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ONCOLOGICAL AND COSMETIC OUTCOME OF ONCOPLASTIC BREAST SURGERY.

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ABSTRACT… Objectives: Oncoplastic breast surgery (OBS) is a revolutionary approach for managing breast cancer. This manuscript aimed to assess the oncological and cosmetic outcomes of OBS in breast cancer. **Study Design:** Descriptive, prospective study. **Setting:** Department of Surgery, Madina Teaching Hospital, Faisalabad. **Period:** January 2018 to June 2019. **Material & Methods:** Females with invasive breast cancer having 5-6 cm tumour size, Locally advanced tumour after chemotherapy, single tumour and patients < 70 years were included; while patients with fixed tumours, high tumour to breast size ratio, multiple axillary lymph nodes, metastatic cancer & patient's choice for mastectomy were excluded. Oncological outcome was assessed by; Margin involvement, time lag for chemotherapy, local recurrence and distant metastasis. Cosmetic outcome was detected by score given by patient and an independent surgeon. **Results:** Thirty two female patients underwent OBS. Mean age of patients was 46.56 yr (SD =10.23). Six patients (18.8%) had central tumors. 3 patients were post neoadjuvant chemotherapy. In 28 patients volume displacement (VD) surgery; while in 4 patients volume replacement (VR) using different flaps like LICAP flap were done. Histopathology showed positive margin in one case only, in all other cases clear margins were found. Chemotherapy start time varied from 3 to 8 weeks after surgery (Mean=31.3 days). Delayed time was associated with high BMI and diabetes ($P<0.05$). Local recurrence or distant metastasis was not noticed in any case. Majority of the patients and surgeon (90%) were satisfied with cosmetic outcome. **Conclusion:** Oncoplastic Breast surgery is a unique approach to conserve breast even in larger tumours without compromise on oncological principles and cosmesis.

Key words: Cosmetic Outcome, Flap Reconstruction, Oncoplastic Breast Surgery, Oncological Outcome, Therapeutic Mammoplasty.

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INTRODUCTION

In patients with early stage breast cancer, Breast-conservation surgery followed by radiotherapy has almost replaced the radical and modified-radical mastectomies of Halsted and Patey. However, excision of larger breast tissue like > 20%, central tumours and various degrees of ptosis in large breasts may lead to cosmetic deformities. Oncoplastic breast surgery (OBS) evolved from the breast-conserving surgery by expanding its general indications to achieve wide tumour free margins without a compromise on the cosmetic outcomes.[1,2] Thus, oncoplastic breast surgery can be defined as a tumor-focused immediate breast reconstruction allowing for wider volume excision with no aesthetic compromise.[1]

Oncoplastic surgery has emerged as a third option between conventional breast conservation surgery and mastectomy. This basically includes two different approaches: volume replacement (VR) and volume displacement (VD). In volume replacement, partial mastectomy and immediate reconstruction of the breast is done with the mobilization of soft tissue from elsewhere, while volume displacement involves partial mastectomy followed by filling of defect by surrounding breast tissue.[3] The volume-displacement techniques were sub-classified by Clough et al, into two levels[4,5]: Level (I) includes excision of less than 20% of breast volume and no excision of skin or mammoplasty; Level (II) includes an expected 20–50% of breast volume excision, with removal

of excessive skin and mobilization of parenchyma based on mammoplasty techniques. VR procedures can be used in medium or small breasts, if 20–50% of the breast volume is anticipated to be excised.[6]

Oncoplastic breast surgery is gaining popularity in routine breast cancer surgery, sometimes as an alternative to mastectomy for the resection of larger tumours; The goals of breast conservation treatment are to achieve tumour free margins and good local control, with good cosmetic outcome an important secondary goal. However, evidence supporting its safe oncological outcome and cosmetic results are still lacking.[7] In this article we evaluated the oncological and cosmetic outcome of our oncoplastic breast surgery cases.

AIMS AND OBJECTIVES

The aim of this study was to provide an objective assessment of our initial experience of oncoplastic breast surgery based on oncological and cosmetic results of surgery.

MATERIALS AND METHODS

Study Design

This Observational, prospective study was conducted from January 2018 to June 2019 at Madina Teaching Hospital, Faisalabad.

Patient Selection and Evaluation

A thorough history and clinical examination, mammography/ultrasound, histological confirmation and metastatic workup was done preoperatively. Patient biodata and tumour characteristics, surgical technique, complications of surgery and observations of oncological and cosmetic outcomes on follow up visits were entered into a computerised database (Microsoft excel sheet) at Breast Clinic. Written and informed consent was taken from all the subjects. Approval from the hospital ethical committee was obtained.

Inclusion Criteria

Female patients with invasive breast cancer having tumour size of upto 5-6 cm size with optimum tumour size to breast size ratio, locally advanced tumour after good response to neoadjuvant chemotherapy, single focus tumour, central and peripheral tumours. No clinically palpable axillary lymph node or mobile ipsilateral lymph nodes, patients younger than 70 years with good physiological function.

Exclusion Criteria

Tumours with skin fixity or peu'd orange appearance, tumours in small size breast with a high tumour size to breast size ratio, fixed to Nipple Areola complex (NAC), multifocal tumours, Multiple axillary lymph nodes, metastatic cancer & patient's choice for mastectomy.

Data Analysis

For qualitative variables like Parity, marital status, family history of cancer, site of tumour and complications; frequency and percentages were calculated and presented in tables and graphs. While numerical (continuos) variables like age, BMI, hospital stay, surgery time, tumour size, weight of excised specimen, cosmetic score was presented as Mean ± SD. Chi- square and Fischer exact test was used to test association. Statistical significance was considered at a P value of < 0.05. IBM SPSS version 22 was used for data analysis.

Operative Technique

Female patients who met the inclusion criteria were operated by oncoplastic breast surgery. Treatment plan for the patients was discussed in multidisciplinary team meetings. Majority of the patients were admitted one day before surgery. Preoperative markings were done with the patient in upright position. In 28 patients volume displacement (VD) oncoplastic surgeries (Figure-1a, b, c) were done by different techniques according to site and size of tumour, degree of ptosis and radiological tumour density. In 4 patients volume replacement (VR) using flap reconstruction was done (Figure-2 a-e).

29 patients underwent OBS as a primary procedure, while 3 patients had large size tumour initially and underwent neoadjuvant chemotherapy before OBS. Tumour bed was marked with clips to help in delivery of radiotherapy to tumour bed. These clips and good communication with radiotherapist

are important to aid in accurate tumour bed boost.[8] After wound healing patient was referred to oncologist for adjuvant chemotherapy, radiotherapy or hormonal treatment. Follow-up for oncological and cosmetic outcomes was done every 3 months in 1st year and thereafter 6 monthly.

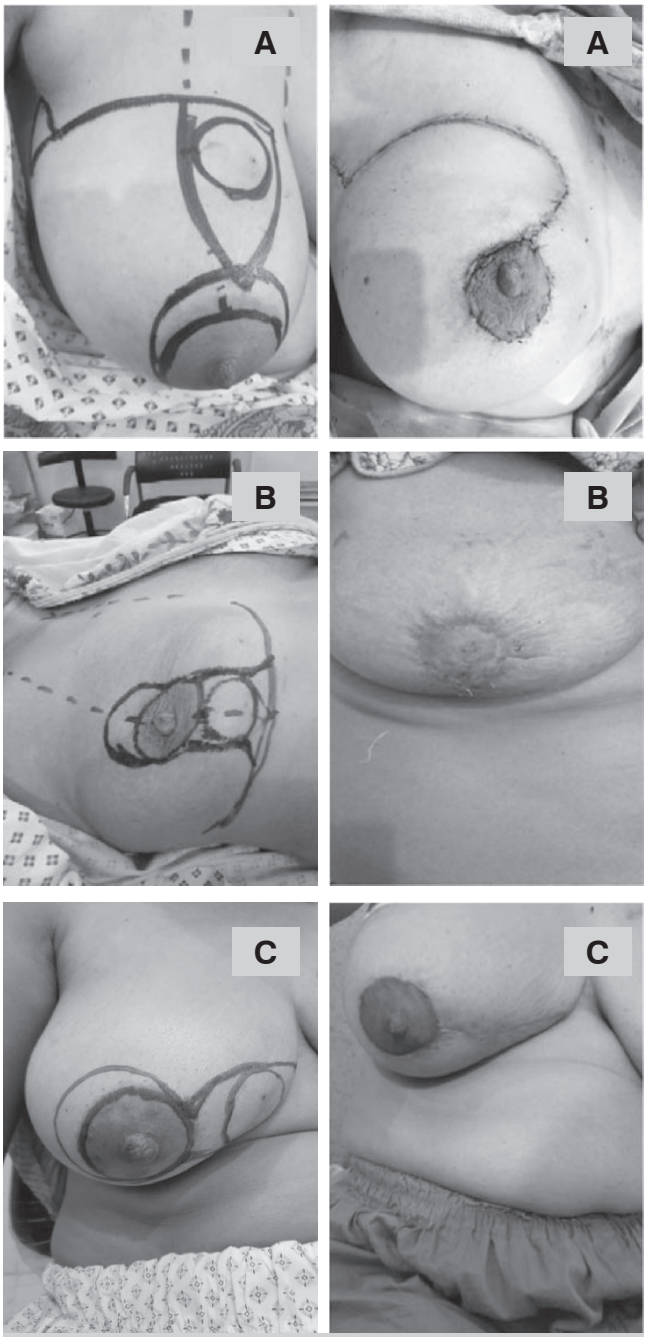

Figure-1. Different volume displacement Oncoplastic surgical techniques (Pre-op & post- op view)
a) Matrix rotation b) Inf pedicle flap for central tumour
c) Medial Mammoplasty

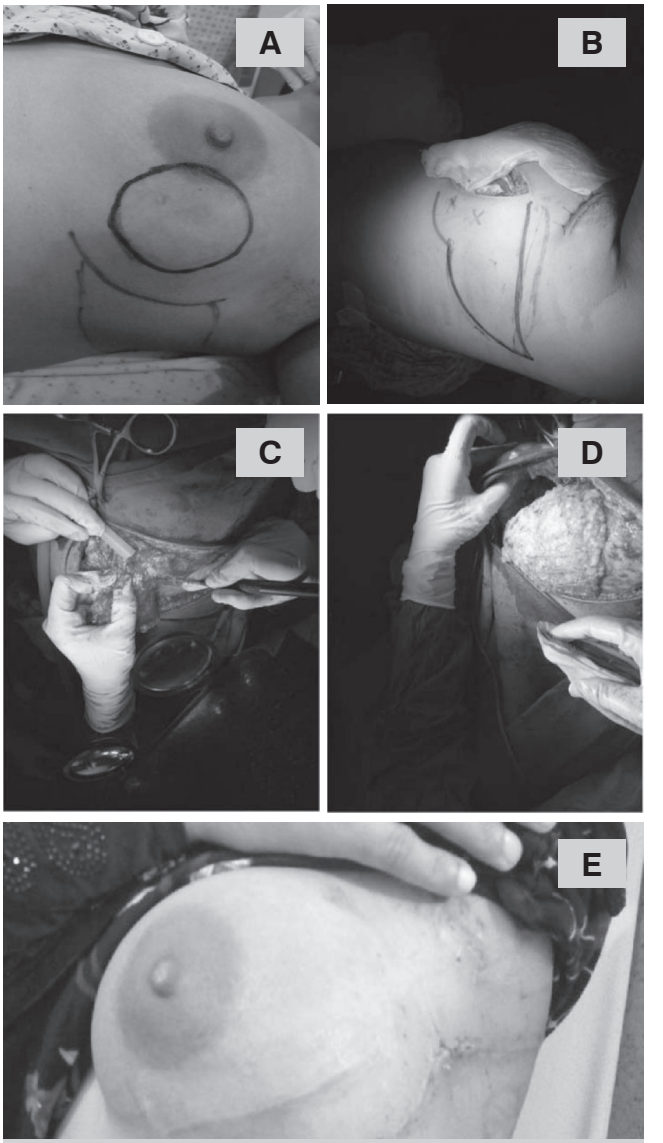

Figure-2. LICAP Flap a, b: Preop markings; c,d: LICAP flap dissection; e: 1st week Post op

OUTCOME MEASURES

Oncological Outcome

Oncological outcome was assessed by Margin involvement (<1mm closest margin was considered positive), time lag for the start of chemotherapy after OPS, local recurrence and metastatic disease.

Cosmetic Outcome

Cosmetic score was recorded by the surgeon and was reviewed by patient and an independent surgeon (not directly related to the surgery).

A questionnaire was used to assess cosmetic outcome at 6 and 12 months after surgery. Assessment of cosmetic outcome was done using a score from 5 (excellent) to1 (bad). Patient was considered to be satisfied with cosmetic outcome if given a score of 4 (good) or 5 (excellent).[2]

RESULTS

Mean age of the patients was 46.56 (SD 10.23) (range: 28-70 yr); 18 patients (56.2%) were premenopausal and 14 (43.8%) were post menopausal. Mean BMI was 23.9 ± SD=3.9 (range 19-35), 5 patients (15.6%) had a family history of breast cancer. Most of the patients were of low parity (either nullipara: 16% or had 1-2 children: 62.5%).

Tumour location in different quadrants is shown in Figure-3. Six of our cases were of central breast tumours. Regarding surgery, Table-I shows different operative techniques of oncoplastic breast surgery that were used according to tumour location, size and breast density. In majority of the patients with wise pattern mammoplasty, we used superomedial NAC pedicle. Mean Operation time was 72.27 ± 22.25 (range:40-130 min). Longer time was related to flap reconstruction cases. Mean weight of the specimen was 270 g ± 97 (range: 115- 455g). Mean size of specimen as determined by histopathology was 36.8 mm 0.8 (range 1.75 -5.25). Mean hospital stay was 4.5 days ± 2.85 (1 to 14 days). In 8 patients (25%) early post op complications were seen and in one of these late complication of abscess formation was noticed, (Table-II).

Table-III shows oncological outcomes of our patients. We did not find any case with local recurrence or distant metastasis during our study period. One patient with close margin <1 mm underwent mastectomy after getting histopathology report. All other patients had safe resection margins. Time for starting first chemotherapy varies from 20-50 days with an average time of 31.97 ± 6.5 days. Patients with delayed start of chemotherapy (>6 weeks) after surgery were assessed. A significant correlation was found with high BMI (p=0.000) and diabetes (p=0.007) in these patients (Table-IVa & IVb).

Regarding cosmetic outcome, majority of the patients (90%) were satisfied with the cosmetic outcome. Table-V. Mean score given b the patients (4.6 ± 0.75) was better than score given by the independent Surgeon 4.4± 0.94. That is statistically significant (p=0.000).

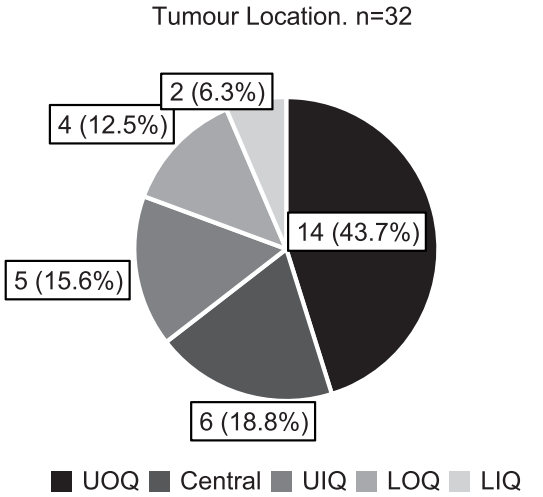

Figure-3. Tumour location

Tumour Location	Oncoplastic Technique	No. of patients n=28
Central Tumours (N=6)	• Wedge Inverted T mammoplasty	3
	• Melon Slice Mammoplasty	2
	• Inferior pedicle Flap	1
Eccentric/ Peripheral Tumours (N=22)	• Wise pattern	7
	• Round Block/crescent mammoplasty	5
	• Batwing	3
	• Lateral mammoplasty	2
	• Medial mammoplasty	2
	• J plasty	1
	• Vertical mammoplasty	1
	• Matrix rotation	1

Table-I. Oncoplastic technique (VD group, n=28)

Early/Late	Complications	No of patients (%)
Early	Seroma	6 (18.8)
	Partial wound necrosis	1 (3)
	Nipple necrosis	1 (3)
Late	Abscess	1 (3)

Table-II. Post op complications:

Oncological Outcome		No. (Percentage) n=32
Margins positivity		1 (3%)
Time lag for start of chemotherapy	4 wk 4-6 wk 6-8 wk	20 (62.5%) 9 (28%) 3 (9.4%)
Local recurrence		0
Distant metastasis		0

Table-III. Oncological outcome

		BMI		Total
Time for start of Chemotherapy		Normal	Over weight	
Time	Early (<6 weeks)	28	1	29
	Delayed (>6 weeks)	1	2	3
Total		29	3	32

Table-IV. Association of factors for delayed start of chemotherapy

Chi-Square Test

	Value	P-Value
Pearson Chi-Square	12.789	.000

Table-IV (a) Time for chemotherapy start and BMI cross tabulation

Time for chemotherapy start and diabetes Crosstabulation

		Diabetes mellitis		Total
		No	yes	No
Time for start of chemotherapy	Early (6 weeks)	25	4	29
	Delayed (<6 weeks)	0	3	3
Total		25	7	32

Table-IV (b). Diabetes mellitis and time lag for start of chemotherapy:

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)	Point Probability
Pearson Chi-Square	11.823 (b)	1	.001	.007	.007	
Continuity Correction(a)	7.316	1	.007			
Likelihood Ratio	10.352	1	.001	.007	.007	
Fisher's Exact Test				.007	.007	
Linear-by-Linear Association	11.453(c)	1	.001	.007	.007	.007
N of Valid Cases	32					

Cosmetic Outcome	Patients Rating	Surgeon's Rating
Excellent (5/5)	23 (72%)	22 (70.4%)
Good (4/5)	6 (18.7%)	4 (12.8%)
Fair (3/5)	2 (6.4%)	4 (12.8%)
Poor (2/5)	1 (3.1%)	2 (6.4%)
Bad (1/5)	0	0
Mean	4.58	4.42
SD	0.75	0.94

Table-V. Cosmetic score given by patient and surgeon

Table-V. Data Analysis: Patient score v/s Surgeon score Crosstabulation

		Surgeon				Total
		Poor	Fair	Good	Exce-llent	
Pati-ent	Poor	0	1	0	0	1
	Fair	1	1	0	0	2
	Good	1	2	4	0	7
	Exce-llent	0	0	1	21	22
Total		2	4	5	21	32

Chi-Square Tests

	Value	Df	Asymp. Sig. (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)	Point Probability
Pearson Chi-Square	40.322(a)	9	.000	.000		
Likelihood Ratio	39.692	9	.000	.000		
Fisher's Exact Test	36.217			.000		
Linear-by-Linear Association	21.850(b)	1	.000	.000	.000	.000
N of Valid Cases	32					

DISCUSSION

Oncoplastic breast surgery has gained a widespread popularity during the last two decades as an important component of breast cancer surgery and it has enabled surgeons to perform breast conservation in large tumors.[9] We conducted this study on 32 female patients with invasive breast cancer to find out the oncological and cosmetic outcomes of oncoplastic breast surgery. Mean age of our patients was 46.56 yr ±10.23 (range 28-70 years). 18 patients (56.2%) were premenopausal and 15 (47%) were postmenopausal. Other Local and regional studies also show breast cancer in younger eastern population and support the impression of more younger patients of breast cancer here as compared to western population.[10-12]

Mean size of tumour detected clinically was 39.8 mm ± 0.9 (range 22- 55mm) while histologic assessment showed a mean size of 36.8 mm ± 0.8 with a range of 1.75-5.25. Three patients with bigger size of tumour (6-8 cm), underwent neoadjuvant chemotherapy and then oncoplastic breast surgery was offered. In our study tumour to breast size ratio was the main deciding factor for conservative breast surgery. Pillarisetti from India also used same criteria for selecting patients for breast conservation. Various studies document size of the tumour as a relative criterion for patient selection in oncoplastic breast surgeries and demonstrate its feasibility every time it is judged possible to achieve complete surgical excision with good cosmesis.[13] In properly selected patients, with favourable cancer histopathology, even bigger sized tumor, oncoplasty is a very good technique to preserve the integrity of the breast. The only thing that hinders this option is a skill and training deficiency.[14]

Wise pattern and round block mammoplasty were most common techniques in our study. We used different techniques according to location of tumour, degree of ptosis and breast density. For example, round block mammoplasty is mostly used for the lesions located in periareolar area or upper inner quadrant of breast.[2] A Literature review study by Cruz L also described Wise pattern mamoplasty, followed by the round block and LD flap as most common oncoplastic breast surgeries performed.[15]

Breast conservation has been routinely denied for a long time, in patients with central breast tumors accounting for 5–20% of breast cancer cases.[16] However, with the use of flaps and many other emerging techniques, central tumours are no more a contraindication to breast conservation and even larger and multifocal tumours can be treated by OBS.[14,17] In our study we had 6 cases (18.8 %) of central breast tumour. We used Grissotti flap, Inverted T mammoplasty, Round block, Batwing's and melon slice mammoplasty for central tumours.

Option of cosmetic correction of contralateral side was offered to all our patients. However, no patient agreed for either immediate or delayed surgery to the unaffected side. Adimulam, et al from India also described similar approach of non acceptance of contralateral breast surgery by the patients when symmetrising mammoplasty was offered.[18] However, in developed countries it is a routine practice. Timing of opposite breast symmetrising procedures varies. De Lorenzi et al performed immediate contralateral breast reduction mastopexy in majority of OBS cases[19], however those in favour of delayed symmetrising surgeries argue that radiotherapy to breast may

lead to poor cosmetic results.[20]

Mean operation time in our study was 72 min ±22.26 (range 40- 130 min). Mean duration of hospital stay was 4.5 days ±2.8 (range 1-14 days). This was shorter than another local study.[9] In majority of our patients hospital stay was < 5 days (75%), however patients who underwent two staged flap reconstruction or wound related complications had longer (>10 days) hospital stay. Eight patients (25%) had early complications e.g, seroma in 5 patients, partial wound necrosis in 2, nipple necrosis in 1 patient and only one patient presented with delayed complication of an abscess formation (3months after surgery), during the course of chemotherapy that was managed by incision and drainage under local anesthesia on OPD basis. Egyptian study also report a 25% complication rate, most of which are of minor level. Literature shows that risk of morbidity increases with age, obesity, smoking, diabetes and bleeding disorders.[21-23] We found high BMI and diabetes association with wound related complications and delayed start of chemotherapy, P value <0.05.

Regarding oncological outcome, we did not find any case of local recurrence or distant metastasis at a maximum follow up of 18 months. Other neighbouring countries studies also report OBS very safe in terms of local recurrence and distant metastasis.[9,17,24]

Regarding time lag for the start of chemotherapy different studies document oncoplastic breast conservation safe.[25-28] In our study mean time for the start of chemotherapy was 31.3 days± 6.3 (range: 3 -8 weeks). In majority of the patients (87.5%) chemotherapy was started in 3 to 6 weeks time. In a study conducted by Khan J and colleagues comparison of delay in chemotherapy was done between oncoplastic breast surgery group, BCS, mastectomy, or mastectomy and immediate reconstruction. No difference between the groups was found for chemotherapy delivery.[29] A population based study conducted at Denmark also concluded that oncoplastic breast surgery does not cause any delay in the start of chemotherapy in comparison with mastectomy or lumpectomy.[30]

Cosmetic results as scored by the patients were excellent, good, fair and satisfactory in 72%, 18.7% and 6.4% & 3.1 % patients respectively with no bad score given by any patient. This shows an overall mean of 4.57±0.75 (range 2-5), equivalent to 90 % satisfaction with the cosmetic appearance. Independent surgeon gave a mean score of 4.42 ±0.94 score (range 2-5), equivalent to 88.4 % satisfaction. Other studies also report good cosmetic outcome after OBS in nearly 90% of patients.[25] Score given by the patients was better as compared to the surgeon, Similar approach of the patients was described by a European cohort study.[19]

Initial results of oncoplastic breast surgery are very encouraging in our study, however long term results will be needed to further support its safety and feasibility in our patients.

CONCLUSION

Oncoplastic breast surgery is an important revolution in breast surgery in which we can perform a wide tumour resection even for large size and poorly located cancers. This study showed oncoplstic breast surgery oncologically safe as well as associated with high patient satisfaction with cosmetic outcome despite large volume excision.

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