Original Article

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Superomedial Pedicle Septum based Reduction Mammoplasty for Breast Hypertrophy

Hiba MS Alkharasani [1] , Jabir R. Hameed [2]

[1] Candidate for the Arab Board of Plastic Surgery, Al-Sader Teaching Hospital , Basrah, Iraq

[2] Consultant plastic surgeon, Al-Sader Teaching Hospital , Basrah, Iraq

ABSTRACT

Background: Reduction mammoplasty is a technique used for treating women with breast hypertrophy, in addition to improving the appearance of these breasts. Hence, the corrections under this mammoplasty include functional and aesthetic outcomes, while preserving the vascularity and sensibility of the breasts.

Aim : To evaluate superomedial septal-based reduction mammoplasty in patients with breast hypertrophy on Nipple Areola Complex (NAC) vascularity, sensibility and overall complications.

Patients and Methods: A total of 29 patients with bilateral breast hypertrophy underwent reduction mammoplasty with the superomedial pedicle and septal perforated technique. The mean distance of SN-N was 36.9 cm on the right side and 37.4 cm on the left side. The mean distance transfer of nipple–areola was 18.2 cm for the right side and 18 cm for the left side. The mean excised tissue was 1283 g from the right side and 1240 g from the left side.

Results: Postoperatively, the mean of SN-N was 21.5 cm for both the right and left side. A limited wound dehiscence occurred in four patients (13.8%), impaired nipple sensation occurred in three patients (10.1%), while infection was found in one patient (3.4%).

Conclusions: In our study**,** using the superomedial pedicle and septal perforator provided a safe and reliable technique for treating patients with breast hypertrophy, including macromastia and gigantomastia. It minimized the risk of vascular compromise of the NAC. this technique was found to show minor complications and provide good aesthetic outcomes.

Keywords: Breast Reduction, Superomedial Pedicle Technique, Mammoplasty, Würinger's Septum, Breast Hypertrophy.

Corresponding author: *Hiba MS Alkharasani, Email: d.habah88@gmail.com*

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INTRODUCTION

The breast has been an image of maternity, womanhood, a symbol of motherhood, and sexuality.[1] Breast hypertrophy can be divided into two: it can manifest as macromastia, which is defined as a symptomatic breast tissue that weighs less than 1500g, or gigantomastia, which is defined as symptomatic breast tissue weighing greater than 1500g.[2]

Breasts that have an abnormal size and shape are often perceived as unattractive.[3] In this regard, conditions breast hypertrophy can have psychological impacts, including social isolation, self-confidence erosion, and breakdown of self-image. In addition, severely large breast leads to physical problems, such as shoulder, back, and posterior neck pain and also limited range of movement. All patients suffer from intertriginous eczema at the inframammary crease, as well as furrowing from the brassier strap.[4] This causes women to seek surgical intervention.[2] Breast hypertrophy is thought to be an abnormal end-organ response to circulating estrogen with the normal levels of estrogen and the usual number of estrogen receptors in women with mammary hypertrophy, evidence of some women's hypersensitivity to the hormone which is commonly idiopathic.[5] Overall, 60% of the breast is supplied by the internal mammary artery, while 30% is supplied by the lateral thoracic artery and 10% is supplied by minor contributions from the thoracoacromial, intercostal, subscapular, and thoracodorsal arteries.[6]

The horizontal fibrous septum (Würinger's septum) is a thin lamina of connective tissue that emerges from the pectoralis fascia at the level of the fifth rib, traversing the breast from medial to lateral. It then extends to the middle of the nipple, thereby dividing the gland into a cranial and caudal part.[7] In breasts with greater fat content, especially in obese patients, the septum becomes less readily distinct.[8] The superomedial pedicle technique with inverted-T, first described by Orlando and Cuthrie in 1975. Mustapha Hamdi who first described septum based mammoplasty , to enhanced blood supply to NAC had being used with posterioinferior ,medial or central pedicles & also used with different designs by other authors.[9] Breast hypertrophy with sever ptosis > 15cm length of pedicle corrected by free nipple grafting that used for many years with draw back on sensation ,loss of NAC or depigmentation,[10] inferior pedicle safely removed up to 2000g , but with less upper pole fullness & bottoming out.[11]

Aim of the study

The aim of the present study is to evaluate superomedial septal based reduction mammoplasty in patients with breast hypertrophy on Nipple Areola Complex (NAC) vascularity, sensibility and overall complications.

PATIENTS AND METHODS

This prospective study was conducted from January 2019 to June 2021 at the Al-Basra Center of Plastic and Reconstructive Surgery. A total of 29 patients with bilateral breast hypertrophy underwent reduction mammoplasty. A superomedial pedicle and septal perforator-based technique was employed for this purpose. The demographics and preoperative measurements have been provided in (Table 1). A preoperative general

evaluation of the patient was done. Following this, a specific breast assessment was done. All of our patients were complaining from shoulder, neck, and back pain, with many of them complaining of intertrigo at the inframammary fold with a bilateral shoulder groove. They all had an unaesthetic breast appearance as well. One of them was a smoker as well. We excluded patients who had undergone surgical procedures that interfere with pedicle, as well as those diagnosed with or suspicious of having a malignant breast pathology. Patients aged below 16 were excluded as well. Following this, a preoperative breast ultrasound was done. Moreover, a routine preoperative investigation was conducted on all of our patients for their hemoglobin level and bleeding profile. They also underwent a virology screening and were tested for COVID-19. All the results came negative. Photographs were taken of our patients with informed preoperative consent.

Table 1: Demographics and preoperative measurements.

	Range	Mean
Age	25–56	38.5
BMI kg⁄m^2	25.8–45.8	32.4
SN-N Rt(cm)	30–48	36.9
SN-N Lt(cm)	29–45	37.4
IMF-N Rt(cm)	12–26	18.2
IMF-N Lt (cm)	11–23	18

Operative technique

Preoperative marking:

The initial stage of the operation involved marking the patient while she was in standing position. First, we marked a line along the midline from the sternal notch to the umbilicus, in addition to marking the distance from the suprasternal notch to nipple. Then, both the inframammary folds were marked. Following this, the breast meridian was marked by drawing a line that extended from the midclavicular point drown to the nipple areola complex, down to inframammary fold. The new nipple position was selected to be located along the breast meridian midline at the level of inframammary line with consideration in severe ptotic breast marked 1–2 cm below it to avoid high up nipple, so proposed new nipple position about 19–24 cm from suprasternal notch. The mosque dome draws around the new nipple position and attached with two vertical limbs that drawn by displacement of breast laterally and medially along the breast meridian. The length of the vertical limb was in the range 6–10 cm. The vertical limbs then joined the lateral and medial inframammary fold at an angle of 45°. After this, we marked the superomedial pedicle lateral to the center of the new NAC passing, around the NAC to the end in the corner of the limb (the junction of the vertical limb with curvilinear lines). The flap width was about 8–10 cm. The marking is as shown in Figure 5.

A handheld Doppler was used in all of our cases to determine and ensure the pedicle vascular supply, which is provided from both the second and third intercostal arteries branches of the internal mammary artery.

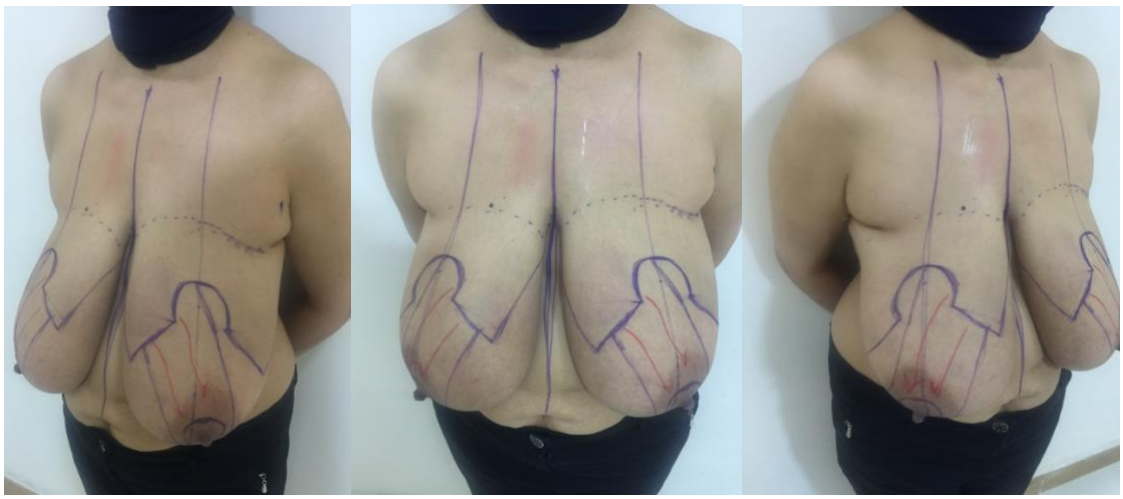


Figure 1: Pre-operative marking.

Surgical technique

The entire operation was done under general anesthesia The patients were laid in a supine position with their arms abducted. A local infiltration of the incision lines (20 ml of 2% xylocaine with 1:500000 adrenalin with normal saline, 150 ml on each side) was carried out by avoiding the superomedial pedicle. The operation began by marking the new desirable NAC circumference, using a cookie cutter. Usually, the circumferential diameter of the desired new NAC is 4.5 cm. The new NAC was incised first by using a no. 15 scalpel. Then, the pedicle was completely de-epithelized, leaving the nipple and an incised areola. Then, the pedicle was incised superficially along its border and gradually deepened along its inferior border until the horizontal breast septum could be observed along the inferior border of the pedicle. Then, the incision was done along the inframammary fold that was extended gradually, using a monopolar cautery, to the underlying muscle fascia to meet with the pedicle incision. The dermo glandular tissue resection being inferiorly. The septum was less readily identified in those patients with greater content of fat, particularly obese patients. After identifying the horizontal septum at the inferior border of the breast, the previously made superficial incision at the border pedicle was deepened to the chest wall to create a fully thick pedicle, initially. This was created using a pyramidal flap with NAC at its apex and the underlying parenchymal tissue at its base, with double blood supply from the superomedial pedicle and horizontal septum. The remainder of the breast tissue was removed in C- shaped fashion (400–3200g). After ensuring adequate hemostasis, the areola was set in its new position by using a 4⁄0 vicryl dermal and 4/0 nylon subcuticular suture. A closed system suction drain was then inserted from the axilla. Following this, both the vertical limb and horizontal were closed using a 2/0 polyglactin (vicryl) dermal suture and a subcuticular 3/0 prolen for the skin.

The dressing was done on the wound and hospitalization for 24 hours. The patient was then put on injectable 3rd generation cephalosporin for the first five days. They were then continuously out on an oral antibiotic for another 10 days. The drains

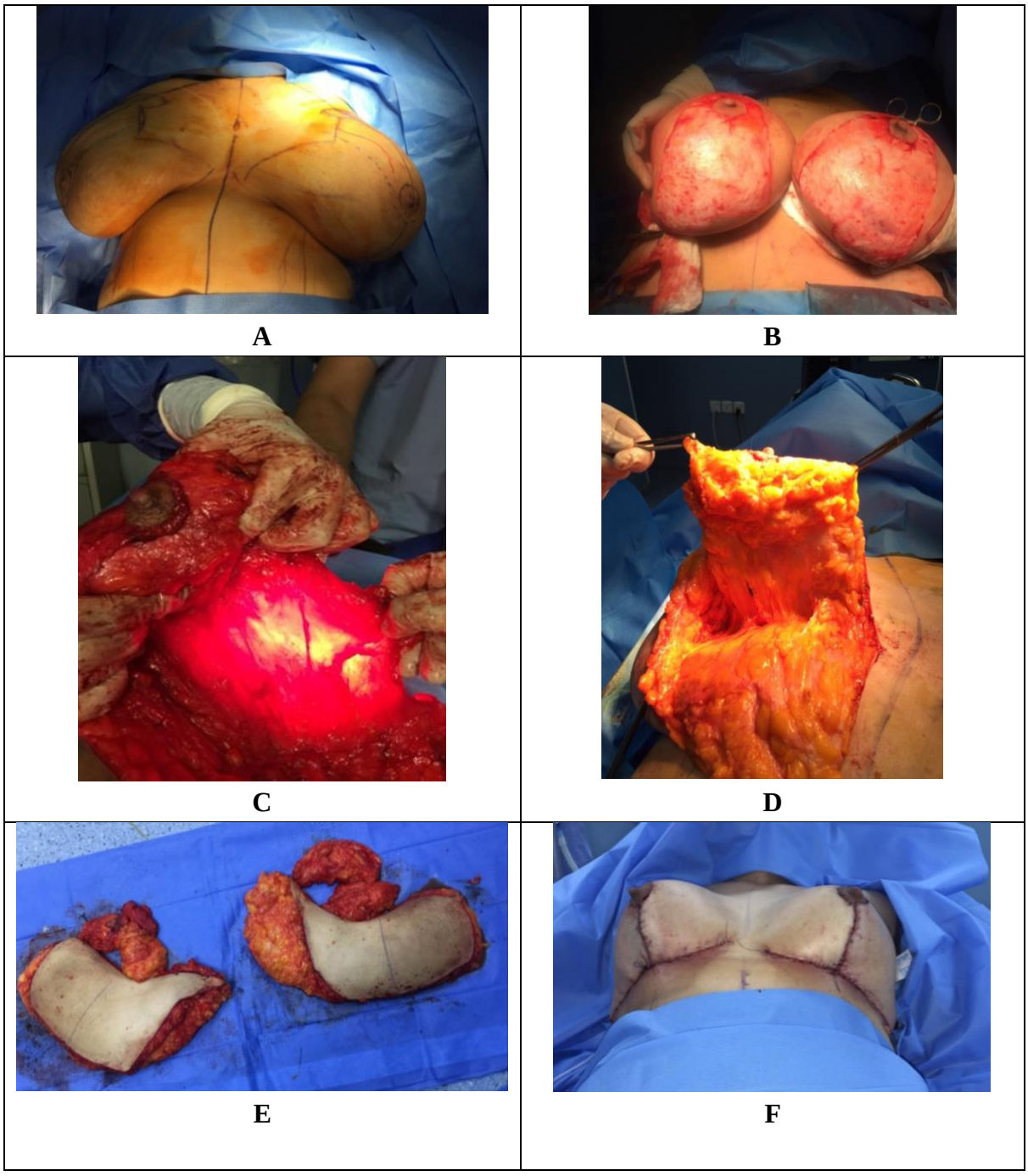


Figure 2: Operative steps**: A.** intraoperative; **B.** the bilaterally deepithalized pedicles; **C.** and **D.** The horizontal septum; **E.** The excised tissue; **F.** Immediate post op.

usually removed 5 days postoperatively. The suture removed 14 days after

operation. Following this, the patients were instructed to wear a sport bra for eight weeks after the operation. In the post-operative period, every patient received

midline to evaluate the changes occurred in breast. The patients were also assessed for any post-operative complications, including nipple necrosis (partial or complete) , sensation retained near normal or still impaired within 1st six months, wound infection, hematoma, seroma, fat

RESULTS

A total of 29 patients with bilateral breast hypertrophy were operated, using a superomedial pedicle and septal perforator based technique .

The post-operative measurements are as shown in Table 2.

From the pre- and post-operative measurements, we observed significant changes in the postoperative breast measures with the mean changes in the right SN-N at 16 cm, the left SN-N was at 15.5 cm, the left IMF-N at 8.7 cm, and the right IMF-N at 8.8 cm ($p = 0.0003$) (Table 3).The p value shows high significance.

The frequency and percentage of post-operative complications have also been provided in Table 4. Wound dehiscence was treated conservatively without further squeal. Regarding nipple sensation, which was assessed by light touch, a majority of the patients had sensations that were near normal within the initial six months . All the scars had started to fade away, with no

silicone gel and were instructed to used it for at least six months.

During follow up measurements was taken in form of the SN-N , IMF-N , & nipple

necrosis, and wound dehiscence at T-junction or extended to the vertical limb. In addition to this, an assessment of the patients' satisfaction was also carried out. For data analysis, SPSS (Statistical Package for the Social Sciences) version 26.

reported case of keloid or hypertrophic scars

The patient's satisfaction was assessed with regards to long-term projection and contour, breast symmetry , size, nipple position and sensation, scar acceptance (Table 5).

All the patients showed improvement in their breast appearance and reported less pain at the shoulder, neck, and back regions.

Since none of our patients were pregnant, there was no need to measure their post-operative breast-feeding capability

Table 2: Post-operative measurements.

	Mean	Range
SN-N Rt (cm)	21.5	20–24
SN-N Lt (cm)	21.5	19–24
IMF-N Rt (cm)	9.4	6–13
IMF-N Lt (cm)	9.2	6–12
MID-N Rt (cm)	11.5	10–13
MID-N Lt (cm)	11.7	10–13
Tissue excised Rt (g)	1283	400–3200
Tissue excised Lt (g)	1240	480–2450

Table 3: Differences in the pre- and post-operative measurements.

	Mean	95% Confidence interval of the difference		Significance
		Lower	Upper	
SN-NpreL -SN-N 6m L	15.5	13.5	17.0	0.0003
SN-NpreL - SN-N 6m L	16	14.2	17.5	0.0003
IMF-NpreR - IMF-N 6mR	8.8	7.4	10.2	0.0002
IMF-NpreL - IMF-N 6m L	8.7	7.5	10.0	0.0002

Table 4: Frequency &percentage of complications.

		Frequency	Percentage
Infection	No infection	28	96.6%
	Infection	1	3.4%
Wound dehiscence	No dehiscence	25	86.2%
	Dehiscence	4	13.8%
Sensation	Norma nipple sensation	26	89.9%
	Weak nipple sensation	3	10.1%
Hematoma		0	0
Seroma		0	0
Fat necrosis		0	0
Nipple necrosis		0	0

Table 5: Patient satisfaction.

	Frequency	Percent
Very satisfied	13	44.8%
Satisfied	13	44.8%
Neither satisfied nor dissatisfied	2	6.9%
Dissatisfied	1	3.4%
Total	29	100%

Figure 3 : 49-year-old patients before (A, B, C) preoperative and (D, E, F) after 13 months. Right SN-N (41 cm) and resected (2000 g); left SN-N (40 cm) and resected (2400 g).

Figure 4 : 27-year-old patients before (A, B, C) preoperative and (D, E, F) after 9 months. Right SN-N (32 cm) and resected (600 g); left SN-N (31 cm) and resected (570 g).

Figure 5 : 40-year-old patients before (A, B, C) preoperative and (D, E, F) after 12 months. Right SN-N 41cm and resected 1650g , and Left SN-N 42cm and resected 1705g .

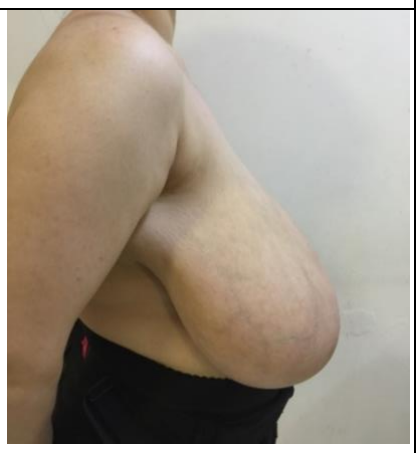
Case No. 4		
		
A	**B**	**C**
		
D	**E**	**F**

Figure 6: 26-years old patients (A, B, C) preoperative and (D, E, F) after 4 months . Right SN-N 40cm and resected 1600g , and Left SN-N 41cm and resected 1675g .

Figure 7: 52-years old patients (A, B, C) preoperative and (D, E, F) after 1 month . Right SN-N 42cm and resected 1100g , and Left SN-N 40cm and resected 1000g

DISCUSSION

Reduction mammoplasty is a technique used for treating women with breast hypertrophy, in addition to improving their breast appearance. Hence, it has both functional and aesthetic outcomes.[5]

The assessment of the post-operative measurement shows significant difference for SN-N distance and IMF-N distance from preoperative measurements (p = 0.0003). These significant reduction in breast measures and size improved patients' quality of life and facilitates daily activities, thanks to the great reduction in neck and shoulder pain. Moreover, a majority of the patients reported an improvement in their breast appearance, size, and projection.

Those cases with breast hypertrophy with more then 40cm nipple to sternal notch distance, the classical option for nipple transposition require to use free nipple grafting which by itself carry many disadvantage including loss of sensation, areola hypopigmentation and inability to breast feeding, while using of conventional pedicle technique for NAC transpotion in extreme cases of breast hypertrophy (>40cm) carry high risk of NAC necrosis . In general NAC necrosis following reduction mammoplasty whether the flap is based superiorly or inferiorly had being estimated as 0.4-6%.[12]

One of the advantages of this technique is that it can be applied for patient with sever ptosis (more than 40 cm nipple to sternal notch) with preservation of NAC . In our study, there was no nipple necrosis. Moreover, Bucaria et al. reported no NAC necrosis with severe breast ptosis (SN-N 40–50 cm),[12] while Uslu et al. showed 2.7%[13] NAC necrosis with an average of 32.99 cm (SN-N), Mohammed *et al*,[14] had no nipple necrosis (SN-N: 39.7 cm), and these studies used the same technique which included superomedial suptum-based mammoplasty. Lugo et al. reported a 10.5% incidence of partial necrosis of NAC, while Landau and Hudson determined rates of 6.5% partial areola necrosis, using the superomedial technique.[13] On the other hand, Hamdi et al. used horizontal septum with lateral and medial pedicles which showed partial (0.5%) and total (0.5%) NAC necrosis, respectively.[15] The comparison by Aurelio et al. [9] for inferior pedicle (25%, average SN-N:34.3 cm) and inferocentral pedicle breast reduction (5.8%, average SN-N: 35.1 cm) NAC complication.[15] In those patients. their breast was found to be too long due to which, a longer pedicle with wide base was required to avoid disruption in the blood supply to NAC. Needless to say, this long flap with a wide base reduced the amount of resected breast. So, by adding a septum-based perforator to superomedial flap, this will help ensure dual blood supply to that pedicle, allowing an increase in the breast tissue resected. Moreover, a superomedial septum-based mammoplasty can reduce the incidence of venous congestion as the technique can preserve the NAC drainage. Moreover, the pedicle inset in this technique is comfortable, avoiding the risk of stretching and kinking the venous system, making it safer for breast hypertrophy. Van Deventer et al. revised the arterial blood supply to the breast by including 27 adult cadaver breasts. They concluded that the location of the main vascular supply to the breast is constant. They observed that NAC necrosis occur because of complete or partial absence of

branches from these arteries. Hence, they concluded that the NAC blood supply is unpredictable, stating that including branches from more than one source would be safer.[16]

The wound dehiscence in our study we encountered once in the T – junction and extended to the vertical limb four cases (13.8%), one of them was smoker and others occurred in long suprasternal notch distance (SN-N >40) in , comparison with Landau and Hudson reported (18%) used superiomedial technique , while Uslu et al. (1.62%),[13] Bucaria et al. (18.2%),[12] Hashem Mohammed,[14] (11.4%), they used superiomedial and septum based technique . Hamdi et al. had (7.7%) dehiscence ocurred in medial and lateral pedicle with septum based mammoplasty.[15] The delayed wound healing correlated directly with the average preoperative breast volume, average resection weight per breast, smoking and with patient age.[17] This study show medium to high wound dehiscence, compared to other studies. Moreover, the study had patients with a large resected breast tissue (mean right: 1840 g; left: 1712 g). These cases were managed conservatively and the wound was healed via secondary intention. The follow-up revealed scars that were acceptable.

After most of technique nipple numbness to some degree and tend to return with time, but never return to normal level.[18] The advantage of preserving the horizontal septum within the flap is that it helps maintain the NAC sensation and preserve the fourth intercostal nerve carried within it. This helps maintain and direct 93% of the sensation to the NAC. Benedetto et al. showed that the septum-based technique is significant as it has better sensibility, compared to non-septum-based techniques. Moreover, it ensures a more inferior-central pedicle.[19] On the other hand, Ümran et al. showed that there are no statistically significant differences between the inferior and superomedial pedicle.[20] In our study, a majority of the patients retained sensation or regained it within first 6months during the post-operative period. Only three (10.3%) of them had impaired sensation and reported a large resected tissue (3200g and 1700g) and last one time factor < 6 months follow up. Uslu et al. showed a 2.7% loss of sensation in cases with partial nipple necrosis.[13] Regardless of the technique used, it is clear that greater the reduction resection, greater the likelihood of the impaired nipple sensation.[18]

The patients' satisfaction with this technique was found to 89.6%. Mohammed et al. show overall satisfaction of inferior pedicle(62.5%) in comparison with superiomedial pedicle was (95.5%).[21] while Aurelio et al . more satisfied with inferocentral pedicle breast reduction (90.2%) and comparison with inferior pedicle (87.2%).[9]

The functional benefit of this technique was obvious, as all of our patients reported the disappearance of their shoulder, neck, and back pain after operation .

Another advantage of superomedial septum-based reduction mammoplasty is that it helps ensure an aesthetically pleasing breast shape with an adequate and stable projection, unlike in the case of the inferior pedicle reduction mammoplasty technique .

CONCLUSIONS

Breast reduction using the superomedial pedicle and septal perforator is a safer procedure well vascularized specially for large breast that minimized NAC vascular compromised, and reliable technique for treatment of patients with breast hypertrophy, including macromastia and gigantomastia. It is a versatile technique with high predictability, low complications, and good aesthetic outcomes.

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