recorded and maintained. Urine passed was monitored due to catheterization (>30mL/hr passed). Thromboprophylaxis was administered. Pain score at rest and on movement was less than 5. During the first day post operatively, legs were kept in abduction, with a Charnley pillow kept between the knees, as this may help prevent dislocation of the operated hip. Patient was mobilised with great care, under supervision. He was discharged from hospital on day 6 post op with strict instructions as to avoid full weight bearing for at least 6 weeks. At two weeks the skin clips were removed.

Follow up appointments were organised at 6 weeks when a check X-ray and a general overview will be performed. The final appointment will be at 6 months post operatively.

Image post-op shows:

- Mesh to hold autograft in situ (taken from iliac crest)
- Revision stem (Exeter stem, modular)



Case Discussion:
Total joint arthroplasty, including total hip arthroplasty (THA), can be considered to be one of the greatest advances in medicine in the 20th century. For patients with hip arthritis, THA has proved to be a successful and effective procedure, improving the quality of life drastically by reducing pain, increasing mobility, improving sleep, as well as social and sexual function. Long-term follow up studies suggest that around 85% of hip replacements would still be functioning by 20 years after surgery. The need for a revision THA can be either due to failure of the implant, or due to loosening. A failure of an implant is indicated by repeated dislocations. Causes of failure include incorrectly positioned implants, material interposed in the joint and fracture of the bone around the implant, secondary to surgery or trauma. Loosening is subdivided into septic and aseptic. Septic loosening usually involves infection by a low-grade pathogen such as Staphylococcus epidermidis [1]. Aseptic loosening occurs 10 to 20 years after THA surgery as a result of a chronic inflammatory reaction in response to implant particulate debris, leading to progressive osteolysis around the implant. It is the single major limitation of THA long-term success, requiring revision surgery. With the increasing life expectancy and frequency of THAs in younger, heavier, more active patients, aseptic loosening and the consequent revision surgery are becoming more prominent issues in the field of orthopaedics [2].

Pathophysiology
Following numerous histopathological analyses, it has been established that the peri-prosthetic bone loss in THA aseptic loosening is secondary to wear debris which accumulates and mediates a chronic, granulomatous inflammatory reaction. Total joint arthroplasties involve creating an interface between artificial materials and the skeleton. At such an interface a combination of mechanical and biologic factors contribute to the generation of an osteolytic response. Relative motion between the implant and the surrounding bone, due to metal/bone modulus mismatch and possibly poor implant fixation, is responsible for the generation of particulate debris. Such wear debris is biologically active and in the early stages, a pseudomembrane forms, surrounding the implant. Within this membrane, various cell types are stimulated by the wear debris to release pro-inflammatory cytokines. Different particle sizes, shapes and compositions have been found to produce different interactions. In fact, the polytetrafluoroethylene (PTFE) acetabular components which were previously used required revision after 1-3 years, and a dramatic decrease in revision surgery frequency followed the introduction of the polyethylene cups.

Macrophages and phagocytes are stimulated by the debris particles to release a variety of pro-inflammatory cytokines including TNF, IL-1, IL-8, IL-11, PGE2 and RANKL. Normal bone remodeling involves a dynamic balance between bone resorption by osteoclasts and bone deposition by osteoblasts. The cytokines and growth factors released in large quantities and over a long period of time (owing to particle resistance to enzymatic degradation), lead to a disturbance in this balance, favouring bone resorption by relative osteoclastic over-activity. The RANK/RANKL pathway is thought to be the principal pathway leading to increased osteoclastogenesis. RANKL binds to its cognate receptor RANK on osteoclast precursors, with resulting activation of NF-kB transcription factors and osteoclast differentiation [3]. Knowledge of the pathophysiologic mechanisms involved can be exploited to provide targets for pharmacologic agents to inhibit the particle-induced osteolysis, thus providing alternatives to surgical therapy.

Clinical presentation and examination
This case involves a patient presenting with hip pain and a history of THA for that same hip 10 years ago. A detailed history and clinical examination can be very helpful in narrowing down the potential sources of this hip pain, especially by determining if the source of pain is intrinsic (involving the THA) or extrinsic. Aseptic loosening and sepsis are by far the most common intrinsic causes of hip pain in a patient with a THA. Extrinsic causes are many and include lumbar spine disease such as spinal stenosis and disc disease, trochanteric bursitis, sciatic or obturator nerve impingement, claudication, abductor or iliopsoas tendonitis and stress fractures of the pubic ramus. [4]

This patient had tenderness mostly in the groin, which is typical of loosening (especially the acetabular component) but it may also indicate iliopsoas tendonitis. Lumbar spine disease would more likely present as posterior buttock and thigh pain, extending distal to the knee. Trochanteric bursitis would be indicated if pain was felt directly over the greater trochanter.
The fact that the pain came about with weight-bearing but was relieved with rest, further points to a diagnosis of aseptic loosening. Lumbar spine disease may be accompanied by neurological features such as radiation below the knee, numbness and parasthesia.
Of note is the patient's history of diabetes and smoking, and perhaps even a family history of heart disease. Thus, with these risk factors for atherosclerosis it would be reasonable to think of peripheral vascular disease in the differential diagnosis. Pain secondary to vascular insufficiency would have a history of intermittent claudication i.e. pain starts after walking a roughly constant distance, and is relieved by stopping.

The history may also indicate whether this is a case of aseptic loosening or sepsis. Pain by septic loosening often starts within months of the primary THA and the severity of the pain would be greater than expected, possibly even constant and not relieved with rest. Furthermore, a history of fever and chills would be suggestive of sepsis.

During the physical examination any hip function abnormalities and reproduction of pain are sought for. Evaluation of the gait can give important clues, and in this patient, the antalgic gait with a positive Trendelenburg test further point to an intrinsic source of hip pain. The observation that the right lower limb is longer than the left can be expected, as a result the primary THA in the right hip. Loosening often causes pain at extremes of motion and which can be reproduced by internal or external rotation. Iliopsoas or abductor tendonitis would be diagnosed following careful muscle testing. Checking the peripheral pulses, skin temperature and lower limb arterial flow with an ultrasound Doppler probe will exclude peripheral vascular disease as the cause of hip pain.
In summary, the history and examination revealed hip pain, especially in the groin on palpation, which was felt upon weight bearing, relieved by rest and reproduced by internal rotation. Moreover, an antalgic gait, positive Trendelenburg test but normal lumbar spine, neurologic, muscle and vascular examinations were recorded. These findings exclude an extrinsic source of pain, and are consistent with aseptic loosening.
In cases of THA loosening it is imperative to determine if there is sepsis or not, as a revision THA with an undiagnosed occult sepsis would have disastrous consequences. Laboratory tests include white blood cell count (WBC), C-reactive protein (CRP) and erythrocyte sedimentation rate (ESR), although the value of these tests (sensitivity and specificity) is doubted. A raised WBC may indicate sepsis but in isolation is of no significance. A normal ESR and CRP exclude the diagnosis of infection, but if both are elevated there is a high probability of infection. Needle aspirations of the synovial fluids may also be used to check for infection, but the definite diagnosis can often only be made by frozen section histology during revision surgery.
Technetium-99m (Tc-99m) methylene diphosphonate (MDP) bone scintigraphy is often used to assess the fixation of cemented components. MDP bone images are very sensitive indicators of bone turnover and activity, but they are not very specific. Increased radionuclide uptake can be caused by infection, loosening, heterotopic ossification, stress fracture, Paget disease and tumours. In this case, the bone scans showed a pattern of uptake which suggested loosening rather
than infection.

Plain radiographs can provide many clues which help in making the diagnosis of a loose prosthesis. However, it must always be kept in mind that radiographs tend to underestimate the degree of osteolysis around the components. Whenever possible, radiographs should be compared to previous radiographs in order to note any changes, for example in the position of the components and any new radiolucent areas. A change in the position of the components, as was the case in this patient, is pathognomonic of loosening. One should also look for any radiolucencies at the cement-bone interface. Radiological lines of demarcation at this interface which are more than 2mm in thickness, progressive and surrounding the whole interface strongly indicate loosening. Other radiological signs which indicate loosening include new radiolucencies at the cement-metal interface as well as cement fractures [2]. Since the radiographs showed new radiolucencies between the cement and both prosthetic components and changes in the position of the components, the diagnosis of aseptic loosening could be confirmed.

Therapy
Once aseptic loosening is diagnosed, revision of total hip arthroplasty should be considered. However, the decision to carry out this procedure should be taken after careful consideration of many factors. Revision surgery is often indicated if the patient experiences significant symptoms, notably pain, which have an effect on their activities of daily living. The orthopaedic surgeon may rarely even recommend surgery in the absence of symptoms if serial radiographs indicate substantial osteolytic lesions, before bone loss becomes too severe for revision. In cases of loosening, periodic follow ups may be necessary to monitor the rate of progression of loosening and thus intervene promptly when impending failure is suspected.

Primary THA and revision arthroplasty share the same goals i.e. to restore a pain free, functional hip and hence follow the same general principles. However, revision THA is markedly more complex and technically demanding. Compared to primary THA, in revision arthroplasty the poorer bone quality makes component fixation more difficult. In addition, revision surgery involves removing loose components, osteolytic lesions and particle generators, making the procedure more extensive. Moreover, patients undergoing revision surgery are older and often with more comorbidities, which may render them less tolerant to long surgical procedures.

The surgical goals of one-stage revision surgery include: removal of loose components and associated cement; reconstruction of bony defects with bone graft and metal augmentations; and placement of stable revision implants. Preoperative planning is crucial as the majority of challenging features of a revision can be predicted. The state of fixation of the components must be determined (loose or well-fixed) in order to plan for component extraction (e.g. trochanteric osteotomy may be required for well-fixed components). The amount of bone loss must also be assessed, thereby possibly indicating the need for bone grafts. In this case, such a graft was required for the acetabular roof. This was necessary since stability of the revision acetabular cup can only be achieved with an intact acetabular rim. Segmental defects and decreased bone stock will require a structural allograft, supported by a reconstructive cage [5].

Whenever possible, the incision (and thus the approach) of revision surgery should be done over the previous scar, although it is more extensive with revision in order to gain greater access. The soft tissues are released to allow dislocation of the hip. In the anterolateral approach, the main soft tissues encountered are the fascia lata and the gluteus medius and vastus lateralis muscles. Great care must be taken during surgical dislocation of the hip to expose the femur, since at revision the femur would be weakened due to cavitation and cortical defects and fractures are more likely. Once the hip is well exposed, the pseudocapsule is removed and implant removal carried out, before the revision components are inserted and secured [6]. As can be noted by comparing the preoperative and postoperative radiographs, the femoral component inserted in the revision surgery was an Exeter block, in contrast to the Charnley monoblock used in the primary THA. The Exeter block is a modular component, with a screwable head, thus allowing for different head dimensions and neck orientation, making it more stable in comparison to the monoblock.

Revision surgery produces less satisfactory results and has more frequent complications in comparison to primary THA.

Mahomed et al. reported that while the rates of adverse outcomes are quite low, they are significantly higher after revision than after primary total hip replacement [7].

Table 1 below shows the rates of some complications occurring within 90 days of primary and revision total hip replacements:

	Mortality	Pulmonary Embolism	Wound Infection	Hospital Readmission	Hip Dislocation
Primary THA	1%	0.9%	0.2%	4.6%	3.1%
Revision THA	2.6%	0.8%	0.95%	10%	8.4%

Table 1: Rates of complications occurring within ninety days, following primary and revision THA

During the operation, blood loss can be significant during revision THA and thus blood transfusions may be necessary. Complete blood counts taken pre operatively are used to see if the patient is anaemic, and if this is the case, it should be corrected before the operation since studies have shown that even mild degrees of anaemia are associated with increased postoperative 30-day risk of mortality and cardiac event following major non-cardiac surgery, especially in elderly, male patients [8].
Many postoperative complications can be reduced or avoided by a carefully designed drug regimen. Infection is a possible complication of every surgical procedure, but in joint replacement surgery even more stringent precautions must be taken since infection can lead to a failure of the joint replacement. Among the various precautions taken (sterilized instruments, theatres with air filters and laminar flow etc.), antibiotic prophylaxis is an essential part of perioperative care. Since this case involves a prosthesis, a combination of Gentamicin (an aminoglycoside) and Flucloxacillin (a β-lactamase-resistant penicillin) was used, in accordance with Infection Control Unit recommendations. Also of note, although the diagnosis was that of aseptic loosening, antibiotic-impregnated cement (Rifampicin combined with cement) was used, in case an occult infection was missed and to prevent an infection developing postoperatively.

Postoperative pain must be controlled by a variety of analgesics. This patient was given drugs from three different classes of analgesics. Paracetamol and Diclofenac, a Non-steroidal anti-inflammatory drug (NSAID), are COX-inhibitors and therefore decrease prostaglandin production. While being effective in reducing pain, thereby decreasing opioid drugs in managing the pain, Diclofenac is given only for 1 week, due to its numerous side effects, especially gastric ulceration, typical of all NSAIDs. Morphine, an opioid, was administered by a system of Patient Controlled Analgesia (PCA), which involves intravenous infusion of doses of morphine via an electronic pump that is controlled by the patient. Since effective pain relief requires flexible and individualized dosage regimens, PCA helps to improve pain control, decrease postoperative morbidity and hence leads to greater patient satisfaction [9]. However, opioids are well known to cause nausea and vomiting, by their action in the chemoreceptor trigger zone (CTZ) in the area postrema within the medulla. Therefore, prochlorperazine (an antipsychotic drug) was administered as an antiemetic, by acting as an antagonist to dopamine D2 receptors in the CTZ.

While deep vein thrombosis (DVT) is a common complication following surgery, it is even greater in joint replacement surgery, and even more so in revision THA due to longer operating times and hospital stays with little mobility (due to high risks of dislocation). Antithrombotic therapy is important to reduce risks of DVT and the possible secondary pulmonary embolism. This patient was given rivaroxaban, a relatively new drug that acts as a direct factor Xa inhibitor, thus blocking both extrinsic and intrinsic pathways of the coagulation cascade. It is indicated for thromboprophylaxis following hip and knee replacements, and studies are showing greater effectiveness with rivaroxaban, compared to other anti-thrombotic drugs such as enoxaparin [10].

Being a diabetic, the patient's drug therapy had to include hypoglycemic agents. Glucose control is important in patients for elective surgery. High blood glucose levels can lead to increased risks of wound breakdown and infections. The patient was administered Actrapid, since the patient would be starved before the operation and thus, this short-acting insulin is less likely to result in a hypoglycemic event.

Rehabilitation & follow-up

Following revision THA there is a high risk of hip dislocation and this implies that patient should be mobilized gradually with great care. Rehabilitation is important postoperatively to maximize functional performance and improve the patient's ability to carry out activities of daily living. However, several physical impairments must be overcome, namely pain, limitations with hip movement and muscular weakness. These physical impairments can cause great disability which limit the benefits obtained by surgery. Rehabilitation must be carried out by an interdisciplinary team, which includes surgeons, physiotherapists, occupational therapists and nurses, in order to provide a holistic recovery. The benefits of rehabilitation are mostly seen within 3-6 months after surgery, although improvements are noted for up to 2 years. There are a number of biomedical factors which influence the final outcome of rehabilitation including fixation method, the surgical approach used, any complications and comorbidities, and patient factors such as strength, coordination, weight and cognition.

Rehabilitation involves a variety of aspects. Patient education helps to reduce the risk of dislocations during functional mobility and self-care. For example, with the anterior approach, patients are advised to avoid extreme external rotation, adduction and extension of the operated hip. A number of exercises can be carried out by the patient to regain muscle strength and endurance. In particular, strengthening the hip abductors helps maintain a level pelvis during the stance phase, preventing the contralateral hip from swinging laterally during the swing phase. Despite such exercises, various studies indicate that the muscles in both lower limbs, but even more so in the operated limb, never regain their full strength [10].

It is important to supervise and help patients to perform functional tasks. In the postoperative period, patients are instructed regarding transfers, such as how to get out of bed or into an armchair, how to walk on level and uneven ground, how to climb and descend stairs and even lower extremity dressing. Instructing and supervision is crucial to reduce the risks of dislocations of the operated hip and to allow the patient regain independence in self-caring. An important consideration is the type of weight-bearing permitted postoperatively and the need for aiding devices. Weight-bearing restrictions are prescribed by surgeons to prevent any adverse effects on the operated joint. They range from partial weight bearing, to non-weight bearing, as was the case in this patient. Weight-bearing restrictions imply the need for assisting devices which help in joint unloading during mobility. Wheel chairs, walkers, canes and crutches greatly help in making the patient more independent and carry out basic activities. The best device should be chosen for each individual, for example patients with hand joint involvement due to rheumatoid arthritis may not be able to use a walker, or their residence may not be accessible to wheel chairs or walkers. With the increasing urgency to shorten the length of hospital stays, patients are often discharged before having obtained full functional level, and thus it is imperative that the patient's social background is taken into account, and family training and education can be beneficial in allowing the patient to continue regaining functional ability outside of hospital.

Learning Points:

- Aseptic loosening is the most common cause of failure of total hip replacements.
- Aseptic loosening is a result of osteolysis around the prosthetic components secondary to a chronic granulomatous in flammatory response generated by particulate debris.
- Patients present with hip pain (around 10 or more years after primary THA), which may limit their daily activities, and with tenderness particularly in the groin and the thigh.
- The diagnosis of aseptic loosening can be made by taking a thorough history and carrying out a complete physical ex amination. Plain radiographs can confirm the diagnosis and monitor progressive osteolytic lesions.
- It is essential to rule out septic loosening as this would change the management. White blood cell count, ESR and CRP levels can provide an indication of sepis, together with bones scans, and joint aspiration. However, due to the sensitivity and specificity levels of these tests, results must be interpreted with caution.
- Revision surgery is indicated in aseptic loosening. It is significantly more complex, technicaly demanding and associated with higher risks of complications, compared to primary THA.
- Following revision THA, patients must be followed periodically, and emphasis must be placed on rehabilitation by a multidisciplinary team in order to facilitate a faster and holistic recovery.

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Case Report 3
Melanoma

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Introduction:

Melanoma is a relatively common neoplasm which is increasing in incidence. Melanoma appears as a variegated irregular maculopapular lesion usually on the skin, but possibly on mucosae, conjunctiva, orbit, nails and oesophagus. They may be black, brown, red-blue, grey or unpigmented. Histologically they are larger than nevi cells with irregular nucleoli and eosinophilic nucleoli. [1] Melanoma incidence in Malta is lower than that in northern Europe and is similar to that in southern Europe. However, incidence appears to be increasing. . In a study done between the years 2000-2004 the rates for invasive melanoma were of 8.81 per 100,000 (males) and 7.29 per 100,000 (females). A relatively high proportion of patients present with thick lesions emphasising the importance of continued efforts to diagnose cases earlier. [2]

Aim:

The aim of this article is to make the reader aware of the importance of early detection and prevention of melanoma, to highlight the risk factors for developing melanoma and to outline the way in which melanoma is diagnosed, treated and followed up.

Case Presentation:

A 20 year old male student initially presented at dermatologist with a pigmented macular skin lesion on the right upper posterior thigh. The lesion was painless, asymmetric with colour variation from pink to brown. The lesion was relatively small in size, with a diameter of approximately 10mm x 7mm. A total skin investigation was performed and the patient did not have many nevi. On palpation the regional lymph nodes did not appear enlarged. There was no history of recent weight loss. The patient is a known asthmatic, and is on salbutamol (SABA) for asthma control. There are no other known chronic diseases.

Family History:

There was no previous history of melanoma and no family history for melanoma.

Social history:

The patient is a full time student. There is no history of smoking or alcoholism. When the patient was asked about sun exposure, he couldn't recall any severe sunburn in childhood, and there isn't a particularly high tendency to tan. The patient also does not spend a lot of time in the sun, and has a skin type III18.

Diagnostic considerations: [3]

- Malignant Melanoma
- Benign melanocytic lesion
- Dysplastic nevus
- Blue nevus
- Epithelioid (Spitz) tumor
- Pigmented spindle cell nevus of Reed

Investigations:

The patient first underwent a surgical excision of the lesion (excision biopsy). Excision was performed after the lesion was anesthetized via local anaesthesia. A small amount of surrounding tissue was removed as well to ensure that any possible malignant cells were excised. The sample was sent for histological investigations at the pathology lab.

A skin ellipse, measuring 20mmx9mmx2mm, bearing a slightly raised, lightly pigmented lesion measuring 10mmx7mm, was excised. On microscopy the section showed nested and single atypical melanocytes at the dermal-epidermal junction, above the junction as well as infiltrating the dermis where they reached the mid reticular dermis. The tumour had the overall configuration of a naevus and the tumour cells had a nevoid appearance. However, marked nuclear atypia was present throughout the tumour including at it deepest aspect. There was no ulceration. There was no host inflammatory response to the tumour. The excision of the tumour was complete.

The lesion was confirmed to be an invasive nevoid melanoma Clarke stage IV (Tumour extends between bundles of collagen of reticular dermis (extends into reticular dermis)), T classification pT3aN0 (AJCC staging), and a Breslow thickness of 2.19mm, the mitotic count was of 0/mm [2] [4] [5]

Following diagnosis of melanoma a sentinel lymph node biopsy (SLNB) was performed for staging purposes. This is a minimally invasive technique to assess regional lymph node status in patients with malignancy. Any region of skin drains to a particular group of lymph nodes, but first the lymphatics drain through the sentinel node. Therefore it follows that if melanoma has metastasised it will first affect the sentinel node.
Identifying the Sentinel node involves two techniques. A gamma radiation emitting sulphur colloid is injected around the tumour before the operation and then the gamma emitting node is identified, and a vital blue dye (isosulphan blue) is injected intradermally at the time of surgery and the blue node is then identified. The two techniques are usually used together to ensure that the correct node is in fact identified6.
The specific and limited removal of the sentinel node allows one to predict metastasis and reduces surgical insult and morbidity compared with conventional lymphatic clearance 6. Sentinel lymph node status is the most important independent prognostic factor in terms of disease progression and melanoma-specific survival.
The Sentinel node was removed from the right groin, and results were as follows: 'A portion of fatty tissue measuring 10mm x 12mm x 9mm. On sectioning, 2 nodules are present, each measuring 7mm in maximum dimension. The diagnosis was of benign reactive lymph node changes, mostly sinus histiocytosis. No metastases were present.

Treatment:
The only procedure carried out for melanoma is a wider skin excision if there is no metastasis, this is done to decrease chances of local recurrence. This procedure was performed at the same time as the SNLB for logistical convenience and to because a wider excision before an SNLB would alter the lymphatics of the area rendering an SNLB impossible.
The wider skin excision was done with a skin ellipse including subcutaneous tissue measuring 57mm x 35mm x 15mm being excised (margins 3cm). The diagnosis was of no evidence of residual melanoma.

Follow up:
The patient is being followed up through outpatient appointments every 3 months for the next 2 years, every 6 months for the 2 years following those and then at least once every year for life. This follow up involves history and physical examination with special emphasis on skin and lymph nodes.

Discussion:
What is melanoma?
Melanoma is a malignant tumour of melanocytes, which are of neural crest origin. The most common forms of skin cancer are basal cell skin cancer, squamous skin cancer and melanoma. Melanoma is the least common of these. However, it causes the highest rate of mortality of the three. It is the second most common cancer in teenagers and young adults.
Melanomas have two growth phases, a radial phase during which malignant cells grow in a radial fashion in the epidermis and a vertical phase in which the malignant cells invade the dermis and develop the ability to metastasise.
There are four main subtypes of melanoma, namely the superficial spreading melanoma (about 80%), nodular melanoma, lentigo maligna melanoma and acral lentiginous melanoma. Superficial spreading melanoma can occur anywhere and is characterised by slow, radial growth. Nodular melanoma can also occur anywhere, but is more common in men and exhibits rapid growth with an early vertical growth phase. This makes it more aggressive than superficial spreading melanoma. Amelanotic nodular melanoma is possible (5% of nodular melanomas). Lentigo maligna melanoma occurs in elderly with a history of sun exposure. It presents as large lesions on the face or neck, often arising from a precancerous lentigo maligna (Hutchinson's freckle). Acral lentiginous melanoma is the most common type of melanoma in coloured people and typically occurs on the palms, soles or under the nails. Rarely, melanoma may also develop on the eyes (ocular melanoma) or any mucosa (mucosal melanoma). Mucosal melanomas tend to be very aggressive. Ocular melanoma is the commonest type of ocular malignancy.

Risk Factors
The risk factors for melanoma include fair, sun-sensitive skin that burns rather than tans, many moles—more than 50, moles which are large or unusual in colour or shape, a personal history of melanoma, excessive exposure to UV from the sun or sun beds and a history of severe sunburns. In fact, about 80% of melanomas occur in white skinned people. The disease is also exceedingly common in albinos.

Close family history of melanoma, freckling (especially of the upper back), red or blond hair, blue, green or grey eyes and the presence of solar keratosis are also risk factors for developing melanoma. Each of these risk factors increases the risk of melanoma by about 3.5 times. [9]

In melanoma, as with all other skin disorders, it is important to ask about occupation and hobbies as part of the history in order to reveal any possible exposures that may have contributed to the disease process. People who work in the sun all day are at a higher risk of developing Lentigo malignant melanoma and some studies have shown that exposure to insecticides such as carbaryl may also increase the risk of developing melanoma. [10]
The Gene CDKN2A has also been implicated in the development of malignant melanoma. This gene generates a variety of transcripts varying in their first exon. Two proteins produced by these transcripts have been found to function as CDK4 Kinase inhibitors. Another transcript is known to contain an alternate open reading frame (ARF) that specifies a protein which functions as a stabilizer of the tumour suppressor p53. All these proteins share a common functionality in cell cycle G1 control and mutations in this tumour suppressor gene have been correlated with various cancers including malignant melanoma. [19] However, people with apparently no risk factors and those with darker skin can also be affected by melanoma, as was the case with this patient. A possible explanation is the general immunosuppressive effect of sunlight, leading to an increased risk of developing melanoma due to lack of immunological tumour surveillance. This risk seems to be especially highlighted in individuals who are unaccustomed to sunlight exposure, and only receive intermittent doses of strong sunlight. This explanation would also account for melanoma that occurs in areas not normally exposed to sunlight, as in this cas. [11] [12]

Detection, Clinical Features and Prevention
Self detection or detection by a family member of the melanoma has very high success rates with research showing that 53% of melanomas are discovered by the patients themselves and a further 17% by their family members. A skin self-exam is simple and takes only 10-15 minutes once per month8. A mirror can be used to visualise hard to see places.
Melanomas are usually dark brown or black, and they may be flat or raised. Many melanomas arise from a pre-existing melanocytic naevus (at least 50%13), so it is essential to report any recent changes in a mole to a doctor.
The main signs for melanoma may be summarized in the mnemonic ABCDE:

- Asymmetry
- Borders (irregular)
- Colour (variegated)
- Diameter (greater than 6 mm)
- Evolving over time

Other features of a pigmented lesion that are suggestive of advanced melanoma include bleeding, ulceration, satellite or in-transit lesions, sensations of local discomfort and the presence of a red halo around the lesion. Melanomas (especially the superficial spreading type) may also show patches of regression.
Satellite lesions are lesions occurring around the main lesion due to lateral spread of cells via the dermal lymphatics, while in-transit lesions occur along the route of lymphatic drainage of the naevus.
Although spread to regional lymph nodes occurs quite quickly, haematogenous spread tends to occur late. However, when it does occur it is unpredictable and tends to be aggressive.

Protection of the skin by staying out of the sun during midday hours (11am – 4pm), wearing protective clothing and wearing sunscreen with an SPF of 50, and which protects against UVA and UVB, are all important in preventing melanoma. Sunscreen should not be used to prolong exposure, and it is important to reapply sunscreen at 2 hour intervals. Protective clothing should include hat, sunglasses and preferably a long sleeved shirt and trousers. Tanning beds and sunlamps should also be avoided as they expose the user to harmful UVA and UVB rays14.
Educating the public on melanoma and how to prevent it is probably the best way to reduce the incidence of melanoma and other skin cancers [15]

Prognostic Features
The importance of self examination of the skin cannot be emphasised enough as the prognosis for melanoma changes drastically for early lesions and more advanced lesions. The most accurate indicator of prognosis is the Breslow's depth of the lesion. A Breslow's depth of less than 1mm has a 5 year survival rate of over 95%, and one of more than 4mm has only a 50% 5 year survival rate assuming there is no nodal or distant metastasis7. Amelanocytic melanomas have a worse prognosis than their melanocytic counterparts simply because they are often diagnosed late. This further emphasises the importance of early detection.
The presence of satellite or in-transit lesions and ulceration of the lesion both make the prognosis worse. Also, males tend to do worse than females. As in this case, the absence/few mitotic bodies improve prognosis.

Finally, the presence of metastases has a huge impact on prognosis. A single positive node is associated with a 40% 10-year survival rate, while 2 positive nodes give a 13% survival rate. If distant metastases are found, there is only a 25% 2 year survival rate. [9]

Treatment Options

Treatment of melanoma is primarily surgical. In this case, an excision biopsy is performed (or an incision biopsy for an exceptionally larger lesions) to confirm the diagnosis and determine the Breslow thickness and Clark stage. Next, depending on the Breslow thickness, a clear margin (including subcutaneous tissue) needs to be excised: [9]

Breslow Thickness (mm)	Recommended Margin (cm)
In Situ	0.5
<1	1
1-2	1-2
2-4	2-3
>4	3

It is important to have clear margins to lower the risk of local recurrence and eliminate undetected satellite lesions.
Regarding lymph nodes, SLNB is the mode. This was in fact what was used in this case. In patients with melanoma of less than 1mm depth SNLB is not recommended unless there are other poor prognostic factors like ulceration and high mitotic rate. If the SNLB is positive a radical lymph node dissection is recommended as this prolongs the disease few survival, although it does not affect the overall survival rate. [20]

Medical management is reserved for adjuvant therapy of patients with very advanced melanoma (Breslow >4mm). This was, hence, not required in this case. However, modified radiotherapy may reduce recurrence and improve survival rates. [9] Immunotherapy (interferon or interleukin) may be used in conjunction with chemotherapy or surgery to increase the immune system's ability to recognise and destroy cancer cells. [16] Chemotherapy is of limited usefulness, but is sometimes used in disease that has spread or to slow the progression of the disease, as in locally advanced melanoma with regional or in-transit metastasis, where surgery is not an option.

Patients with distant metastases may consider radiotherapy or chemotherapy (dacarbazine), though these would have only a palliative role. Surgery may be considered in oligometastatic disease, or to prevent pain or ulceration. Very advanced patients may consider enrolling in a clinical trial. [17] Melanoma vaccines are the best near term hope for improving mortality in patients with advanced disease. Currently trials are aimed at treatment of patients with advanced disease, but their relatively low toxicity makes them attractive for adjuvant therapy in stage I patients at high risk for recurrence. [21] In short, melanoma with distant metastases is not normally curable, so efforts should be aimed at prevention and early detection of the disease.

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Case Report 4
Colovesicular Fistula

Daniele Lauretta Agius & Caroline Attard
Reviewed by: Mr. Dennis T. Gatt LRCP(London) FRCS(England) FRCS(Edinburgh) IOM

Summary
A fistula is an atypical connection between two epithelial surfaces, in the case of an enterovesical fistula between the urinary and gastrointestinal systems. These may be the result of a number of causes including:
1. Congenital abnormalities
2. Inflammatory diseases of the bowel (such as diverticulitis and Crohn's Disease)
3. Cancer
4. Infection
5. Trauma
6. Iatrogenic (such as a post-operative complication) [3]

A colovesical fistula (colovesicular fistula), an abnormal connection between the bladder and colon, is a known complication of diverticular disease, occurring in around 2%-22% of patients suffering from diverticulosis. These fistulae tend to occur three times more often in males than in females. The difference in occurrence is thought to be related to the fact that in females there is the uterus which may prevent the colon and bladder from coming into contact with each other. In fact in females other types of fistulae, such as vesicovaginal and enterovaginal, occur more frequently than colovesical fistulae. [2]

Aim:
This article highlights the importance of the early identification and management of colovesical fistulae, which although uncommon complications of diverticulitis, can be very uncomfortable for the patient and if not treated early, can lead to high morbidity.

Presenting Complaint:
A 58- year-old gentleman was admitted to hospital for an elective sigmoidectomy in view of a colovesical fistula. The patient had been diagnosed with a colovesical fistula two months prior to the surgical operation.

The patient had originally presented with dysuria (pain during micturition) which did not improve after taking a course of antibiotics. Upon further investigation the patient also described symptoms of pneumaturia and faecaluria. Upon systemic enquiry the patient did not complain of any changes in bowel habit or per-rectal bleeding, abnormal urinary frequency, nocturia, haematuria, weight loss or lethargy. The patient had no respiratory, cardiovascular or neurological symptoms.

The patient suffers from hypercholesterolaemia and diverticular disease. The patient was also being monitored since he was known to have an infra-renal abdominal aortic aneurysm. The patient is not known to suffer from diabetes mellitus or hypertension.

At 31-years-of-age the patient had a surgical procedure for a pilonidal sinus.

The patient's medication included aspirin (stopped approximately a week prior to the proposed date of surgery) and simvastatin. The patient is not known to suffer from any drug allergies and did not suffer from any complications with anaesthesia.

The following findings were made following a physical examination:
- Patient was afebrile.
- Blood pressure: 125/85 mm Hg
- Pulse: 87 bpm
- Heart Sounds: S1+S2+0
- Chest was clear with good air entry.
- Abdomen was soft and non-tender.
- No pallor, jaundice or clubbing present.
- No oedema or tenderness of lower limbs. Mild bilateral varicose veins in lower limbs were present.

Family History
The patient's mother and brother both suffer from diabetes mellitus. The patient's sister passed away 21 years ago, at the age of 45, following complications of a uterine cancer.

Social History
The patient works as a telephone operator. He smokes around 10 cigarettes a day and drinks alcohol socially. The patient lives with his wife.

Investigations:

Cystogram
Reason for cystogram: A 58yr old gentleman with past history of colonic inflammatory strictures now presented with pneumaturia.
Result: The bladder showed a smooth outline with no evidence of any fistula. Even though the bladder was stressed, no communication with another viscus was noted. No obvious gas within the bladder could be identified. Till the day before the cystogram was performed the patient was still complaining of pneumaturia and also faecaluria.

Barium Enema
A double contrast barium enema was performed. A short stricture in the sigmoid colon was identified. No abnormalities could be seen in the right side of the colon. A review of a CT scan which had been performed two years previously showed the presence of extensive diverticular change and mural thickening in the sigmoid colon and descending colon with loss of the fat plane between the sigmoid colon and the posterior wall of the urinary bladder.

Possible diagnosis: A diverticular stricture with suspected fistula formation between the sigmoid/ rectum and the urinary bladder.

Treatment
The preferred treatment in this case is sigmoid colectomy with resection of the colovesical fistula. This procedure starts by performing a midline incision. Once that the incision has been performed the descending colon, all the way up to the transverse colon, is mobilised. The sigmoid colon and urinary bladder are then separated from each other by both sharp and blunt dissection, thus freeing the colon all the way down to the healthy rectum. The sigmoid is then resected and the descending colon and rectum are normally anastamosed together. An omental patch is placed between the colon and the bladder to prevent further fistulae.

Outcome and follow-up
Two days following the procedure the patient said he was feeling well. He was haemodynamically stable and passing clear urine (via a catheter). On examination the patient was found to be afebrile and his abdomen was found to be soft and not tender. No bleeding was noted from the incision. The patient was started on IV antibiotics.

Four days after the procedure the patient had the following vital signs:
- BP 130/75
- Heart Rate: 90bpm
- Afebrile

The patient's WBC count was noted to be 14.40, the absolute neutrophil count was 10.68 and his Hb was 12.7.

The patient reported that he still hasn't had bowel movement, nor has he passed flatus yet.
The patient is to be monitored until he is in a better condition and is opening his bowels regularly

Discussion
The majority of colovesical fistulae occur as a complication of diverticular disease, of which around 10%-15% of patients require surgical treatment for diverticulitis.[5]

Most often, patients having a colovesical fistula present with pneumaturia (presence of air in the urine) and faecaluria (presence of faeces in urine), both of which were present in this patient. Patients then tend to develop dysuria and abdominal pain, mostly in the suprapubic region. In the majority of cases the fistula allows material to travel in only one direction, from the colon to the urinary tract, and therefore all symptoms are urinary in nature, and in fact fistulae rarely give rise to gastrointestinal symptoms (e.g. urinary leakage into the colon). Generally symptoms are associated with chronic urinary tract infections. The trademark presentation of a colovesical fistula is known as Gouverneur syndrome. This refers to a patient presenting with suprapubic pain, frequency, dysuria, and vesical tenesmus. Patients may also present with other signs, namely abnormal urinalysis findings, foul smelling urine, debris in the urine, haematuria, and UTIs. [2] [5]

Even though pneumaturia is common in patients with a colovesical fistula (occurs in about 50%-60% of patients), it is not diagnostic of a fistula since it may be caused by gas-producing bacteria which have invaded the urinary tract (e.g. Clostridium).

This is especially common in patients suffering from diabetes mellitus. On the other hand, faecaluria, which occurs in roughly 40% of cases, is a cardinal sign of a colovesical fistula. [3]

When diagnosing a colovesical fistula, taking the patient's clinical history is of vital importance since it may be indicative of the disease. If a colovesical fistula is suspected, a Charcoal test may be performed. The patient is given oral activated charcoal, and if a fistula is present, particles of charcoal should appear in the urine a couple of hours after its administration. However this is not specific for a colovesical fistula, since it only confirms the presence of a connection between the gastrointestinal and urinary systems. [2,5]

An abdominal CT scan is diagnostic in about 90%-100% of patients with a colovesical fistula. The CT scan would show air or oral contrast in the bladder. A CT scan will also give information regarding intraluminal or extraluminal pathology. [5]

Another investigation which can be carried out is a cystoscopy. Colonic fistulas normally occur on the left side and dome of the bladder (as opposed to small bowel fistulae which occur on the right side and dome of the bladder). The vast majority of cases (80%-100%) exhibit bullous oedema, erythema, or exudation of faeculent material from the fistula site. However, even though cystoscopy is able to detect these signs, it is suggestive of a fistula in only 10%-46% of cases, since the fistula is not always visualized. Unfortunately cystoscopy is reported to be successfully diagnostic in only 38%-48% of cases. [1] [4] [5]

Occasionally a VCUG (voiding cystourethrogram) can be performed. However, since most often these fistulae only allow a unidirectional flow, it is highly unlikely that any contrast medium will make its way from the bladder into the colon. [2]

When treating colovesical fistulae, two approaches may be taken: the medical treatment, and the surgical treatment. The first choice would be a primary resection of the colon with anastomosis performed as a 1-stage procedure, involving either simple closure, use of an omental flap, or resection and closure of the bladder defect. Alternatively laparoscopic treatment of colovesical fistulae has also been successfully performed. Laparoscopic treatment is advantageous when compared to conventional surgery since it causes less scarring, a shorter post-operative stay, and a lower occurrence of ileus. [1] [4] [5]

Occasionally patients refuse the surgical procedures or are deemed to be unfit for surgical treatment (e.g. if other comorbid conditions are present). Patients will keep on suffering from pneumaturia and mild urinary symptoms. Antibiotic treatment can be given intermittently but it is very unlikely that this alone will control the urinary symptoms. Antibiotic treatment can nevertheless prevent more life-threatening conditions, such as sepsis, bacteraemia and renal failure from occurring. Experimental studies performed on animals have shown that colovesical fistula may be tolerated quite well, unless a distal urinary or gastrointestinal obstruction develops. [1] [4] [5]

Learning points

- Colovesical fistulae are a known complication of diverticular disease.
- These fistulae are about three times more common in males than in females.
- Often these fistulae allow material to travel in only one direction, from the colon to the bladder, and in the majority of cases, symptoms are urinary.
- Signs and symptoms vary between individuals but commonly include:
  - Pneumaturia
  - Faecaluria
  - Recurrent UTIs
  - Gouverneur syndrome (suprapubic pain, frequency, dysuria, and vesical tenesmus)
- Diagnosis very often confirmed through CT imaging of abdomen: air will be present in the bladder.
- If possible, treatment of choice is a primary resection of the colon with anastomosis performed as a 1-stage procedure.

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Case Report 5
Persistent Vegetative State secondary to a motor vehicle accident

Franklin Abela & Anthony Dimech
Reviewed by: Dr Robert Sciberras MD, AMusLCM, MRCP(UK), DipHlthMgt(Keele), FRCP(Lond)

Case Summary:
The case presents a young girl who was involved in a road traffic accident. Despite being alive at present, her body cannot perform any basic functions since she is in a persistent vegetative state. Numerous examinations and investigations showed several lesions in the head, neck and thorax, the most striking of which being an avulsion injury at the junction of the spinal cord with the medulla.

Aim:
The purpose of this writing is to shed light on a rare condition brought about by one of the most common mechanisms of injury. Considering the extent of the injury that this girl presented with, her survival rate was low, yet somehow she managed to cheat death. The frequency of such cases taking place in Malta is exceptionally rare, making this episode worth publishing.

Case Presentation:
In 2008, a 15 year old girl was involved in a motor vehicle accident. She was a passenger in the front seat of a car. She did not suffer from any known disease at the time. Following impact, the driver did not experience any major trauma. On the other hand, the ambulance crew found the girl unconscious on the road with absent pulses and with no respiratory movements. Her pupils were fixed and dilated. Cardio-pulmonary resuscitation (CPR) was started in casualty and the patient was intubated. Since then, she had been in a vegetative state in the intensive care unit, relying on daily physiotherapy and dedicated nursing care to keep her systems functioning.

Investigations:

Computed Tomography (CT) scan
An emergency CT scan of the whole body was performed on admission. The following findings were made:

- Small intracranial haemorrhage measuring 1.1cm in diameter lying in the temporal horn of the left lateral ventricle.
- Fracture of the base of the skull located on the left side and passing obliquely through the posterior part of the mastoid process. The cervical spine appeared intact.
- In the chest, there were several lung contusions in the right middle lobe, as well as in the apical and basal segments of the right lower lobe. Contusions were also identified in the left lower lobe. No pneumothorax was seen. The mediastinum and chest wall were intact.
- In the abdomen, there were signs of total gastrointestinal distension (including the stomach).
- On the right side of the pelvis, a small amount of free fluid could be seen, but was not indicative of blood.

Subsequently, another four CT scans were carried out within the following two months.

Magnetic Resonance Imaging (MRI)
Subsequently, a MRI scan was performed, with the following results.

- Evidence of extensive trauma at the junction of the medulla oblongata and the spinal cord at the level of the foramen magnum. There was a soft tissue swelling, 7 millimetres in diameter, immediately behind the odontoid peg in keeping with extra-axial haematoma.
- In addition, there was evidence of haemorrhage around the cranio-cervical junction, within the spinal canal and foramen magnum. The spinal cord at this level was largely destroyed and atrophic in keeping with severe avulsion injury at the junction of the spinal cord and medulla oblongata. There was no obvious fracture but the spinous process of C2 and posterior arch of C1 were separated, again in keeping with soft tissue injury.

Neurological Examination
The patient was noted to have twitching of her eyelids and eyebrows, suggestive of convulsions. The neurologist performed an electroencephalogram (EEG). Initial EEG results confirmed status epilepticus. Close monitoring of EEG was carried out by taking serial EEGs. In addition, she was kept constantly monitored using the bispectral index (BIS) monitor.
It took several weeks to establish antiepileptic treatment to sufficiently control her seizures.

Patient was unresponsive to name calling and did not obey verbal commands. She opened her eyes spontaneously as soon as she was off sedation and muscle relaxants. Cough reflex was present but swallowing reflex was inexistent. Fits were no longer noticed.

No reaction to deep pain stimuli on all four limbs.

Cardiovascular
Vital observations were monitored and recorded hourly when the patient was in intensive therapy unit (ITU). Initial records following the incident showed the following:
Heart rate: sinus tachycardia (94 beats per minute).
Blood pressure: normo- to hypotensive ranging from 100-120mmHg systolic and 50-70mmHg diastolic. Heart sounds: S1 and S2 were normal.

Treatment

Ventilation
Permanent tracheostomy was performed six days after admission. The patient had been fully dependent on ventilator support since then.

Several attempts to wean the patient off the ventilator proved unsuccessful because breathing rate dropped down to 5 to 6 breaths per minute when withholding ventilator support. Attempts were also done to support the patient's breathing using a pressure controlled positive pressure ventilator (Nippy 3®), but yet again she was developing high endotracheal tube carbon dioxide (CO2) levels and periods of apnoea.
Instead, the patient was ventilated using the synchronized intermittent mandatory ventilation (SIMV) mode, with respiratory rate of 15 breaths/min, tidal volume of 400 liters, pressure support of 20, positive end-expiratory pressure (PEEP) of 2 aided by 30% oxygen via tracheostomy. Pre-oxygenation prior to suctioning the airway and changing of position was recommended.

It was advised to maintain tracheostomy cuff pressure at around 25-30cm of water, and avoid overinflation. Air leak was noted at times, depending on patient's position. Endotracheal CO2 and oxygen levels were monitored closely and any leaks were compensated for by slightly increasing the tidal volume.

Swabs and foam dressings were placed underneath the tracheostomy flanges in order to slightly protrude the tracheostomy tube. If tracheostomy tube is not secured accordingly, it may result in one lung ventilation.

Medications

In ITU, phenytoin (antiepileptic), sodium valproate (anticolvulsant) and sodium thiopentone (barbiturate general anaesthetic) were given intravenously. Levels of anti-epileptics in blood were taken regularly and the doses adjusted according to the neurologist's advice.
When the patient was about to be transferred to a ward, a percutaneous endoscopic gastrostomy (PEG) tube size FR9 was inserted under local anaesthesia in the ITU and that became the primary route of drug administration. Such drugs included:

Levetiracetam (Keppra®) – to treat epilepsy with partial seizures
Phenytoin
Lactulose – osmotic laxative
Paracetamol – analgesia on a p.r.n. basis

In addition, hypromellose (an ophthalmic lubricant) was included in the regime.

Intake

On admission, the patient was fed via a nasogastric tube size 12. This was subsequently changed to PEG tube feeding. Instructions on usage and care of the PEG tube were provided by the nutrition team. The patient is taking full strength Nutrison® at 80ml/hr. In addition, 60 millilitres of water are given every 3 hours.
Bowel sounds are currently present and absorption is good.

Output

Via tracheostomy: moderate loose yellowish to white secretions.
Via mouth: profuse salivation.
Via urinary catheter: good diuresis. At present, the patient is not catheterised due to a progressive loss of urethral tone which made it impossible to fix a urinary catheter inside the bladder. Instead, adult diapers are used.
The patient opens bowels regularly. Lactulose syrup is taken as required.

Follow-up:

- The patient is nursed on an anti-cubitus air mattress. She has no pressure sores.
- Turning 3 hourly on both sides using pillows in between thighs and knees supported from the back.
- Chest physiotherapy and passive movements of all limbs being three times daily.
- Paddings placed under pressure areas (ear, buttocks, heels).
- Foot splints are applied to prevent footdrop. Despite this, signs of footdrop are present.
- Protective cream applied on pressure areas.
- Mouth and eye care as required.
- Tracheostomy care and mouth toilet as necessary.
- The patient is also followed by a speech therapist.
- Her mother is still in denial. She is being followed regularly by a psychologist.

Learning Points:

- There is an ever growing need for CPR training for lay people because the earlier this is started, the better.

- Since the patient has no perception of pain, clinical examination is very important to exclude conditions which are nor mally painful. On one occasion the patient developed a perforated peptic ulcer and needed emergency laparotomy. This would have been missed if it was not for routine examination.

- Every aspect of life of a patient in a vegetative state has to be catered for. For example, at a point the girl was becoming overweight due to excess calories administered via PEG. The consultant ordered a reduction in daily calories, in spite of protests by her mother. The patient is now nearer to her ideal weight. So constant monitoring, even of weight, is important.

- Psychological support should also be available to the nursing staff. It is not easy to care for young patients in similar states.

- The reality of the situation might not be understood by relatives. For example, the patient's mother has not yet given up hope that her daughter will eventually survive and walk out of hospital. At times, this also causes some friction between her and the nurses.

Case Report 6
Discitis

Lauren Abela & Keith Borg Xuereb
Reviewed by: Dr. T. Yousefi MD

Case Summary:
Discitis is an inflammatory condition of the intervertebral disc or disc space. It is an uncommon condition which occurs mostly in young children or as a post-operative complication, such as following an epidural. It is extremely rare in the elderly as disc size and sponginess decreases with age and consequently the risk of infection decreases. In this case, discitis occurred spontaneously in an elderly patient and was complicated by a psoas abscess. The patient also suffers from acute renal failure, chronic heart failure, left sided pneumonia and shingles (Herpes Zoster) in dermatome S3. A trapped spinal nerve occurring at the intervertebral foramen is a common complication in fact, the subject did suffer from sciatica for the past 30 years.

Demographic Details:
J.M. C, Male, Marsascala
72, D.O.B 31/12/1938

Referred from: Infectious Diseases Unit (IDU)
Location, Date of Examination: Karin Grech Hospital G2 ward ;29/10/2011;

Presenting Complaint:
Severe back pain- 5 days
Fever- 1 day
Confused and Disoriented-1 day

History of Presenting Complaint:
Patient admitted to A&E c/o 5 day history of left sided back pain radiating to left lower limb down to mid-shin. Pain had a gradual onset. Pain is so severe that patient is unable to get out of bed. GP had started him on Coltramyl, Cataflam, Nexium & Codipar on 04/09/11 and had improved slightly. During these 5 days he had slept comfortably at night and felt better lying on his left side. Patient had left lower limb weakness 3 years ago, but never saw GP. He does give a 30 year history of left lower limb sciatica which however never hindered activity.
Also c/o shortness of breath on exertion; however no cough, no sputum, no chills, no rigors though had some frequency of urine that was dark in colour.

Past Medical History: Nil to note. Patient does not suffer from any chronic diseases. ° hypertension,° diabetes, ° hypercholesterolemia, ° jaundice, ° asthma.
Past Surgical History: Nil to note.

Drug History:

Drug	Dosage	Frequency	Indication
Thiocolchicoside (Coltramyl)	4mg		Analgesia
Diclofenac potassium immediate-release tablet (Cataflam)	50mg	TDS	Analgesia
Esomeprazole (Nexium)	20mg	Once daily	Prevention of NSAID-associated ulcers
Co-codamol 8/500 (Codipar)	2 tablets	TDS	Analgesia

Family History:
Two of his siblings, both older (aged 78 and 80) have difficulty walking and are relatively immobile. His father and uncle (both deceased) suffered from difficulty walking.

Social History:
Patient is a farmer. He has stopped smoking 30 years ago(1 packet a day) and is a social drinker. He lives with his wife, aged 72 and his son, aged 43. Both are in good health.

Systemic Enquiry:
General Health: Well overall. Weight loss since admission, diminished appetite.
Cardiovascular: Cold extremities in both lower limbs for the past 2 years.
Respiratory: Shortness of breath on exertion.
G.I.T: Long standing constipation, slight dysphagia, few vomiting episodes.
G.U.S: Catheter was inserted thus patient could not identify any changes in urinary patterns.
CNS: Nil to note
Musculoskeletal: Left lower limb pain. Left upper limb stiffness
Endocrine: Polydypsia (possibly side effect of drugs given).
Others: Bed sores since admission

Current therapy:

Treatment on Discharge	Dosage	Frequency	Period
Ciprofloxacin (500mg) Ciproxin	Tab	BD	Indefinite
Rifampicin	300mg	BD	Indefinite
Minihep	5000 units	TDS	Indefinite
Omeprazole (Losec MUPS)	20mg; Film-coated gastro resistant tablets	BD	Indefinite
Maxalon	10mg	TDS (PRN)	Indefinite
Slow K	2 tabs	TDS (PRN)	Indefinite
Protifan	5 scoops	TDS	Indefinite

Discussion of the results of a general and specific physical examinations
On A&E admission, the patient was found to have a low systolic blood pressure (104) with normal diastolic pressure (81), tachycardia of 113 beats per minute with an afebrile temperature. He had a low oxygen saturation (89%) and hence was given oxygen. On examination, heart sounds were normal although bilateral inspiratory crackles were heard at the lower 1/3 of the thorax especially on the left. Tenderness was observed in the left iliac fossa but was not accompanied by either rebound or guarding. The rectum was full of hard stools but no melaena was reported. Bilateral pitting oedema was present in the left lower limb up to the mid shin. Lower limb showed 4/5 power on hip flexion and knee extension. Absent knee reflex; reduced plantar reflex.

Reflexes	R	L
Knee Jerk	Normal	Absent
Ankle Jerk	Normal	Normal
Plantars	+	Diminished
Sensation	Normal	Normal

Power	R	L
Hip Reflex	5/5	4/5
Knee Extension	5/5	4/5
Knee Flexion	5/5	5/5
Ankle Flexion/Extension	5/5	5/5

Differential Diagnosis

- Osteomyelitis
- Spinal tumours
- Rheumatoid Spondylitis

Diagnostic Procedures:
a)Lab investigations:

22/10/11	Albumin (serum)	23.9 g/L
22/10/11	Alkaline phosphatase (serum)	81 U/L
08/09/11	Alkaline phosphatase (serum)	85 U/L
22/10/11	ALT (serum)	6 U/L
08/09/11	ALT (Serum)	56 U/L
08/09/11	Amylase (Serum/Plasma)	36 U/L
09/09/11	ANCA testing (serum)	Negative Titre (<1/10)
09/09/11	Anti-Nuclear Antibody (serum)	Negative Titre (<1/80)
08/09/11	APTT (sec)	29.9 sec
08/09/11	APTT Ratio	1.15 Ratio
22/10/11	Basophils Abs	0.03 x 109 /L
08/09/11	Basophils Abs	0.02 x 109 /L
22/10/11	Bilirubin (serum)	9.40 umol/L
08/09/11	Bilirubin (serum)	30.60 umol/L
10/09/11	Blood culture for MCS	Blood Culture Aerobic/standard: No Bacteria Cultivated
10/09/11	Blood culture for MCS	Blood Culture Anaerobic/Standard: No Bacteria Cultivated
08/09/11	Blood culture for MCS	Blood Culture Aerobic/Standard: No Baccteria Cultivated
08/09/11	Blood culture for MCS	Blood Culture Anaerobic/Standard: No Bacteria Cultivated
08/09/11	Calcium (serium)	2.25 mmol/L
23/10/11	Chloride (serum)	108.8 mmol/L
22/10/11	Chloride (serum)	106.4 mmol/L
08/09/11	Chloride (serum)	101.3 mmol/L
22/10/11	C-Reactive Protein (serum)	75 mg/L
08/09/11	C-Reactive Protein (serum)	413 mg/L
23/10/11	Creatinine (Serum)	100 umol/L
22/10/11	Creatinine (Serum)	100 umol/L
08/09/11	Creatinine (Serum)	337 umol/L
22/10/11	Eosinophils Abs	0.50 x 109 /L
08/09/11	Eosinophils Abs	0.01 x 109 /L
22/10/11	Erythrocyte Sedimentation Rate (ESR)	49mm 1st Hour
08/09/11	Erythrocyte Sedimentation Rate (ESR)	91 mm 1st Hour
23/10/11	Estimated GFR	68 mls/min / 1.73 m2
22/10/11	Estimated GFR	68 mls/min / 1.73 m2
08/09/11	Estimated GFR	17 mls/min / 1.73 m2
22/10/11	Gamma Glutamyl Transferase (serum)	29 U/I
08/09/11	Gamma Glutamyl Transferase (serum)	63 U/I
08/09/11	Glucose – Random	5.63 mmol/L
22/10/11	Haematocrit	29.8%
08/09/11	Haematocrit	39.0%
22/10/11	Haemoglobin	10.2g/dL
08/09/11	Haemoglobin	13.8g/dL
08/09/11	INR	0.98 ratio
22/10/11	Lymphocytes Abs	1.46 x 109 ./L
08/09/11	Lymphocytes Abs	0.52 x 109 /L
14/10/11	MC & S	No bacteria cultivated
08/09/11	MC & S	No bacteria cultivated
09/09/11	MC & S	No bacteria cultivated
22/10/11	Mean Cell Hb	28.9 pg
08/09/11	Mean Cell Hb	30.7 pg
22/10/11	Mean Cell Hb conc	34.2 g/ dL
08/09/11	Mean Cell Hb conc	35.4 g / dL
22/10/11	Mean Cell Volume	84.4 fL
08/09/11	Mean Cell Volume	86.7 fL
22/10/11	Mean Platelet Volume	9.9 fL
08/09/11	Mean Platelet Volume	12.2 fL
14/10/11	Microsopy	Gram Stain – Abundant Red Blood Cells and Polymorphs present Moderate Gram positive cocci in pairs and short chains seen
08/09/11	Microscopy bacteria	+/HPF
08/09/11	Microscopy Ca Oxalate	Absent/LPF
08/09/11	Microscopy Cellular Casts	Absent/LPF
08/09/11	Microscopy erythrocytes	Absent/HPF

08/09/11	Microscopy granular casts	Absent/LPF
08/09/11	Microscopy hyaline casts	+/LPF
08/09/11	Microscopy others	Abs
08/09/11	Microscopy phosphates	Abs/LFP
08/09/11	Microscopy renal cells	Abs/LFP
08/09/11	Microscopy squamous cells	Abs/LFP
08/09/11	Microscopy transitional cells	Abs/LFP
08/09/11	Microscopy triple phosphates	Abs/LFP
08/09/11	Microscopy urates	Abs/LFP
08/09/11	Microscopy uric acid	Abs/LFP
08/09/11	Microscopy white blood cells	0.5/HFP
08/09/11	Microscopy yeasts/fungi	Abs/HFP
22/10/11	Monocytes Abs	0.47 x 10 9 /L
08/09/11	Monocytes Abs	0.6 x 10 9 / L
22/10/11	Neutrophils	3.74 x 10 9 / L
08/09/11	Neutrophils	10.2 x 10 9 / L
08/09/11	Osmolality	310 mOsm/kg
08/09/11	Phosphate	0.98 mmol/L
22/10/11	Platelets	288 x 10 9 / L
08/09/11	Platelets	125 x 10 9 / L
23/10/11	K+(serum)	3.46 mmol/L
22/10/11	K+ (serum)	2.99 mmol/L
08/09/11	K+ (serum)	5.09 mmol/L
08/09/11	Prothrombin time	10.60 s
22/10/11	Red Blood Cell Count	3.5 x 10 12 / L
08/09/11	Red Blood Cell Count	4.5 x 10 12 / L
22/10/11	Red Cell distribution width	14.6%
08/09/11	Red Blood Cell Distribution width	14.6%
22/10/11	Reticulocytes Abs	14.80 x 10 9 / L
08/09/11	Reticulocytes Abs	14.40 x 10 9 / L
09/09/11	Rheumatoid factor IgM	<15U/ml
23/10/11	Na+ (Serum)	140.0mmol/L
22/10/11	Na+ (Serum)	137.0 mmol/L
08/09/11	Na + (Serum)	134.0 mmol/L
09/09/11	Total extractable nuclear antibody (serum)	0.2 index value
23/10/11	Urea (serum)	1.70 mmol/L
22/10/11	Urea (serum)	2.30 mmol/L
08/09/11	Urea (serum)	25.8 mmol/L
08/09/11	Urinalysis bilirubin	1.0 mg/dL
08/09/11	Urinalysis erythrocytes	50uL
08/09/11	Urinalysis glucose	Normal mg/dl
08/09/11	Urinalysis ketones	-ve mg/dl
08/09/11	Urinalysis nitrates	-ve
08/09/11	Urinalysis pH	5.0
08/09/11	Urinalysis proteins	>5mg/dl
08/09/11	Urinalysis specific gravity	1.020
08/09/11	Urinalysis urobilinogen	4.0mg/dl
08/09/11	Urinalysis wbc	25 uL
22/10/11	Wbc	6.2 x 10 9 / L
08/09/11	Wbc	11.4 x 10 9 / L

20/10/11 MRSA screen
Staphylococcus Aureus d(MRSA) cultivated
Bacitracin- sensitive
Framycetin- sensitive
Neomycin- sensitive
Oxacillin- resistant
Mupirocin- sensitive
For Staphylococci, Levofloxacine sensitivity result is equivalent to Ciprofloxacin. Patient was screened for Rickettsia, Leptospirosis and was negative for both.

b)Instrumental examinations:

Lumbar spine and SI joint X-ray.
08/09/11 Report: There is narrowing of the L3/L4 intervertebral interval. Mild degenerative changes seen throughout the lumbar spine. There is normal alignment of the lumbar vertebrae with abnormal lumbar lordosis. The vertebral body height are preserved. The transverse and spinous processes, the vertebral endplates and neural arches are intact.

Several MRI spine images were taken and it was found that L3-L4 discitis has accompanying:
1. Epidural collection causing significant impingement of the thecal sac and spinal canal stenosis
2. Large Left sided psoas abscess
3. Much smaller Right sided psoas abscess.

Chest X-Ray
08/09/11 Report: AP sitting view. The left hemidiaphragm is indistinct secondary to plate-like atelectatic changes, otherwise lungs are clear. Cardiothoracic ratio cannot be accurately assessed due to projection. There are no signs of pneumothorax or pleural effusion seen. Consolidation in left base.

US Abdo
08/09/11 Report: Clinical details – Acute renal failure. Findings – liver is normal in size and echotexture. No focal lesions are seen within it. No intrahepatic or extrahepatic bile duct dilatation is seen. The Gall Bladder is midly distended, no stones or signs of inflammation are seen. Both kidneys are normal in size, shape and parenchymal thickness. No stones or hydronephrosis are seen. Right kidney measures 9.6 cm; left Kidney measures 9cm (interpolar dimensions). Head of pancreas is homogeneous – no focal enlargement or cystic changes are seen. The pancreatic body and tail are obscured by overlying gas. Spleen is unremarkable. Urinary bladder empty and could not be assessed (catheterised). Aorta – normal calibre. No free fluid is seen in abdo and pelvis.

MR Whole Spine.
14/09/11 Report: Spinal alignment is satisfactory and there is no cord compression evident. L3-4 disc space narrowed and shows high signal intensity and mild posterior protrusion consistent with acute discitis with mild thecal compression. No other significant abnormality.

MR Spine Lumbar/ Sacral.
27/09/11 Report: Bone Marrow signal intensity is abnormal – with low signal intensity seen on both T1 and T2 weighted sequences.
L3/L4 disc is of diminished height with high T2 signal intensity consistent with known history of discitis and is unchanged since previous imaging. An epidural collection of high intensity on T2 and intermediate signal intensity on T1 is seen posterior to L3/L4 disc, extending superiorly to the level of the upper endplate of L3 and inferior to the level of the lower. This is slightly more prominent on the current study than on the one done 2 weeks ago, and is significantly impinging the thecal sac, causing a significant spinal canal stenosis.
The epidural collection is extending through the left L3/L4 neural foramen into the left Iliopsoas with a resultant large abscess (predominantly in left Iliacus). A smaller 1.6 cm abscess is also seen just lateral to the right L3/L4 neural foramen, within the Psoas muscle.
Abnormal Bone Marrow signal Intensity. Query Anaemia?
Other Bone Marrow infiltrative conditions may also be considered.

Therapy
a)Drugs
On 08/09/11, patient was started on Augmentin IV & Klacid PO and it was advised to keep off NSAIDs. The patient had few febrile episodes and was started on Doxycycline; however blood cultures were negative for any growth. It was later decided to start Rifampicin and Ciprofloxacin. Patient has been on ciprofloxacin since 10/9 and rifampicin since 16/9.
Patient was recently found to be MRSA postive in nasal swab cultures and is receiving the required treatment for decontamination such as Bactroban nasal ointment and Chlorehexidine bodywash.

b) Surgical
CT Cyst drainage.
14/10/11 Report: A 12-French locking pigtail catheter was inserted over the wire under CT guidance and under local anesthesia. Around 150 ml of pus was aspirated. Drain was left in situ. Samples were sent for C&S and grew nothing on cultures, other than a few Gram positive cocci on microsopy.

Final Treatment

It was decided that he is to wear a Kendall brace for the discitis. Patient received physiotherapy for mobilisation and has made some improvements, using a rollator. Bed rest is no longer recommended for patients suffering of discitis so as to improve the osmotic pressure and hence increase blood flow to the intervertebral disc. The patient was kept on antibiotics and symptoms improved.

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