

The Physical and Psychological Effects of Breast Reconstruction in Breast Cancer Patients. A Retrospective Quantitative Analysis Between 2009 and 2011 at Mater Dei Hospital, Malta

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Abstract

Breast cancer is a devastating disease afflicting many women. The aim of this retrospective review was to assess the physical and psychological effects of patients who underwent breast reconstruction after breast cancer surgery.

Methods: Clearance from the patients' consultants, data protection officer and medical ethics committee was sought and granted. A participation letter was sent to 67 eligible patients who had reconstructive breast surgery between 2009 and 2011. Forty-two (63%) patients agreed to participate. These patients had a short personal interview during which two questionnaires (SF-36v2 health survey and one on the physical aspects) were completed.

Results: The patients' mean age was 53.9 years (range 31-75). Reconstructive breast surgery using implant-only was performed in twenty-eight (66.7%) cases. Twenty-three (54.8%) of the forty-two patients had complications, with 1.35 complications/per person affected. The complication rate did not differ significantly amongst the different reconstruction groups ($p=0.196$). Patients who underwent autologous and oncoplastic reconstructive procedures scored significantly higher satisfaction scores than the prosthesis and prosthesis/autologous group ($p=0.01$). Whether or not the reconstruction was immediate or delayed or the patients had complications, did not have statistically significant effects on the patients' health domain scores ($p>0.05$). The difference of two proportions between the sample studied and the norm showed that the sample studied had a statistically significant higher depression risk than the norm population ($p=0.0154$).

Major conclusions: Complication rates were comparable amongst the different reconstruction techniques. A higher than normal depression risk was found in the sample studied and therefore improvement of the support services given to patients is recommended.

Key words: Breast cancer; reconstruction; chronic pain; satisfaction; depression

Introduction

The estimated age-adjusted annual incidence of breast cancer in the European Union was 110.3/100 000 and the mortality 25.0/100 000 [1]. Breast reconstruction is part of the holistic management of patients who are willing to

undergo such surgery and whose disease is amenable to reconstructive breast surgery.

A multitude of studies have been performed to try and identify factors that might make a patient more susceptible to complications. A higher Body Mass Index (BMI) was found to increase morbidity irrespective of the type of reconstruction [2]. Delayed reconstructive surgery was deemed to be the most appropriate option for reconstruction since it allows the possibility of better postoperative plastic results [3]. The Quality of Life (QOL), which may be affected by a myriad of circumstances, is one of the major measurable outcomes of breast reconstruction. This was assessed after immediate breast reconstruction by way of the SF-36 health survey [4]. All health domain scores had increased one year after reconstruction and were comparable to the norm population, as opposed to the lower scores recorded preoperatively in terms of emotional wellbeing and physical role functioning health domain.

To date, a standardized quality of life tool that targets

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breast reconstruction after breast cancer is still under development [5]. Breast cancer is on the increase, with the Malta National Cancer Registry [6] quoting 307 new cases of breast cancer in 2009 and 320 new cases in 2010.

This article presents retrospective data on the physical and psychological effects of forty-two (42) patients who underwent breast reconstruction following breast cancer and/or risk reduction breast surgery between 2009 and 2011 at Mater Dei Hospital, Malta.

Methods

The approval from the breast and plastic surgeons at Mater Dei Hospital was sought and obtained upon the presentation of a drafted proposal for this study, together with the letters of participation and consent forms which were written in both English and Maltese. The responsible bodies subsequently granted data protection clearance and ethical approval. A list of patients who had reconstructive breast surgery was compiled from all the Mater Dei Hospital operating theatre registers covering surgeries performed from 1st January 2009 to 31st December 2011. The case notes of patients in whom the operation title was unclear as to whether reconstruction was carried out for breast cancer and/or risk reduction were requested from the hospital Medical Records Departments and examined to confirm the purpose of their surgery. To complement this, the consultants had a database of operated patients that was also utilised. The list of patients was then checked on the main hospital database to confirm whether the patients were alive or deceased. The final number of eligible patients was sixty-seven (67) of whom forty-two (63%) agreed to participate in this study. An invitation letter to participate in the study was sent to the patients. Some patients called the researcher directly stating they were interested in participating, others replied via email and a few by telephone text message while the majority who agreed to participate returned the consent form in the attached self-addressed envelope. A total of 40 personal interviews were performed at Mater Dei Hospital. Two patients had a telephone interview since they were too unwell to attend hospital but were still keen to participate. The BMI of the latter two patients was calculated using the measurements supplied by the patients. The rest of the BMI measurements were calculated after taking height and weight measurements of each patient attending the interview.

The physical questionnaire compiled by the researcher looked at the BMI, diabetes and smoking status, type and size of tumour, TNM staging, neoadjuvant and adjuvant radiochemotherapy, hormonal therapy, biological therapy, type of surgeries performed, antibiotic prophylaxis, local and systemic postoperative complications and their management, whether reconstruction was immediate or delayed

and patient satisfaction scores. All patients' demographics were coded.

The SF-36v2 health and wellbeing questionnaire, which is a Likert-type survey, was used to address the patient's psychological wellbeing. All licensing and permissions were obtained from the Medical Outcomes Trust and QualityMetric Incorporated, Lincoln, Rhode Island, USA. The Standard Form of the survey was utilised, thus the recall period was the 'past 4 weeks' which ranged from December 2013 till February 2014, depending on when the patients had their interview. The main health domains assessed are as follows: Physical functioning refers to the ability to perform daily physical tasks such as bathing and dressing; Role physical refers to the physical component affecting work and other daily activities; Bodily pain refers to the patient's level of physical pain and its effect on their life; General Health refers to the patient's perception of how good or bad their health is; Vitality refers to the patient's level of energy; Social Functioning refers to the effect of physical and emotional problems on social activities; Role emotional refers to problems with work or other daily activities secondary to emotional problems; Mental health refers to feelings such as depression, peacefulness and happiness. Physical component Summary (PCS) combines the scores of PF, RP, BP and GH. Mental Component Summary (MCS) combines the scores of Vitality, SF, RE and MH.

Statistical significance was defined as $p < 0.05$. All analyses were performed using the SPSS version 17.0. (SPSS Inc. Released 2008. SPSS Statistics for Windows, Version 17.0, Chicago). Chi Squared, One-Way ANOVA and difference of two proportions were the tests used to check for statistical significance.

Results

A total of forty-two patients participated in this study. Patient demographics, diabetes, smoking status and BMI are shown in Table 1.

Table 1. Sociodemographic data.

Patient characteristics	(n=42)	
	Frequency	Percentage
Age Range (years)	31-75	
Mean Age (years)	53.86	
Diabetes	3	7.10%
Smokers	11	26.19%
Normal BMI	16	38.10%
Overweight BMI	15	35.70%
Obese BMI	11	26.20%

Reconstructive techniques were grouped into four major groups, namely prosthesis, autologous, oncoplastic and prosthesis +autologous.

Tumour characteristics together with neo/adjuvant treatment are shown in Table 2. The TNM staging was compiled [7].

In 23 patients (54.8%), one or more postoperative complications occurred. The commonest complication was chronic pain. Implant migration occurred four times in three patients (9.52%) (twice in one patient). The patients who underwent oncoplastic resections did not suffer from any complications; however, no statistical difference amongst the different groups was obtained ($p=0.196$) (Table 3).

Patients who were of older age, high BMI, diabetes and smokers did not show statistical significant difference with regards to complications ($p=0.168$; $p=0.288$; $p=0.801$ and $p=0.553$ respectively.)

Patients who underwent neoadjuvant chemotherapy ($p=0.630$), neoadjuvant radiotherapy ($p=0.786$), adjuvant chemotherapy ($p=0.462$), adjuvant radiotherapy ($p=0.844$), and hormonal therapy ($p=0.609$) did not show a statistically significant higher complications rate.

Antibiotic prophylaxis did not alter the rate of complications significantly ($p=0.587$). Patient satisfaction scores

and surgery recommendation did not differ significantly according to whether or not they developed complications ($p=0.264$) and 0.857 respectively. The satisfaction score ranges from 1-5 (1 corresponds to 'very unsatisfied' and 5 corresponds to 'very satisfied'). Patients who underwent autologous and oncoplastic reconstructive procedures scored significantly higher satisfaction scores than the prosthesis and prosthesis/autologous group ($p=0.01$) (Table 4).

The prosthesis/autologous reconstruction group were more likely to have delayed reconstruction ($p=0.028$.)

The SF-36v2 health survey assessed eight health domains, namely: Physical Functioning (PF), Role Physical (RP), Bodily Pain (BP), General Health (GH), Vitality (VT), Social Functioning (SF), Role Emotional (RE) and Mental Health (MH). The results obtained showed that the studied population had lower scores in the BP, MH and RE (Figure 1). One-way ANOVA was used to test the results of different health domains with the different variables. No statistically significant difference was obtained for the different health domains across the four different groups of reconstruction: Physical factor ($p=0.13$), Role Physical ($p=0.29$), Bodily Pain ($p=0.24$), General Health ($p=0.50$), Vitality ($p=0.74$), Social Functioning ($p=0.47$), Role Emotional ($p=0.64$), Mental Health ($p=0.23$).

Patients who underwent neoadjuvant and adjuvant chemotherapy and hormonal therapy did not score significantly lower scores in the respective health domains.

Patients who underwent neoadjuvant radiotherapy scored significantly lower scores in the Vitality ($p=0.04$), Social Functioning ($p=0.04$) and Role Emotional ($p=0.00$) health domains whilst patients who underwent adjuvant radiotherapy scored significantly higher scores in the mental health domain ($p=0.000$). Patients who underwent biological therapy scored significantly lower scores in the physical factor health domain ($p=0.01$).

Whether the reconstruction was immediate or delayed, or whether the patients had postoperative complications, did not have statistically significant effects on the patients' health domain scores ($p>0.05$).

The SF-36v2 health survey results revealed a higher than normal positive depression risk for the sample studied as compared to the norm population (30% and 18% respectively) (Figure 2). The norm population was the population used in the standardization of the SF-36v2 health and wellbeing questionnaire. Data on the norm population was based on US 2009 norms that were provided by QualityMetric Incorporated.

Thirteen patients out of a total of 42 (30%) in the sample studied had a positive depression screening risk as compared to 678 patients out of a total of 4024 (18%) in the norm sample. This difference reaches statistical significance when using the difference between two proportions ($p=0.0154$).

Table 2. Tumour characteristics.

Tumour characteristics	Frequency	Percent
Invasive Carcinoma	26	61.9
Carcinoma in situ	6	14.3
Other types	6	14.3
Prophylactic surgery	2	4.8
Unknown histology	2	4.8
Neoadjuvant Chemotherapy	4	9.5
Neoadjuvant Radiotherapy	3	7.1
Adjuvant Chemotherapy	17	40.5
Adjuvant Radiotherapy	19	45.2
Hormonal Therapy	24	57.1
Biological Therapy	7	16.7
Stage 1A	8	19
Stage 1B	2	4.8
Stage 2A	5	11.9
Stage 2B	8	19
Stage 3A	2	4.8
Stage 4	3	7.1
Missing Stage Data	14	33.3

Table 3. Reconstruction type and postoperative complications.

		Reconstruction Type			Total
		Prosthesis	Autologous	Prosthesis/ Autologous	
Complications	Chronic Pain	6 33.3%	0 0.0%	2 25.0%	8 25.8%
	Implant Migration	3 16.7%	0 0.0%	1 12.5%	4 12.9%
	Wound Maceration	1 5.6%	0 0.0%	0 0.0%	1 3.2%
	Infection	1 5.6%	2 40.0%	1 12.5%	4 12.9%
	Capsular Contracture	2 11.1%	0 0.0%	1 12.5%	3 9.7%
	Nipple Areolar Complex necrosis	2 11.1%	0 0.0%	0 0.0%	2 6.5%
	Flap Necrosis	0 0.0%	2 40.0%	0 0.0%	2 6.5%
	Fat Necrosis	1 5.6%	0 0.0%	0 0.0%	1 3.2%
	Haematoma	1 5.6%	1 20.0%	1 12.5%	3 9.7%
	Seroma	1 5.6%	0 0.0%	0 0.0%	1 3.2%
	Incisional Hernia	0 0.0%	0 0.0%	1 12.5%	1 3.2%
	Burst Tissue Expander	0 0.0%	0 0.0%	1 12.5%	1 3.2%
	Total	18 100.0%	5 100.0%	8 100.0%	31 100.0%

Table 4. Reconstruction types and satisfaction scores.

		Reconstruction Type			
		Prosthesis	Autologous	Oncoplastic	Prosthesis/Autologous
Satisfaction Score	Very Unsatisfied	0 0.0%	0 0.0%	0 0.0%	2 40.0%
	Unsatisfied	5 17.9%	0 0.0%	0 0.0%	0 0.0%
	Neither satisfied nor dissatisfied	12 42.9%	0 0.0%	1 25.0%	1 20.0%
	Satisfied	11 39.3%	5 100.0%	2 50.0%	2 40.0%
	Very Satisfied	0 0.0%	0 0.0%	1 25.0%	0 0.0%

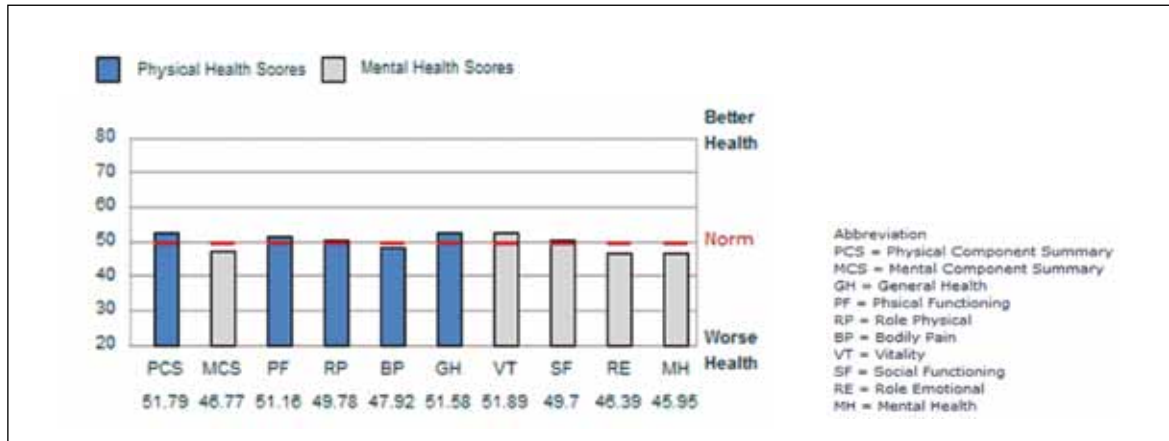


Figure 1. Sample scores for health domains as compared to the norm population.

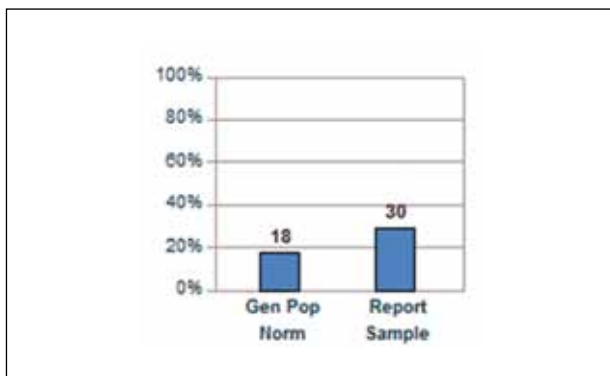


Figure 2. First stage positive depression screening: % at risk.

Discussion

A multitude of factors might influence the physical and psychological wellbeing of patients undergoing breast reconstruction for breast cancer or risk reduction. The ideal breast reconstructive procedure should have little or no complications and carry high patient satisfaction scores.

The aim of this study was to assess the physical and psychological outcome of breast cancer patients after breast reconstruction. The main physical outcome investigated was postoperative complications. Serletti [9] quotes lower complication rates in patients undergoing autologous reconstruction. In our study, complications were not significantly higher in a particular type of surgery group ($p=0.196$). This study demonstrated that there was a 54.8% complication rate with 1.35 complications/patient affected. The most common reported complication was chronic pain, mostly in the implant-only reconstruction group. This might be a reflection of the larger number of patients in this type of reconstruction group (28 patients.) No statistically sig-

nificant results were obtained for the different types of reconstruction and smoking. ($p=0.553$)

One would expect a higher incidence of complications in patients suffering from comorbidities. In their study on BMI and morbidity, Hanwright et al. [2] found that a higher BMI was associated with a higher morbidity rate in the autologous reconstruction groups. In our study group, there were no statistically higher complication rates in patients with high BMI ($p=0.288$). In Malta, the prevalence of diabetes is high (10.4% of adults between 20-79 years in year 2013 had diabetes) [8]. Despite this high prevalence, diabetic patients did not have statistically significant higher complications rates. ($p=0.801$)

A higher complication rate would presumably adversely affect the patient's level of satisfaction. In a study on risk reduction mastectomies, Hagen et al. [10] stated that the satisfaction level of patients was high despite a considerably high complication rate (39.7%). Our study was concordant with the aforementioned study since a higher complication rate was not significantly associated with a lower level of satisfaction. ($p=0.264$)

Heneghan et al. [11] stated that patients with immediate breast reconstruction were more likely to have an improved quality of life (QOL). A study by Elder et al. [4] whereby a similar tool was used to that employed in this dissertation (SF-36), agreed with the results obtained by Heneghan et al. [11] Rubino et al. [12] used more than one scoring tool and concluded that surgery timing and techniques did not seem to influence patient satisfaction and outcome. The psychological wellbeing of our patients was assessed by way of the SF-36v2 survey, which failed to reveal higher scores in all the eight main health domains in patients with immediate reconstruction and thus conform to the aforementioned studies. Consequently, it can be deduced that there was no significant difference between the QOL

of patients with immediate and delayed reconstruction (p value >0.05). The mean health domain scores were comparable for the different types of reconstructive procedures. (P values of >0.05)

The limitations of this study include the following:

- The limited number of patients in the sample
- Study was retrospective with an element of recall bias
- The unequal groups of patients undergoing a particular reconstruction
- No control group
- Difficult to attribute a particular outcome to a specific cause

Conclusion and Recommendations

The results for postoperative complications were comparable between the different groups of surgery. A higher than normal depression risk which showed statistical significance was obtained in this group of patients signifying that we are still lacking in providing patients with holistic management.

The aim for the future is to conduct a prospective qualitative study with a larger number of patients, using a control group. The idea of offering debriefing sessions by a professional psychologist for patients participating in the study will be taken on board, since such interviews might reignite emotions that could affect the patients adversely. The results obtained from this study have been forwarded to the Chairperson of Psychological Medicine at our hospital, and we are currently working on improving and modifying support services for patients.

Ethical Approval: *Ethical Approval was obtained by the appropriate ethics committee of our institution.*

Conflict of Interest: *The authors declare that there is no conflict of interest.*

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