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Research Article

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Outcomes of Breast Free Flap Reconstruction in the Middle East

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Abstract

Objectives: *Reviewing patient satisfaction and quality of life following post mastectomy breast reconstruction in breast cancer patients of Middle East.*

Methods: *Retrospective study of 68 patients of post mastectomy who underwent free flap-based breast reconstruction with a mean follow up of 6 months were studied over a period of 5½ years. Specific preoperative investigation included CT angiography of the abdominal wall for perforator assessment. All of breasts were reconstructed by microsurgical free flap breast reconstruction. A questionnaire was developed for the postoperative patients in order to assess their satisfaction grades.*

Results: *A total of 67 patients of post mastectomy females attended to our clinic for breast reconstruction. Most of the patients (97.3%) were in the age group of 29-53 years. Majority of patients (68%) underwent delayed reconstruction. Average BMI at reconstruction in most females was 30.1. CT angio demonstrated two ideal perforators in 59% of cases. Majority underwent reconstruction by free DIEP flap. Complications occurred in 6.4% of patients. Overall satisfaction rates of 92% was noted. At the completion of the study 30% has completed nipple reconstruction.*

Conclusion: *With the availability of "state of the art" microsurgical breast reconstruction, in properly selected patients, the quality of life and satisfaction rates are high and free flap breast reconstruction has proven to be the standard of care in post mastectomy patient population.*

Keywords: Mastectomy,Breast Reconstruction, Free Flaps

Introduction

Breast cancer is the second leading cause of death in females [1]. In Middle east it accounts for 11% of cancer related deaths [2]. There has been an increase in breast cancer incidence and prevalence in the Arab countries [3, 4]. With the early mastectomy and improved quality of life, more patients are now opting breast reconstruction. The United States has experienced a gradual rise in both immediate and delayed breast reconstruction over the past few decades. The latest rate is as high as 54% of invasive cancer cases and 63% of ductal carcinoma in situ cases [5]. As more and more mastectomy patients are now opting for breast reconstruction, there is a challenge to the plastic surgeons to provide the best and least morbid procedure to this group of patient population. Despite many tools at reconstruction with the reconstructive surgeon now, autologous breast reconstruction still holds a high reputation among the mastectomy females due its natural feel and free from long term side effects [6]. With the advent of microsurgery services in 1990 and its expansion into breast reconstruction in early 2000, microsurgical breast reconstruction has now become the State -of - art procedure in expert hands.

Common types of free flap breast reconstruction include, free TRAM, muscle sparing TRAM, Deep inferior epigastric artery perforator flap (DIEP), Superficial inferior epigastric artery flap (SIEA), less common types are free LD, Rubens flap. Each of the common types of free flap reconstruction techniques has its own merits and demerits. As of now, the most reliable and cost effective flap is the DIEP [7]. The learning curve is sharp and with time it becomes a time saving and less morbid breast reconstruction technique.

Complications of free flap breast reconstruction are mainly related to microvascular issues like arterial vs venous thrombosis, fat necrosis in the flaps, and hernias at donor sites. Large multicenter studies have proved significantly low rates of donor site complications in DIEP reconstructed breasts as compared to TRAM and muscle sparing ones [8]. Overall outcome of successful breast reconstruction is a product of early return to work, less donor site issues and long-term patient satisfaction.

Our Study therefore focused on reviewing patient satisfaction and quality of life following post mastectomy breast reconstruction by free microvascular reconstruction techniques who visited our center for breast reconstruction between 2012 and 2017 as ours is the prime center providing microvascular surgical services in the kingdom.

Methods

Our Retrospective study from July 2012 to December 2017 included all the cases of post mastectomy females who visited our hospital for free flap breast reconstruction. Patients collected data included age at the time of reconstruction, any comorbid illness, contraindication for surgery, whether or not chests were irradiated post mastectomy. Specific preoperative investigation included CT angiography of the abdominal wall for proper localization of the skin perforators.

The standard microsurgical procedure was selected for each patient based on individual requirements and donor site availability. The free flap procedures included mostly Deep inferior epigastric artery perforator flap (DIEP)- double or single perforator with some breasts reconstructed by Superficial inferior artery flaps (SIEA). Post abdominoplasty females were excluded from the study.

The mean follow-up of the patients was 8.57 months and it ranged from 6 months to 1 year. A specific questionnaire was designed for the postoperative patients in order to assess their satisfaction grades and the scores were calculated at successive follow ups in the clinics. Finally, all the data was analyzed statistically using SPSS software and Student's t–test to determine any statistical significance. p-valve <0.05 was taken statistically significant.

Results

In this study of 67 patients, most of whom were Saudi females (98.5%), underwent breast reconstruction by free flaps. Most of the patients at the time of reconstruction were in the age group of 29-53 years with the mean age of 45.3 years. Our average BMI was 31.1. Most of the patients were married (94%). Right sided mastectomy (50.7%) was more common than left and bilateral cases accounted for 4.5. Delayed reconstruction was done in 73.1% of patients and the rest underwent primary reconstruction at the time of mastectomy. CT angio demonstrated two ideal medial perforators in 59% of cases whereas single ideal perforator was noted in 32% of patients.

Free deep inferior epigastric artery perforator flap was performed in majority 91% of the patients whereas rest underwent reconstruction either by muscle sparing free TRAM (6.0%) or superficial inferior epigastric artery flap (3%). Mean operative time was 6.6 hours. Most of the patients tolerated the procedure well and were usually discharged on 5th postoperative day. Complications occurred in 16% of patients and the most common immediate complication included partial abdominal wound dehiscence (9%) and late included fat necrosis seen in 11%. Only 2 total flap losses were noted.

On follow up examination, the patients reported overall satisfaction rates of 92% on long- term examinations. At the time of completion of this study, 30% of patients had completed nipple reconstruction on their reconstructed breasts. When the satisfaction rates were compared with the need for secondary reconstructive procedures, it was found that most of the secondary balancing procedures were performed in unsatisfied females (75%).

Discussion

Breast cancer is a worldwide problem and with advent of early diagnosis and treatment, more and more patients of postmastectomy are now opting for reconstruction. In our most of the patients were in the the age group of 45 years, whereas Bray et al report mean-age group of 53 in their group of patients. Early diagnosis of the breast cancer and its management has led to early age of treatment in most series [1-4]. Our average BMI was 31.1 whereas in various studies across the world BMI in the reconstructed group was between 25-28 noted by many authors around the world, Saudi population has a higher incidence of obesity which has been reflected in our study [9-11]. Comorbid illness was noted in 9% of our patients, most common included hypertension and diabetes, these trends are also noted in varying frequencies across world

literature [5-9]. All of them were optimized before reconstruction procedures to remove confounding factors.

Invasive ductal carcinoma was the most common cancer pathology before reconstruction in our patients (49.3%) as has been also reported [2-4]. Multitude of risk factors that relay in cancer oncogenesis are found in this part of world also. 47.5% of our patients has irradiated chests owing to the invasive nature of the malignancies, however no direct correlation was noted between post op radiation and flap failure rates and was noted by Holmstro¨m et al [12].

Most of our patients came for delayed reconstruction 73.1%, whereas Baumann et al reported 82% and 56% their cases as delayed [10]. In a scenario of invasive ductal cancer, the esthetic results and outcome are markedly affected by postoperative radiations which include varying degrees of fat necrosis and volume loss as has been reported [8-11].

Free deep inferior epigastric artery perforator flap (DIEP) was our workhorse mode of reconstruction (91%). In technical microvascular hands it offers the most reliable, versatile, less time consuming and least morbid mode of breast reconstruction with a sharp learning curve. Worldwide also, free DIEP has been a time-tested reconstruction tool in the hands of a breast microsurgeon [12-17]. However, we have now adopted Serletti algorithm (Table 4) in most our cases to select the type of reconstruction and a free superficial inferior epigastric artery flap was performed in cases with a good vein caliber [18]. This further reduces the time and the need to open rectus fascia and its consequences.

Our complications were comparable to the other studies [8, 9, 11, 13, 14]. The most common included fat necrosis (11%) and small midline abdominal wound dehiscence (9%). Ferlay et al noted fat necrosis in 5 % of their patients [8]. Scheflan et al had midline abdominal wound dehiscence in 4% of their reconstructed patients [19]. Including more than one perforator has been found to lower chances of fat necrosis but in our group of patients, no such correlation was noted as we started using a single reliable perforator.

Our mean operative time was 6.6 hours, which is comparable to the world data. Scheflan et al and Blondeel et al report mean-operative time as 7 hours [19, 26]. Preoperative assessment by CT angiography and its application intraoperative as well as using two team approach has led to a decrease in our mean operative time, with requirement of less anesthesia and early recovery. Our patients are discharged on 4th postoperative day. Discharge dates for most authors has been day 5 [9, 11, 13, 14]. Our comprehensive post-operative management plan enables each patient to follow strict post-operative measures with early pulmonary therapy, ambulation emphasis on use of breast support garment and abdominal binder and return to activity. This has reduced to the average length of stay in this group of patients.

In order to assess the final outcome at 6 months, we devised a special questionnaire for the patients which included aesthetic and objective questions. The females participated in the questionnaire on their follow up examinations. As far as esthetic results were concerned 95% of females were happy with the esthetic results of their reconstructed breasts and felt them soft to touch and more natural. The satisfaction results improved with subsequent balancing procedures and nipple reconstructions. Similar outcomes were assessed by varied authors. Blondeel et al assessed the outcome in their 50 reconstructed breasts and found high satisfaction rates in 80%. Bonde et al studied satisfaction rates in the 112 reconstructed breasts and found that 87% of the females were happy after all the balancing procedures while as Fracon et al reported high satisfaction rates in autologous reconstructed patients as compared to alloplastic group [20-30]. The trend nowadays is go for implant based reconstruction as it saves time, has least morbidity and is generally accepted well by the post mastectomy females. We have demonstrated equal safety and satisfaction rates in our patient group with the added benefit of natural tissue for reconstruction and no long-term side effects.

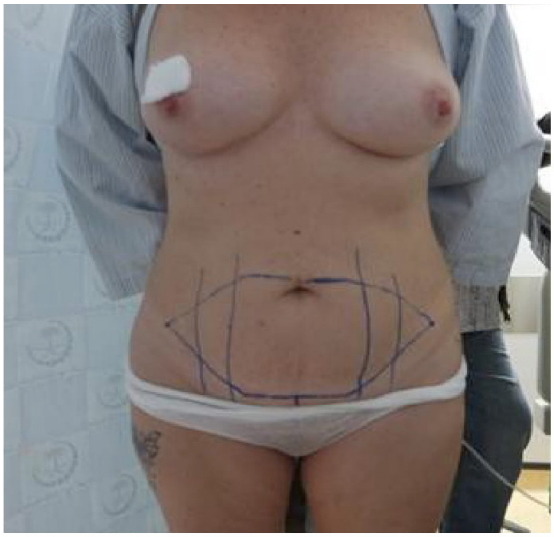

Figure 1: a) preoperative picture of patient with ductal cancer Right breast
b) post operative picture one month post immediate

Figure 2: a), b) one year post operative pictures of the patient shown in figure 1

figure 3 a) left sided mastectomy in a young patient
B) post operative pictures following delayed reconstruction by free diep flap

Figure 4: preoperative evaluation and location of abdominal skin perforators by ct angio.

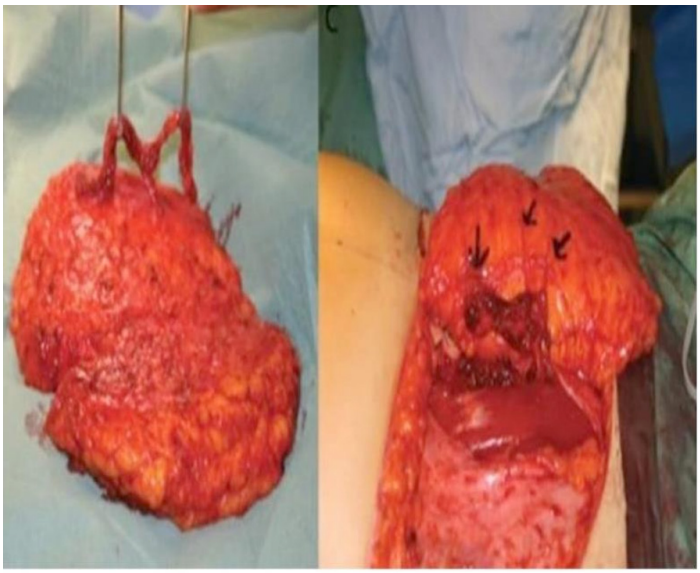

Figure 5: the vascular pedicle along with skin perforators after flap harvest.

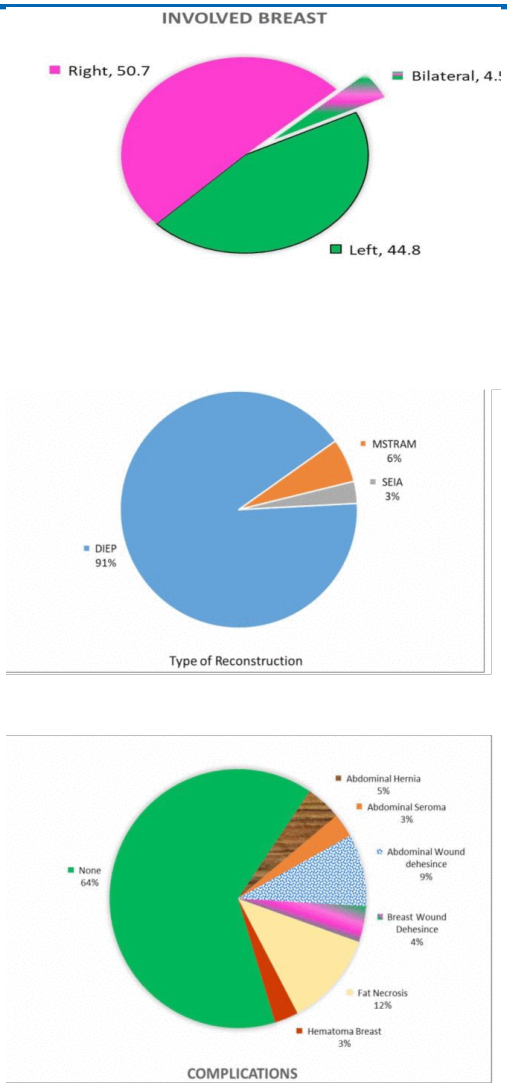

Figure 6: pie charts showings
A) frequency of involved breast. **B**) type of reconstruction
c) complications.

Table 1: Descriptive Statistics

	Characteristic	n (%)
Age (yr)	Mean ± SD	45.3 ± 6.8
	Median (min, max)	46 (29, 59)
BMI (kg/m2)	Mean ± SD	31.1 ± 4.4
	Median (min, max)	31.24 (23.01, 43.9)
Nationality	Non-Saudi	1 (1.5%)
	Saudi	66 (98.5%)
Marital Satus	Single	4 (6.0%)
	Married	63 (94.0%)
Smoking		4 (6.0%)
Asthma		5 (7.5%)
Diabetis Melitus		9 (13.4%)

Hypertension		8 (11.9%)
Hypothyrodism		9 (13.4%)
DVT		3 (4.5%)
PE		3 (4.5%)
Primary Diagnosis	DCIS	31 (46.3%)
	IDC	33 (49.3%)
	ILC	3 (4.5%)
Involved Breast	Bilateral	3 (4.5%)
	Left	30 (44.8%)
	Right	34 (50.7%)
	DIEP	61 (91.0%)
Type of Reconstruction	MSTRAM	4 (6.0%)
	SEIA	2 (3.0%)
Chemotherapy	Yes	41 (61.2%)
Radiotherapy	Yes	32 (47.8%)
Type of Reconstruction	Immediate	18 (26.9%)
	Delayed	49 (73.1%)
Complications	Abdominal Hernia	3 (4.5%)
	Abdominal Seroma	2 (3.0%)
	Abdominal Wound dehiscence	6 (9.0%)
	Breast Wound dehiscence	3 (4.5%)
	Fat Necrosis	8 (11.9%)
	Hematoma Breast	2 (3.0%)
	Total flap loss	2 (3.0%)
	None	43 (64.2%)
Further Surgeries	NAC reconstruction	13 (19.5%)
	Scar Revision	6 (9.0%)
	Breast Reduction	4 (6.0%)
	Debulking	3 (4.5%)
	Mastopexy	3 (4.5%)
	Hernia repair	3 (4.5%)
	Abdominoplasty	1 (1.5%)
	TE	1 (1.5%)
Surgery Length	Mean ± SD	6.6 ± 0.9
	Median (min, max)	7 (4, 9)
Admission Length (day)	Mean ± SD	4.8 ± 1.8
	Median (min, max)	4 (3, 15)

Table 2: Complications across Smoking, Diabetes and Radiotherapy

		Abdominal Hernia	Abdominal Seroma	Abdominal Wound dehesince	Breast Wound Dehesince	Fat Necrosis	Hematoma Breast	None	Total	p value
Smoking	No	2(3.2)	2(3.2)	4(6.3)	3(4.8)	8(12.7)	2(3.2)	42(66.7)	63	0.03
	Yes	1(25.0)	0(.0)	2(50.0)	0(.0)	0(.0)	0(.0)	1(25.0)	4	
Diabetis	No	3(5.2)	2(3.4)	5(8.6)	1(1.7)	8(13.8)	0(.0)	39(67.2)	58	0.001
	Melitus	0(.0)	0(.0)	1(11.1)	2(22.2)	0(.0)	2(22.2)	4(44.4)	9	
Radiotherapy	No	0(.0)	2(5.7)	5(14.3)	3(8.6)	7(20.0)	0(.0)	18(51.4)	35	0.006
	Yes	3(9.4)	0(.0)	1(3.1)	0(.0)	1(3.1)	2(6.3)	25(78.1)	32	

Table 3: Satisfaction rates across questionarre.

		No	Yes	p value
Knowing what I know today, I would definitely choose to have breast reconstruction	Satisfied	40 (63.5)	23 (36.5)	0.126
	Not satisfied	1 (25.0)	3 (75.0)	
Knowing what I know today, I would definitely choose to have the type of reconstruction I had	Satisfied	41 (65.1)	22 (34.9)	0.01
	Not satisfied	0 (.0)	4 (100.0)	
Overall, I am satisfied with my reconstruction	Satisfied	40 (63.5)	23 (36.5)	0.126
	Not satisfied	1 (25.0)	3 (75.0)	
I would recommend the type of reconstructive procedure that I had to a friend	Satisfied	41 (64.1)	23 (35.9)	0.026
	Not satisfied	0 (.0)	3 (100.0)	
I felt that I received sufficient information about my reconstruction options to make an informed choice among several procedures	Satisfied	41 (63.1)	24 (36.9)	0.071
	Not satisfied	0 (.0)	2 (100.0)	
The size and shape of my breast are the same	Satisfied	13 (54.2)	11 (45.8)	0.378
	Not satisfied	28 (65.1)	15 (34.9)	
My reconstructed breast(s) feel soft to touch	Satisfied	31 (59.6)	21 (40.4)	0.622
	Not satisfied	10 (66.7)	5 (33.3)	

Conclusion

Breast cancer is one of leading cancers in women of the Middle East. Early diagnosis and treatment has improved the cure rates considerably. With more awareness, significant group of patients are now opting for reconstruction. With the availability of "state of the art" microsurgical breast reconstruction, in properly selected patients, the quality of life and satisfaction rates are high and free flap breast reconstruction has proven to be the standard of care in post mastectomy patient population.

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