Original Article

Reduction Mammoplasty for Macromastia: Our Experience Using the Inferior Pedicle with Inverted-T Skin Resection

Abstract

Introduction: Macromastia is a major reason why women seek for breast reduction especially when there are symptoms. Breast reduction is an uncommon procedure in our environment and this is a report of our experience with inferior pedicle with an inverted-T skin resection. **Materials and Methods:** This is a report of breast reductions using the inferior pedicle with an inverted-T skin resection approach that were carried out between 2004 and 2022. The information that was retrieved from the case notes were age, marital status, parity, last child birth, family history of breast enlargement, presenting features, height, weight, the weight of tissue excised, and complications. The data obtained were then entered into the SPSS version 25 (IBM Corp.) software and analysed. **Results:** Seventeen women were managed with an age range of 16–50 years and a mean of 31.06 ± 9.66 years. The most common features at presentation were heavy weight around the chest, backache, shoulder pain, no appropriate brassiere with low self-esteem and self-confidence. Ten had skin changes and recurrent rashes over the breast, whereas four complained of grooves with skin changes. The weight of excised breast tissue ranged from 0.2 to 5.5 kg with an average of 2.18 ± 1.28 kg for the right and 2.05 ± 1.00 kg for the left breast. All except one patient had blood transfusion. The common complications were delayed wound healing (47%) followed by partial wound dehiscence (17.6%), and flap necrosis (11.8%). Except for those with flap necrosis the wounds healed with some having broad scars. **Conclusions:** Patients for breast reduction are mainly due to the symptoms and signs with the associated large breast. The inferior pedicle with inverted-T skin resection is a valuable technique with a very good outcome. To improve access to breast reduction, there is the need to enhance awareness through advocacy using women groups and health education.

Keywords: *Breast reduction, inferior pedicle, inverted-T skin resection, macromastia*

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Introduction

The breast is the most significant external structure that identifies an individual as a female.[1] It has a sexual as well as a functional role for breastfeeding. The size of the female breast varies from the small to the very large. Breast hypertrophy manifests as large breast which is usually disproportionate to the woman's physical makeup.[2] A large breast can lead to postural changes that are associated with chronic back, neck, and shoulder pains. Other associated symptoms and signs are headaches, deep bra-strap grooves, rashes beneath the breasts, and painful breast.[2,3] The excessive volume causes functional and physical limitations that can impair a woman's productivity, as well as the ability to work and carry out other activities for daily living.[2] In addition to these physical limitations, there is the social angle of the effect of large breasts which may lead to psychosocial stress. There is the inability to access well-fitting brassieres, other clothing, engagement in sporting activities and the associated public scrutiny because of having enlarged breasts.[4]

Generally Large breasts or breast hypertrophy are reasons for seeking breast reduction. Several studies have demonstrated that breast reduction generally improves the quality of life.[5-8] This has encouraged many women with such a condition to present to a plastic surgeon to undertake such a reduction procedure. The technique used to achieve this depends on the patient's physical characteristics and her attitude towards scar on one side and the surgeons experience and choice on the other hand.[3] The techniques that are commonly used are the superior pedicle, inferior pedicle, and partial amputation with free nipple-areolar

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graft.[3,9] The most common scars following these procedures include the inverted-T scar, the vertical scar and the "no vertical scar" (horizontal scar).[10] The aim of a reduction mammoplasty is to have proportionate, youthful looking breasts with minimal scars, having the ability to breast feed and retain normal sensations,[11] a choice that is usually not achieved fully by partial amputation and nipple-areolar graft. The ability to breast feed is one of the concerns following breast reduction in our environment. The concern regarding the preservation of the ability to breast feed can be achieved using the inferior pedicle reduction mammoplasty.

Breast reduction surgeries are not commonly done in our environment as demonstrated by the very few articles that have been published over the years from Nigeria.[12-17] The aim of this study is to present the outcome of our experience in the surgical management of macromastia using the inferior pedicle with an inverted-T skin resection approach. In addition to this, the very purpose of this article is to advocate for the creation of awareness that breast reduction is not just a cosmetic procedure but also a reconstructive procedure that addresses the health challenges associated with macromastia and to show that breast reduction procedures are available in our environment.

Materials and Methods

Study design

This was a retrospective cohort study of women who had an inferior pedicle breast reduction with inverted-T skin resection from 2004 to 2022.

Study setting

The study was carried out in the Division of Plastic and Reconstructive Surgery, Department of Surgery, Jos University Teaching Hospital, Jos, Nigeria.

Study size

All eligible women, who had an inferior pedicle breast reduction with inverted-T skin resection over a 19-year period, were included in the study.

Participants and surgical technique

All the patients had pre-operative markings done a day before the procedures were carried out. The markings for the inferior pedicle technique are similar to McKissock bipedicle.[18] With the patients standing in an erect position the breast meridian is marked from the midclavicle through the nipple and down to the inframammary fold and crossing it. The inframammary fold line is marked and the level is transposed on the breast meridian to mark the level of the new nipple. Using the point of the new nipple as the centre a circle of about 5 cm is marked out as the edge of the new areola. From the nipple point a divergent line is drawn to pass as a tangent on either side of the dilated areola to reach the inframammary fold. From the lower end new areola margin at the breast meridian a divergent line as a tangent on either side of the areola. The length of the line varies from a distance of 5–9 cm (limb of the pattern) depending on the size of the breast and extent of resection. From each a line will be drawn to meet the inframammary fold medially and laterally. The inferior based dermoglandular pedicle is planned by marking out a base of 4–12 cm (generally the base is about one third of the nipple to inframammary fold distance). The margins of the pedicle are extended upwards to the margin of the areola.

Whereas under anaesthesia the line of incisions and the part to be excised were infiltrated with adrenaline (1 in 100,000) solution with the exclusion of the inferior pedicle. Thereafter the inferior pedicle was de-epithelised, and the excess skin and parenchyma are resected medial and lateral to the pedicle and above the areola up to the level of the key-hole pattern. A layer of breast tissue is left over the lateral musculature to preserve the nipple-areola complex sensation. Meticulous haemostasis is secured using the diathermy and or suture ligation. The nipple–areola complex and the medial and lateral flaps were brought to the desired position and using layers of sutures and the skin closed sub-cuticular sutures, interrupted sutures or skin staplers. The skin closure was approached from the medial and lateral ends of the inframammary folds to the breast meridian, in that way any excess skin is excised to have a straight closure of the vertical segment of the inverted-T scar.

Data sources

The information that was retrieved from the case notes of these women included age, marital status, parity, last child birth, family history of breast enlargement, source of information for breast reduction, presenting features, patients' height and weight, weight of tissue excised, amount of blood transfused and complications. The information obtained had been then entered into a proforma that was designed for the study.

Data analysis

The data obtained were then entered into the SPSS version 25.0 (IBM Corp. Armonk, New York, USA) software and subsequently analysed. Descriptive statistics were used to summarise and display the characteristics of the participants as frequency table to determine the frequencies of the women studied. For finding the averages, median ± interquartile range (IQR) for skewed dataset and mean ± standard deviation (SD) for normally distributed data were used.

Ethical approval

Approval to publish the data that were retrieved was obtained from the Health Research Ethics Committee of the Jos University Teaching Hospital (reference number JUTH/DCS/REC/127/XXXI/382).

Results

Participants

A total of 22 female patients had bilateral breast reduction surgery over a period of 18 years (2004–2022), out of which

17 of them had inferior pedicle reduction mammoplasty with inverted "T" skin resection.

Descriptive data

Their age ranged from 16 to 50 years with an average of 31.06 ± 9.66 years. Ten (58.8%) of them were nulliparous women. Their individual weight at the time of admission was between 50 and 40 kg with an average of 86.68 ± 25.70 kg and their height of was ranging between 158 and 179 cm with an average of 165.88 ± 5.52 cm. The weight of the breast tissue that was excised from each breast ranged from 0.2 to 5.5 kg with an average of 2.18 ± 1.28 kg from the right and a range of 1.1 3.2 kg with an average of 2.05 ± 1.00kg from the left breast. The clinical characteristics of these women are shown in Table 1.

Clinical presentation

All the patients got the information from health workers, regarding the possibility of having surgical care for their breast enlargement/reduction. These patients presented primarily with breast enlargement [Figure 1]. All the patients complained of heaviness around the chest, back ache, shoulder pain, inability to have appropriate brassiere, low self-esteem and lack of self-confidence. Ten (58.8%) patients complained of skin changes and recurrent rashes beneath the breast in the inframammary fold and grooves along the marks of the brassiere, whereas four (23.5%) complained of grooves with skin changes along the strap of the brassiere. On examination, 14 (82.3%) of them had healthy skin whereas the rest had either cellulitis (one) with ulcerations or healed scars with the areas of dyschromia.

Surgical management

The patients had pre-operative preparations with a minimum of two units of blood grouped and cross-matched. A preoperative keyhole (wise) pattern markings [Figure 2] were carried over the breast for all patients as has been described.[6] Under general anaesthesia, the lines of incisions were usually infiltrated with 1:100,000 adrenaline 0.9% saline solution, thereafter the vertical pedicle carrying the dermoglandular pedicle is de-epithelised but sparing the nipple-areolar complex [Figure 3]. The medial and lateral as well the supra-areolar dermoglandular wedges are excised. After securing haemostasis the nipple-areolar complex on the dermoglandular pedicle is elevated to the new position, and then the skin flaps are brought together and the breast closed with an inverted-T wound closure [Figure 4].

Length of stay and outcome

Those without complications had well-healed wounds [Figure 5]. The estimated blood loss ranged from 800 to 1500 mL with a mean of 1076.47 ± 338.73 mL and all except one patient had blood transfusion. Three (17.6%) of the patients had more than 2 (1000 mL) units of blood and 50% (8 out of 16) of those who had blood transfusion had autologous blood transfusion. Those who had homologous blood transfusion were those who had more than 2 (1000 mL) units of blood and the first four patients that were operated. The length of hospital stay ranged from 2 days to 14 days with a mean of 6.24 ± 3.00 days. The most common complication was delayed wound healing (47%) followed by partial wound dehiscence (17.6%) and flap necrosis (11.8%). Except for those with flap necrosis the

Table 1: Clinical characteristics of the patients that had inferior pedicle with inverted-T skin resection breast reduction

Characteristics	Frequency (n = 17)	Percentage	95% confidence interval
Age			
Mean ± SD (years)	31.6 ± 9.66		25.12–35.63
Weight			
Mean ± SD (kg)	86.676 ± 26.49		73.08–101.98
Height			
Mean ± SD (cm)	165.88 ± 5.69		162.49–162.49
Parity of patient			
Nulliparous	10	58.8	
Parous	7	41.2	
Duration of breast enlargement in years			
Median (IQR)	6 (4.5–14)		
Weight of resected right breast tissue			
Mean ± SD (kg)	2.18 ± 1.32		1.15–3.11
Weight of resected left breast tissue			
Mean ± SD (kg)	2.12 ± 1.04		1.25–3.05
Estimated blood loss			
Mean ± SD (mL)	1076.47 ± 349.15		800.00–1500.00
Units of blood transfused			
Median (IQR)	2 (1–2)		
Length of hospital stay			
Mean ± SD (days)	6.24 ± 3.09		4.35–7.38

SD: standard deviation, IQR: interquartile range

wounds healed with some having broad scars. Generally, the final scar [Figure 6] in nearly all the patients were acceptable for both patients and the surgeons even though there was no objective postoperative assessment of the scars

Discussion

Breast enlargement from hypertrophy is an increase in the mammary glands beyond the physiological limits that is expected.[19] This increase with its attendant discomfort necessitates the need to request for breast reduction. In the US, breast reduction is becoming the most common plastic surgery procedure that is carried out,[20] but this is not the case in our environment. In the US, there is a national data that one can keep track of the changes in the number of cases that are done. This type of information that is not available in our country, except for the few cases that have been published.[12-14,17,21-23] This is also shown in the small number that we have recorded in our study, with just a few cases done over a period of 19 years, an average of 0.9 per year compared to higher figure reported from the western world.[24-26] These small numbers are not an indication of the paucity of large breasts in our environment, but may be related to the prevalent cultural belief the people have and the poor social acceptance of cosmetic surgery[17,27] and the few available plastic surgeons with expertise to carry out such a procedure. In addition, there is a lack of awareness of the possibility of carrying out breast reduction procedures in the region.[17,27] Breast reduction for macromastia is a reconstructive as well as a cosmetic procedure because of the size and symptoms associated with it. Most of our patients usually present to the clinic not because of cosmetic reason but because of the symptoms and signs associated with large breasts.[14] These associated symptoms and signs were usually the reasons these women seeking for remedies to relieve them. As shown in this study, all the patients got their information about breast reduction from health workers. To improve access to breast reduction there is the need to improve awareness through engagement with women groups and health education. The people need to know that breast reduction has enormous health benefit especially for those with signs and symptoms from the breast enlargement and not for cosmetic reasons only.

Figure 1: Bilateral breast enlargement

The patients, who were operated over this period, were from a wide age range (2nd to the 6th decade) a finding that is similar to a number of previous studies.[17,19,21,28] This shows that this type of surgery is accessed by all age groups even in our environment just like it has been reported by the US Cosmetic Surgery National Data Bank.[29] It is likely that our figures will increase if the level of awareness and the income of the citizens improve.

We used an inverted-T skin resection in all these patients because most of our patients presented with large breasts, with a mean of over 2 kg of breast that were removed on each breast and most of them were nulliparous and

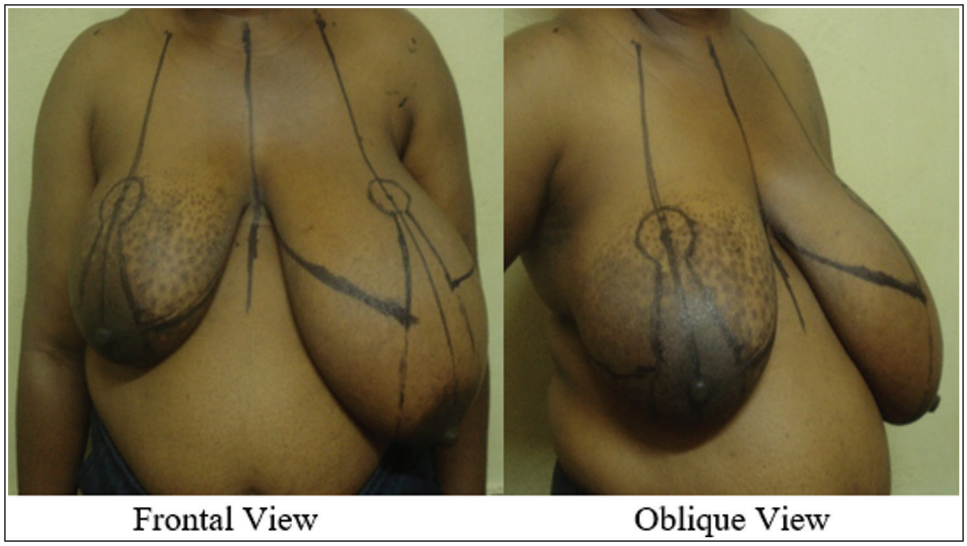

Figure 2: Pre-operative markings for inferior pedicle reduction

are desirous of breastfeeding afterwards. The inverted-T skin resection is best suited for patients with very large breast or those with excess skin as a result of weight loss.[11,30] Generally the inverted-T skin resection can be combined with the different types of pedicles for breast reduction.[18,21,31-33] The most common being the inferior pedicle and this has been the case with the few reports from our region.[13,14,17,21] The inferior pedicle breast reduction is also the most popular method of breast reduction[11,18,25] It is the standard that is used to judge other techniques,[11] and it is easy to teach and learn with predictable results.[18,25]

Figure 3: Intraoperative view of a de-epithelised inferior pedicle

Almost all (94%) our patients had blood transfusion, a finding that is similar with the study by Isiguzo *et al.*[17] The number of units that we used ranged from one (500 mL) to four (2000 mL) units, most of whom had autologous blood that were donated at least a week before their surgery. The use of autologous blood was to reduce the risk of transmission of infection. In this series, the blood loss was significant despite the use of adrenaline and diathermy. Usually, we do not infiltrate the dermoglandular pedicle with adrenaline solution and the diathermy is used with caution over the pedicle. For instance, it has been observed there is the need to review the use of adrenaline to infiltrate the pedicle at higher dilution of 1:500,000 in lignocaine, as this has been shown to minimise blood loss from the

Figure 4: Intra-operative view of inverted-T wound closure after breast reduction

Figure 6: Healed scar post-breast reduction using inferior pedicle and inverted-T scar technique

Figure 5: Inferior pedicle inverted-T scar breast reduction

pedicle.[17] Such a review will help to achieve minimal or no transfusion in our breast reduction surgery as has been reported by Agbenorku *et al.* from Ghana.[21] Where blood transfusion was needed in the past, the use of autologous blood was encouraged,[34] but then there were questions in the subsequent years on the rationale of blood transfusion for such procedures, as most healthy patients will do well if they lose less than 2000 mL.[35-37] However, it has been observed that acute blood loss in an otherwise healthy patient is usually symptomatic unlike in chronically ill patients with anaemia that can tolerate low blood haematocrit or haemoglobin concentration.[36] The large size of breast that were operated upon in our series explains the reason for blood loss and the need for transfusing the patients.

The most common early complications that we encountered were delayed wound healing, wound dehiscence and flap necrosis. These complications were commonly encountered with inferior pedicle breast reduction. The sizes of the breast that we operated upon seem to have contributed, as complications have been reported to occur more in patients with larger breast resection.[27,37] The wound dehiscence was most common at the T junction, a finding that is commonly reported when this technique is used.[17,38] Generally wound dehiscence are usually preceded by seroma, haematoma or wound infection. The resulting effect of this dehiscence is delayed wound healing which can lead to the formation of broad scars. These complications can be mitigated through adequate intra-operative haemostasis and handling of tissue to reduce haematoma, while the use of a triangular (dermal or skin) flap at the T-junction[39,40] or the use of an expanded inframammary fold triangle[41] has been shown to reduce wound dehiscence at the junction by reducing tension.

Conclusion

Breast reduction for macromastia is not a fairly common done procedure in our environment. Patients who seek for such procedure are those who present with symptoms and signs resulting from the breast enlargement. The inferior pedicle with inverted-T skin resection breast reduction procedure has been effective in achieving good breast reduction and alleviation signs and symptoms of breast enlargement in our patients. Being that a significant amount of blood units were transfused in majority of our patients, there is the need to review the use of adrenaline and diathermy to achieve excellent haemostasis and minimise the need for blood transfusion. We believe improving awareness of breast reduction procedures will increase the number of patients that will undergo such procedures. This awareness can be through engagement with women groups and health education.

Declaration of patient consent

The authors certify that appropriate patient consent forms were obtained. The patients gave their consents for their images and other clinical information to be published in the journal. The patients understand that their names and initials will not be published and efforts will be made to conceal their identity, but anonymity cannot be guaranteed.

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Conflicts of interest

There are no conflicts of interest.

Author contribution

1. Simon J. Yiltok: Took part in the concept, design, clinical studies, definition of intellectual content, literature search, data acquisition, data analysis, statistical analysis, manuscript preparation, manuscript editing, and manuscript review.
2. Akintunde J. Akintayo: Took part in the concept, design, clinical studies, definition of intellectual content, data acquisition, manuscript preparation, manuscript editing, and manuscript review.
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The manuscript has been read and approved by all the authors and they agree that it is a true representation of their work.

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