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Axillary Breast: Contouring the Axilla

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Abstract

Commonest cause of disturbed axillary aesthetics is aberrant breast tissue. Our study presents 24 consecutive patients with axillary breast or lipomas, treated with liposuction alone or excision with limited liposuction of axillary folds and dog ears; between 2005 and 2015. Optimum aesthetic outcome was due to i) Pre-op marking in maximum abduction ii) Elliptical excision of apical, hairy skin in the direction of maximum laxity irrespective of location of axillary breast iii) Raising thick flaps to avoid tethering of the scar iv) Meticulous dissection to preserve nerves, axillary pad of fat and lymph nodes, v) Limited liposuction under vision to sculpt axillary folds and dog ears, vi) Suturing in position of maximum abduction, vi) Stretchable tape for dressing instead of pressure garment suitable for unique shape of axilla.

First patient treated with liposuction alone required removal of residual mass whereas patients undergoing axillaplasty had no major complications, had acceptable scars and were happy to have reduction in hair bearing axillary skin. Thereafter only two more patients were treated with liposuction alone. (5 axillae) 21 patients (42 axillae) underwent excisional sculpting of axilla with limited liposuction. Complications were minor and axillary scars were imperceptible and acceptable. We prefer excisional axillaplasty with limited liposuction after the excision. Liposuction alone cannot address the problem satisfactorily and safely.

Keywords: axillary breast, axillary aesthetics, excisional axillaplasty, limited liposuction in axilla, accessory breast

1. Introduction

Axilla can be the seat of many deforming swellings but the commonest malady that compromises appearance and causes concern is axillary breast. Other benign conditions such as

lipoma, lymphadenopathy, hidradenitis suppurativa and vascular malformations must be kept in mind nevertheless.

Peri-pubertal and peri-partum increase in the size of axillary breast causes not only aesthetic concerns but discomfort due to poor arm posture, sweating, and stickiness; not to mention the limitation of choice in apparels that can be worn.

2. Surgical anatomy of the axilla

Axilla is a pyramidal structure—with a concave floor made up of skin and subcutaneous fat—facing laterally and inferiorly [1].

The four borders are

A— anterior axillary fold comprising of free border of pectoralis major,

B— posterior axillary fold comprising of free border of latissimus dorsi muscle,

C and D—the anterior and posterior lines defining the upper, medial arm.

The medial and lateral faces of pyramid comprise of convex upper rib cage medially and inter-tubercular sulcus of humerus laterally. The anterior and posterior faces are free. The apex of

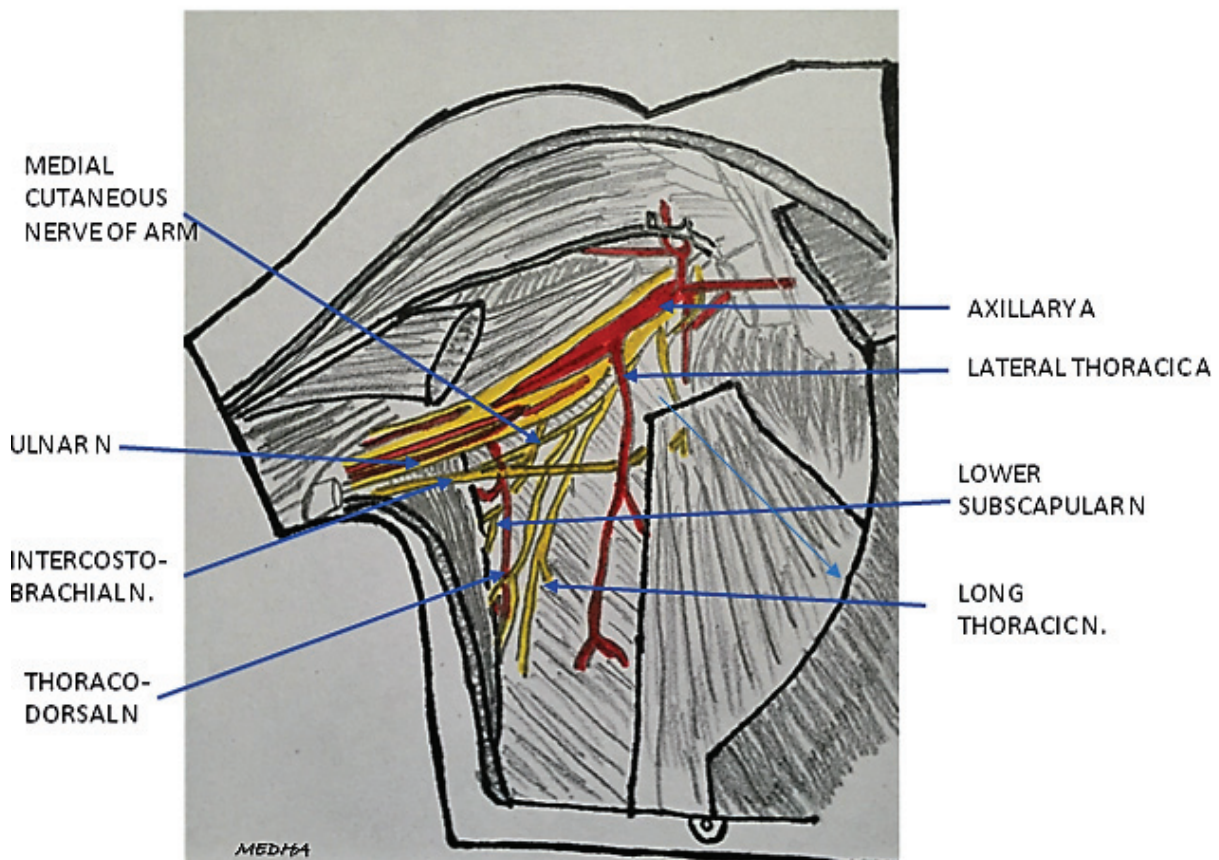


Figure 1. Surgical anatomy of axilla.

the axilla harbors axillary pad of fat, lymph-nodes and lymphatics draining Upper limb as well as the neuro-vascular structures. The latter include intercosto-brachial nerve, medial cutaneous nerve of the arm and the cephalic vein. The apex has axillary artery and vein, invested in layer of fascia. Spencer's foramen is an opening in the pectoral fascia which allows passage of axillary tail of the breast. **Figure 1** illustrates the anatomy in detail.

3. Aesthetic considerations in axilla

3.1. Aesthetic landmarks and their anatomy: physiology of axillary skin

The anterior and posterior axillary folds and the concave floor are key features to consider in order to improve aesthetics of the axilla. The anterior and posterior axillary folds smoothly curving to medial arm can be termed anterior and posterior axillary aesthetic lines respectively, akin to dorsal aesthetic lines of the nose (**Figure 2**).

A fatty fold rolls over into axilla filling it and reducing the definition. A scar crossing the fold of axilla interrupting its smooth transition into medial line of arm violates the aesthetic

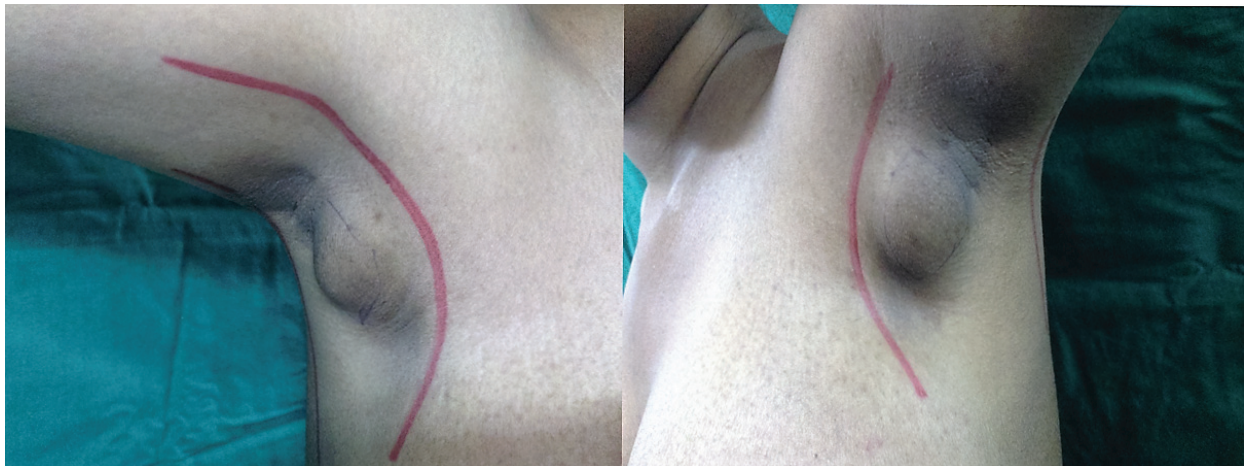


Figure 2. Anterior and posterior axillary aesthetic lines.



Figure 3. A scar crossing the anterior axillary fold compromises outcome.

landmarks, as illustrated in **Figure 3** which shows pre-operative and post-operative photographs of a patient.

Full and convex floor makes it appear unattractive; as also when the floor is irregular, scarred and tethered.

The axillary skin is hairy and rich in apocrine type of sweat glands that open into the piliary canal of the hair follicle. They are larger (800 μm) and secrete a substance that is thicker than that secreted by eccrine glands distributed over rest of the body. The substance is oily, odorless and rich in proteins, lipids and steroids. This nurtures the bacteria on the skin leading to peculiar odor. The apocrine sweat contains pheromone-like substances. The axillary apocrine glands are active during sexual excitement and under stress [2, 3].

It is a common practice to shave axilla in women who wear sleeveless tops as well as in metrosexual men. In tropical countries like India, men often wear sleeveless apparel due to hot climate.

4. Embryology: mammary ridge

4.1. Accessory breast and Kajava classification

4.1.1. Definition of axillary breast

4.1.1.1. Classification of axillary breast*

The mammary ridge in fetal life extends from axilla to groin. Incomplete involution can lead to accessory breast anywhere along this milk line.

Accessory breast tissue is defined as the presence of extra breast tissue in *addition* to normal breast tissue [4]. About 2–6% women have this condition and 20% of all accessory breasts occur in axilla [5, 6]. The accessory breast was classified by Kajava et al. in 1915; based on composition of the aberrant tissue [6, 7]. The diagrammatic representation shown in **Figure 4** can be useful for diagrammatic representation, though the classification is rather cumbersome for practical use.

The axillary breast is a type of accessory breast, located in the axilla. It can be of any Kajava type though we have seen only type 4 in axilla. If there is a connection through spencer's foramen, it can be considered as axillary tail of the breast. In the absence of connection, it is simply an accessory breast tissue in the axilla. Though the management remains the same, ligation of the tail is an important maneuver in case of axillary tail—as it may contain a vessel.

An anatomical sub-classification of axillary breast was proposed by Bhave, according to location [8].

1. Central axillary
2. Para-mammary
3. Medial arm.

Figure 5 shows clinical illustration of the same.



Figure 4. Diagrammatic representation of Kajava classification based on composition of accessory breast. Solid oval = breast tissue, hollow oval = areola, rod = nipple, arrows = hair.

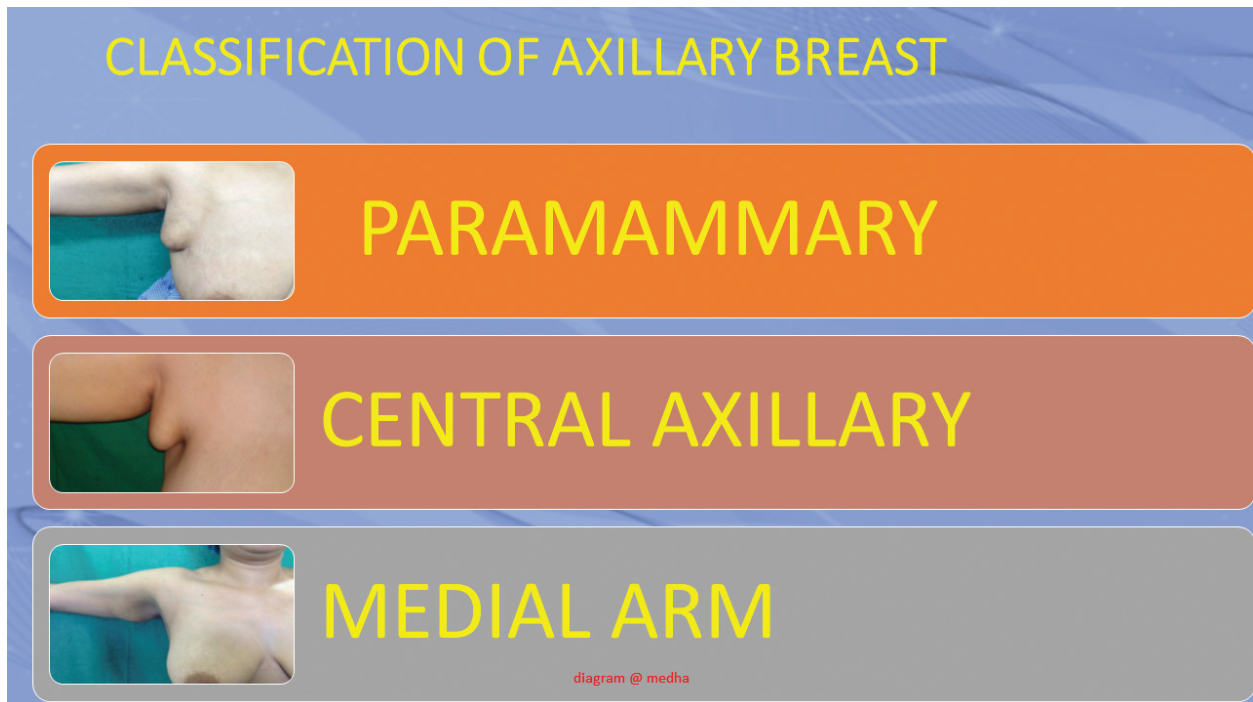


Figure 5. Classification of axillary breast—Bhave Medha.

The classification has diagnostic significance, as many type 2 and 3 breasts can be misdiagnosed as other pathology, which may lead to inferior choice of incision and poor cosmetic outcome.

5. Clinical presentation: symptoms

5.1. Expectations from surgeon

5.1.1. Philosophy of interpretation of a woman's symptoms

Table 1 summarizes the common symptoms in our series. Most of other reports in the literature are by radiologists. Hence the commonest presentation in their series is asymptomatic. There is lack of awareness of the available modes of treatment and fear of scar, which leads to under-reporting. Even if the condition is congenital, most women develop the swelling during hormonal surges such as menarche or pregnancy. The presentation may be at any age, since this is not a pressing complaint unless the patient is worried about cancer.

The reason why treatment is sought is often said to be inability to wear sleeveless tops. In fact, Laurence Kirwan has included this in definition.

Inability to wear proper clothes	23/24
Inability to maintain proper arm posture	20/24
Sweating, sticky skin and discomfort	20/24
Cosmetic concern	18/24
Pain in the lump	11/24
Fear of malignancy- voiced by older patients	2/24
Pain along the medial arm	1/24

Table 1. Symptomatology.

In our series, most of the women felt sweaty, sticky and malodorous due to the presence of mass in the axilla. Fear of cancer, inability to maintain arms in proper posture, pain along the medial arm were the other symptoms. Inability to wear proper clothes was a secondary reason in most women.

A woman needs not only to be heard but also listened to. A surgeon should consider the functional aspects of body contouring surgery before aesthetic as most of the women, especially from India are not seeking to wear exposing attire, but simply want to be comfortable and efficient in daily life.

6. Differential diagnosis

Every structure in the axilla can cause swelling and be confused with axillary breast [8].

- A. Lymphadenopathy—tubercular is the commonest in India. **Figure 6.**
- B. Hidradenitis suppurativa—very common in tropical countries.

- C. Lipoma.
- D. Malignancy.
- E. Sebaceous cyst.
- F. Vascular malformation.

In our series, we have encountered everything except vascular malformation.

It must be noted that the axillary breast can be seat of every benign and malignant disease that can occur in mammary tissue.



Figure 6. Tubercular lymphadenopathy. Patient presented 2 days prior to this cellulitis as axillary breast.

7. Investigations

It follows from the above discussion that ultrasonography of the axilla is the primary modality to diagnose the nature of the swelling, define its contents and establish or rule out vascular connection.

Color Doppler should be done in case of vascular swellings as and when required. Mammography is routinely done to rule out any associated breast pathology.

MRI may be required in some cases where additional pathology like tubercular lymphadenopathy or malignancy is suspected.

8. Treatment modalities and logical choice

The various treatment modalities include [9, 10]

A—open excision,

B—liposuction,

C—non surgical methods like injection lipolysis, high intensity focalised ultrasound (HIFU), etc.

D—combination of excision and suction—axillaplasty.

A—Open Excision.—This can be undertaken in a small mass. But for a large mass this may result in long scars that may cross aesthetic landmarks of axilla.

B—liposuction alone—following hazards of closed procedures in axilla are encountered.

Axilla in abduction—as required for the operation—brings important neuro-vascular structures to the floor and thus makes them prone to injury by the cannula. In adduction, these structures remain at the apex but one cannot operate in such a position. Hence, liposuction alone is a hazardous choice as a primary modality.

Usually, the axillary breast tissue contains fair number of glandular structures, making it difficult to produce satisfactory result with liposuction alone. The use of sharp cannula—as used in male gynaecomastia by some surgeons—is not advisable, due to proximity of important structures. Leaving behind residue of the gland—and suctioning only to produce contouring—is against the principles of surgery. The residue can re-enlarge later. Thus, even if closed liposuction has advantages like minimal scar; the dead space and non-retraction of skin are major deterrents to wide use of this method. Though tumescent liposuction is strongly advocated by some authors [9, 10], it may be hazardous for aforementioned reasons.

C—non surgical procedures like injection lipolysis cannot be used as the agents can cause venous thrombosis and fibrosis in the axilla leading to peri-neural inflammation, fibrosis and pain.

D—axillaplasty—definition and concept.

The term axillaplasty was introduced by Laurence Kirwan in 2009. He defines axillaplasty as follows—axillaplasty is a procedure to correct the overhang of fat and skin above the bra at the armpit, which limits tops that women can wear. The fat is suctioned and excess skin is removed creating a neat thin line scar hidden in the apex of the axilla. The wound is closed with a knotless absorbable barbed 2-0 and 3-0 barbed suture, which aids in the healing [11].

He presented the procedure in 2009 at Las Vegas aesthetic meeting.

We adopted the procedure for management of the axillary breast. Open excision of the breast tissue and skin is done first, reserving the liposuction only to contour the axilla suction the anterior and posterior axillary folds, minimize the dog ears and reduce the length of the axillary scar.

Documentation—sonography report stating the percentage of breast stroma and fatty tissue.

Photographs—frame—mid neck to nipple level

Views—“spread wing” view with arms at right angle—both sides, Rt axilla, Lt axilla.

—Arms abducted above the head—both sides—depicts relation with pectoralis major

—Arms by side—both sides.

8.1. The detailed procedure of excisional axillaplasty

General anaesthesia is used after proper medical fitness is evaluated [8]. Marking is done with arm in abduction—the lax skin is pinched and marked as an ellipse in the direction of maximum laxity. This skin is to be excised (**Figure 7**).

Palpable extent of the gland is marked with dotted lines. The axillary folds may be marked if too bulky [8].

Infiltration is done in a deep plane with 1 in 200,000 adrenaline with, 1% lignocaine in saline. Subdermal infiltration is used only for the incision. If simultaneous liposuction of the back is planned, it is marked pre-operatively and infiltrated after completion of axillaplasty. Skin incision is deepened till superficial fascia as depicted in **Figure 8**. Thick flaps are elevated on either sides to define the axillary breast [8].

Meticulous dissection to separate the breast, preserving every nerve going through the mass, is undertaken. Pectoral border medially, cephalic vein superiorly and the lateral edge of the mass laterally are the limits of dissection. Intercostobrachial nerve is invariably found to be passing through the mass and needs to be preserved as shown in **Figure 9**. The medial cutaneous nerve of arm if encountered, axillary pad of fat and lymph nodes is preserved. The mass usually separates well. If connection with the mammary tissue is identified through foramen of spence, it should be ligated and haemostasis achieved. Excision is essential because there is no other way to safely remove the tough breast tissue with suction. The sharp cannula used sometimes in gynaecomastia cannot be used for fear of damage to nerves.

8.2. Limited liposuction of dog ears, axillary folds and back

Arm is then abducted and temporary staplers are used to secure best position for suturing with minimum dog ears. The dog ears are then thoroughly suctioned. Chasing the dog ear lengthens the scar and if it crosses any anatomical land-mark, the aesthetic outcome suffers. If required, the thick flaps can now be suctioned to contour the floor. Flaps that are too thin will tether to the floor and give unnatural appearance. Moreover, this suction is well away from the important neurovascular structures. It must be noted that liposuction alone is not enough to produce the desired result due to invariable presence of firm breast tissue in the mass.



Figure 7. Marking the incision in direction of maximum laxity. Dotted lines mark the margin of the palpable mass.

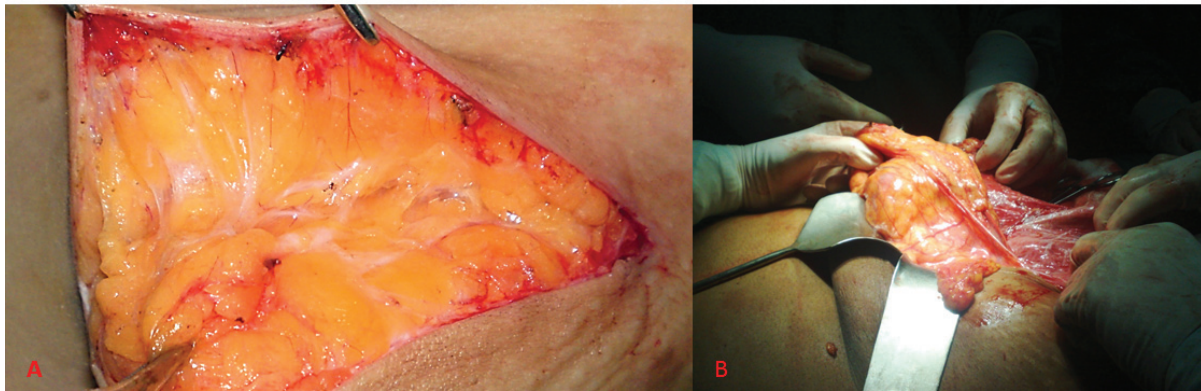


Figure 8. (A) Flaps at level of superficial fascia. (B) Well demarcated mass.

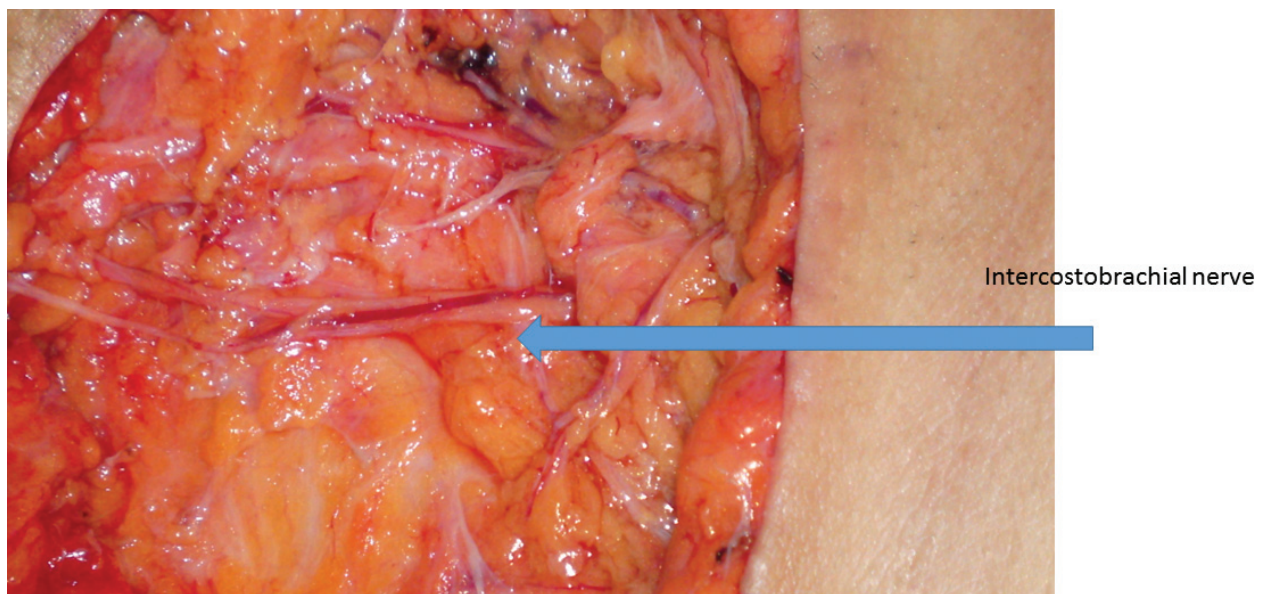


Figure 9. Meticulous dissection of nerves and vessels involved in the swelling is needed to avoid post-operative neuralgia.

8.3. Drains

Suturing is done with 3-0 PDS in two layers. We never needed drains in any of our patients, but they should be used when in doubt.

Axillaplasty can be combined with breast reduction [12].

8.4. Properties of hair bearing skin and advantages of reduction

The hair bearing skin does not retract well after liposuction [8]. Thus, skin excess cannot be taken care of as addressed in abdominal liposuctions. The overhang remains if liposuction is used alone and necessitates excision. Thus, it is wiser to combine the two at the outset. The axillary sweating and hair are matters of concern for most women, and they are happy to have this skin reduced. Despite presence of hair, the scars are imperceptible and often better accepted in exchange of reduction in hair bearing skin.

9. Post-operative program: dressings

9.1. Problem of pressure garments

9.1.1. Problems of compressive dressing

The dressing is done with a thick gauze and cotton pad secured with stretchable many tailed tape as depicted in **Figure 10**. Hypo allergic tape can be used but one may not be able to obtain adequate pressure. Pressure garments are not reliable due to the peculiar shape of the axilla. They can also cause compression of the nerves and veins in the arms due to tight sleeves resulting in edema of the dorsa of the hands. The very first patient in

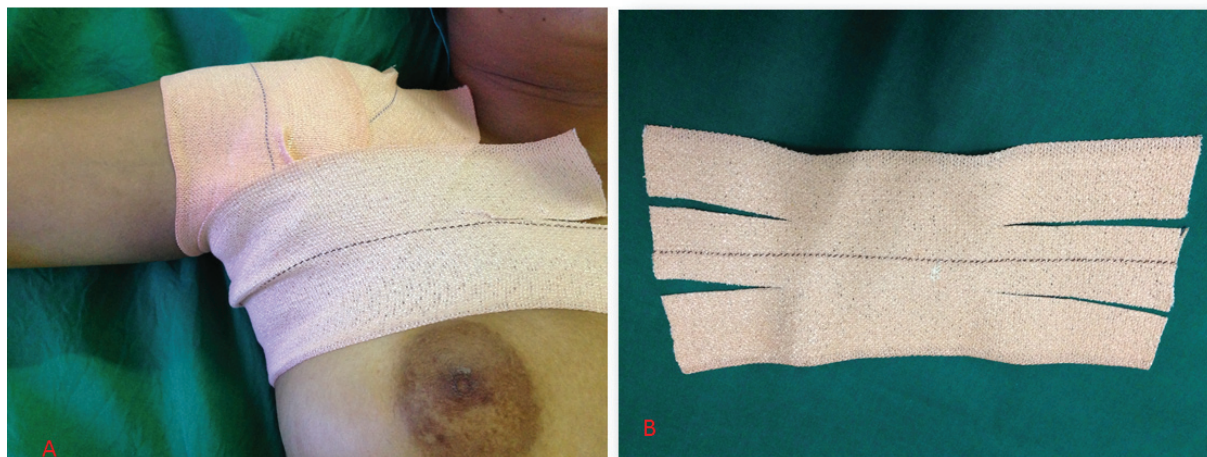


Figure 10. (A) Many tailed dressing drapes well around axilla with concave floor. (B) Way to cut the tape.

our series had come for minimal access surgery. She found it extremely difficult to wear the garment during post-op period due to tingling numbness in the forearms and hands due to excessive pressure on the arms due to tight sleeves. Even after releasing that pressure, we realized that more pressure was at the junction of sleeves and body of the garment than on axilla. Figure of eight dressing—like a clavicular brace—was tried but was found to be inefficient. We have found the many-tailed elastic tape very useful as it goes around the contours of shoulder and chest wall to provide sufficient compression without nerve compression and distal edema. One patient in our series developed severe allergy and blisters due to the tape. Careful monitoring is required, and the tape has to be removed if patient complains of itching without waiting for blisters to develop.

10. Results of excisional axillaplasty with limited liposuction

Our study comprises 24 patients presenting with axillary masses.

The result of surgery upon our initial patient, who insisted on liposuction alone, paved the way to our current method of choice—excisional sculpting with limited liposuction. After her



Figure 11. (A and B) Pre-op of 24 year old air-hostess. (C and D) After closed liposuction. Note residual gland in Rt axilla. Glabrous skin appears to be in excess but non retraction of hairy skin has resulted in excess.

liposuction of both axillary breasts, she had residual mass on right side with solid breast tissue. She had burning of medial arms possibly due to nerve injury. She could not wear garment in post-op period due to distal swelling and tingling numbness. She had to undergo revision surgery on right side to remove residual mass and excess hair bearing skin, which did not retract after surgery as shown in **Figure 11C**.

Thereafter, only one patient underwent liposuction, but she had predominantly fatty tissue. She was lost to follow-up after 1 month.

The rest of the patients was treated by axillaplasty as described above. All patients were photographed pre-operatively, 1 and 6 months post-operatively. They were evaluated for scar quality and aesthetic outcome. **Figure 12** shows a routine result of open axillaplasty.

The rest of the results are tabulated in **Table 2**.

Most of the patients who appeared to have dog ears and mildly hypertrophic scar were found to have total diminution of the scar and resolution of dog ears at the end of 6 months (**Figure 13**).

One patient who had a lipoma in the axilla had previously undergone injection lipolysis outside. She was found to have thrombosis of all the veins in the field as illustrated in



Figure 12. (A–C) Pre-op views Rt side axillaplasty, Lt-liposuction alone. (D–F) 6 months post-op.

Figure 14. This patient had severe medial arm burning pain, both locally and in the medial arm, for about 9 months and needed pregabalin therapy for the same.

The results clearly show that excisional sculpting of axilla is far safer and also an effective method to manage fatty axillary swellings [8, 9, 12]. **Figure 15** shows results of axillaplasty on medial arm type of axillary breast.

The well-maintained axillary aesthetic lines are demonstrated in another patient with central type of axillary breast are shown in **Figure 16**.

Method	No. of patients treated	Complications	Comment
Liposuction alone	Three patients, five axillae (One patient underwent excision on the other side)	One axilla, residual mass, nerve pain	Open surgery required
Axillaplasty with limited liposuction	21 Patients, 44 axillae	As in Table 3	As assessed at 6 months post-op

Table 2. Results.

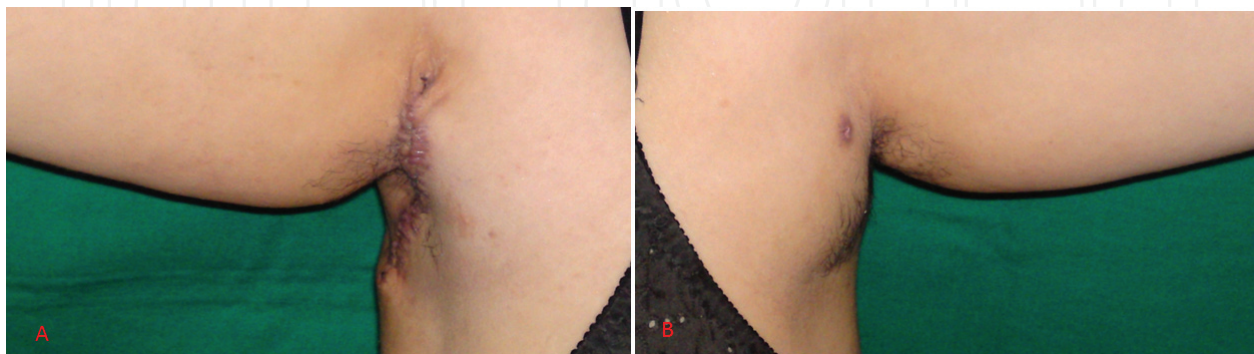


Figure 13. Interim status of patient in **figure 12**, taken at 1 month post-op, A-rt axilla, B-lt axilla. [The scars settled after 6 months as shown in **figure 12 (D-F)**].

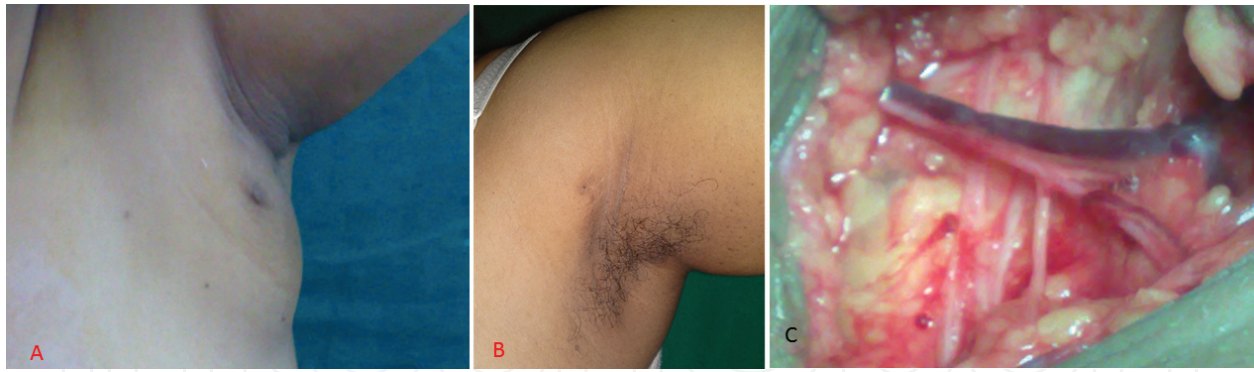


Figure 14. (A) Axillary lipoma with history of injection lipolysis done elsewhere. (B) 6 months after axillaplasty, scar is imperceptible. (C) Intra-op view showing thrombosed veins.

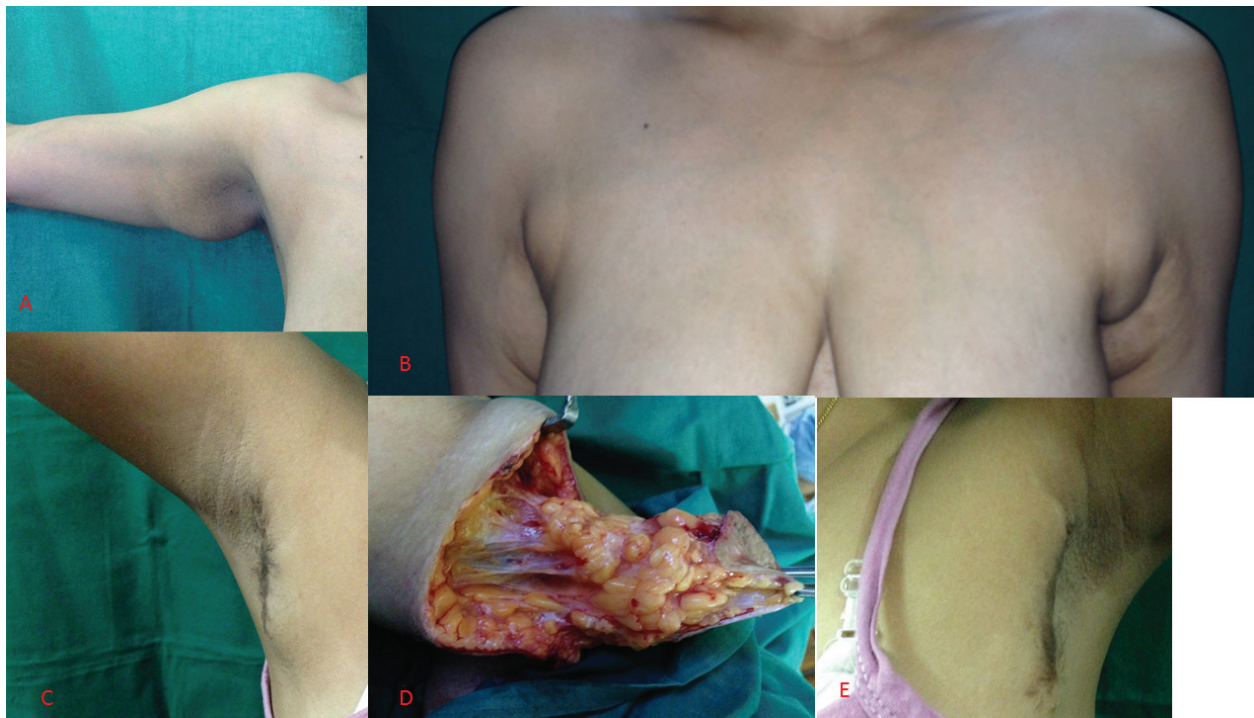


Figure 15. (A and B) Show pre-op views of medial arm type of axillary breast. All skin could be recruited to axilla to avoid a scar on inner arm. (D) Shows communication through foramen of Spencer. (C and E) Show post-op results with mild scar hypertrophy.

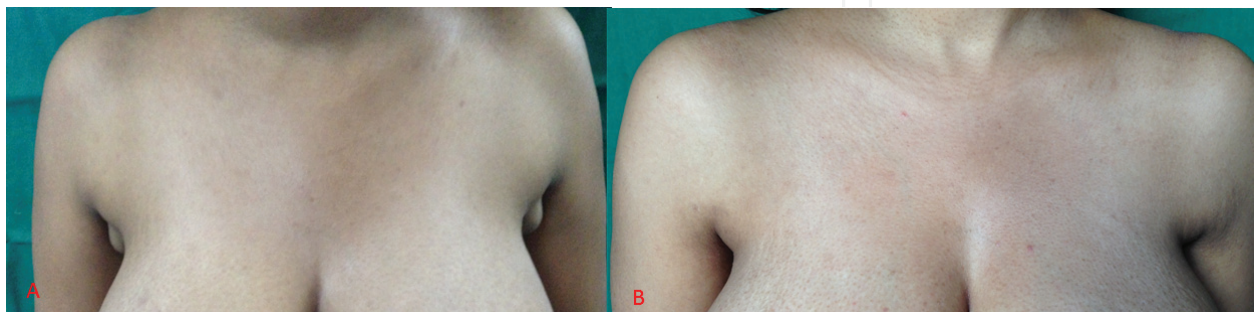


Figure 16. Well maintained axillary aesthetic lines after axilla plasty. 6 months post-op. A—pre-op, B—post-op.

11. Complications

The complications in our series are listed in **Tables 2** and **3** [8].

Bleeding due to vascular injury was not seen in our series. Excessive mobilization in post-op period can sometimes result in late hematoma. This occurred in one axilla of one of our patients on 8th post-op day. It responded to evacuation and pressure with many tailed elastic tape dressing.

Pain—post-operative shoulder stiffness and pain occurs in all patients. Injury to medial cutaneous nerve of arm and Intercostobrachial nerve can cause burning pain in the respective territory. This resolves in 1–6 months but may need neuro-regulators temporarily.

Infection—never occurred in our series. A pre-op cleansing schedule with surgical scrub solution is a part of our protocol.

Nerve injury—every small cutaneous twig in the field that does not lead to the skin being excised needs to be preserved. Else the area of supply would be seat of burning pain.

Seroma—never occurred in our series. Inadequate pressure can cause hematoma and seroma.

Dog ear—minor dog ears always settle with time.

Scars—hypertrophy.

Contracture.

Proper direction of incision in alignment with maximum laxity helps prevent contractures. Limited skin excision and closure without tension prevents hypertrophy. Some patients having

Complications	No. of patients	Comments
Mild scar hypertrophy	3	In one patient, scar crossed the anterior axillary fold but was not hypertrophic
Medial arm pain	2	Pain despite preservation of nerves Resolved with long-term pregabalin therapy
Allergy to sticking plaster	2	One required derroofing of blisters and collagen cover
Infection, seroma	Nil	
Haematoma	1	Developed due to forced passive exercise by a relative on 10th post-op. day. Responded to evacuation and pressure dressing
Dog ear	Nil	
Residual mass	Nil	
Axillary contracture	Nil	

Table 3. Complications of open axillaplasty with axillary sculpting in our series.

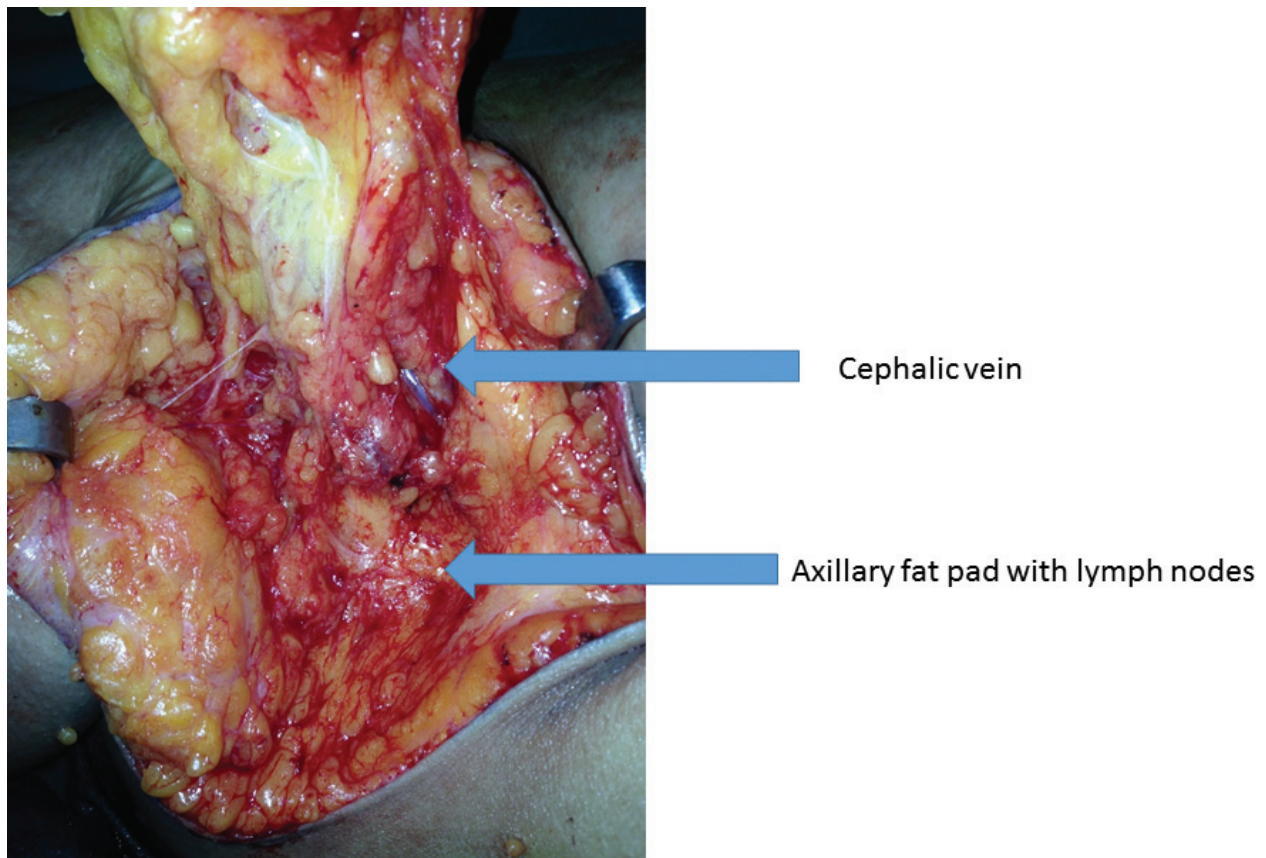


Figure 17. Lymphedema can be avoided by careful preservation of fat pad and nodes. Large nodes if any should be sent for histopathology.

tendency to hypertrophy can have problem, which can be managed with standard intra-lesional kenacort injections and silicon-based scar products.

Theoretically, lymphedema is possible complication, but preservation of axillary pad of fat and lymph nodes if any, limiting dissection below cephalic vein, helps to prevent it as shown in **Figure 17**. We have not encountered a single case so far.

12. Conclusion

Commonest disfiguring mass in axilla is axillary breast. Traditional liposuction for management incurs risk of nerve and vascular injury. Liposuction as sole modality of treatment is neither efficient nor sufficient for complete removal of axillary mass. Only excision results in ugly scars that violate the aesthetic landmarks of axilla. Excisional axillaplasty inclusive of excisional sculpting with limited liposuction for dog ears and axillary folds is safer choice. Scars in axilla heal exceptionally well despite being in the hair-bearing skin, if limited excision is planned, in the direction of maximum laxity. Other variants of axillary breast like paramammary and medial arm must be diagnosed correctly so that incision for removal can be placed in the axilla for better aesthetic outcome.

Acknowledgements

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