



A Single-Center Experience With Gynecomastia Treatment Using Liposuction, Complete Gland Removal, and Nipple Areola Complex Lifting Plaster Technique: A Review of 448 Patients

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Abstract

Background: Gynecomastia is defined as a benign enlargement of male breast glandular tissue. It is the most common breast condition in male, and the prevalence ranges from 32% to 72%. No standardized treatment exists for gynecomastia.

Objectives: The authors treat gynecomastia patient with liposuction and complete gland excision through periareolar incision without skin excision. In case of skin redundancy, the authors use their special technique called nipple areola complex (NAC) plaster lift technique.

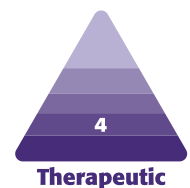
Methods: The authors conducted the retrospective analysis of patient who underwent gynecomastia surgery between January 2020 and December 2021 at Chennai Plastic Surgery. All patients were treated with liposuction, gland excision, and NAC lifting plaster when required. The follow-up period ranges from 6 to 14 months.

Results: A total of 448 patients (896 breasts) were included in our study with average age of 26.6 years. Grade II gynecomastia was most common in our study. The average BMI of the patients was 27.31 kg/m². One hundred and sixteen patients (25.9%) experienced some form of complication. Seroma was most common complications in our study followed by superficial skin necrosis. Patient satisfaction rate was high in our study.

Conclusions: Gynecomastia surgery is safe and highly rewarding procedure for surgeons. Various technologies and methods like liposuction, complete gland excision, and NAC lifting plaster technique should be adopted in gynecomastia treatment to give a better patient satisfaction. Complications are common in gynecomastia surgery but easily manageable.

Level of Evidence: 4

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Gynecomastia is defined as benign enlargement of male breast glandular tissue. The term “gynecomastia” originates from the Greek word “Gyne” meaning female and “mastos” meaning breast. It usually occurs bilaterally, but in some cases it can occur unilaterally.¹ It is the most common breast condition in males, with a prevalence ranges from 32% to 72%.² Gynecomastia is caused due to increased ratio of estrogen to androgen production. Estrogen acts as a growth hormone increasing the size of male breast. The causes of gynecomastia is unknown in 25% of cases.³ Similarly, around 10% to 25% of cases of gynecomastia are associated with drugs like spironolactone, ketoconazole, and calcium channel blocker.⁴

Gynecomastia is often asymptomatic, but breast pain or tenderness may be present in some cases. Many patients with enlarged breast are affected psychologically, which has not been extensively studied.⁵ It might cause anxiety, reduced self-esteem, embarrassment, and depression. This issue should be addressed properly during consultation. Medical treatment of gynecomastia is not successful to date. Different surgical options exist for gynecomastia including liposuction, limited access excision, skin sparing mastectomy, mastectomy with skin resection, and breast amputation with free nipple transfer.⁶

In our practice, we treat gynecomastia patients with liposuction and complete gland excision through periareolar incision without skin excision. In the case of skin redundancy (Rohrich Grade III and IV gynecomastia), we use our technique called nipple areola complex (NAC) plaster lift technique.⁷ The objective of our study is to review the gynecomastia patients treated with our combined technique over a period of 2 years. In this study, we aimed to assess the patient’s demographic data, complications, and patient satisfaction after the treatment.

METHODS

We conducted a retrospective analysis of patients who underwent gynecomastia surgery from January 2020 to December 2021 at our center. Outpatient records, operating procedure, and clinical notes were reviewed. This included a total of 448 patients. All surgeries were performed by single surgeon at our center. The research proposal was submitted to center’s ethical board and approved. Our study followed the Declaration of Helsinki ethical principles for medical research involving human subjects. Written permission was taken from patients to use their photographs for research and publication.

All patients were thoroughly examined during first consultation. The examination included the patient’s history, physical including testicular examination to rule out Klinefelter syndrome, and laboratory test. Patients were allowed for second consultation, if they had any confusion

regarding procedure. Routine blood tests were performed before planning for surgery. Hormonal tests were only performed if patient lacked secondary sexual character. Patient classification was done based on Rohrich classification system.⁸

No standard outcome assessment questionnaire exists for gynecomastia treatment. Therefore, we created our own questionnaires to assess the patient satisfaction after surgery. Questionnaires were sent to patient who underwent gynecomastia surgery from January 2020 to December 2021 via mail.

Operative Technique

Preoperative markings were done in standing position before surgery (Figure 1), and photographs were taken. Measurements were taken as shown in Figure 1. Areas of liposuction below the gland and laterally were marked. Our goal includes giving the patient a sculpted chest rather than just treating gynecomastia. This allows for better skin redraping. All surgeries were performed under general anesthesia.

Liposuction

A 4 mm stab incision was made at the highest point on the anterior axillary line along the axillary crease to make it inconspicuous. The breast tissue and liposuction area were injected with tumescent solution containing 15 mL lidocaine (2%), 10 mL ropivacaine (0.5%), 2 mL adrenaline, and 5 mg triamcinolone acetonide in 1 L of Ringer lactate. Liposuction was performed using vibration amplification of sound energy at resonance and power assisted liposuction device. Four millimeter and/or 5 mm blunt tip cannulas were used for liposuction. Ultrasound-assisted liposuction is used in all cases for better skin redraping.⁹ The inframammary fold is disrupted to allow a more gradual transition of the breast to the abdomen. Liposuction was focused in glandular area as well as the surrounding tissues for improved tissue retraction and to give a more aesthetically pleasing chest. The endpoint of liposuction was determined by the desired chest shape.

Gland Excision

A periareolar incision from 6° to 9° clock position was made for the gland excision. Anterior gland attachment from the skin was released with Metzenbaum scissors. Then, the gland was grasped with Allis forceps and excised using pull through technique. Complete excision of gland was done. The pectoralis fascia is preserved to prevent skin adhesion to underlying structure, which can lead to contour irregularities. No tissue was left under skin. Hemostasis was attained, and the wound was closed in layers with

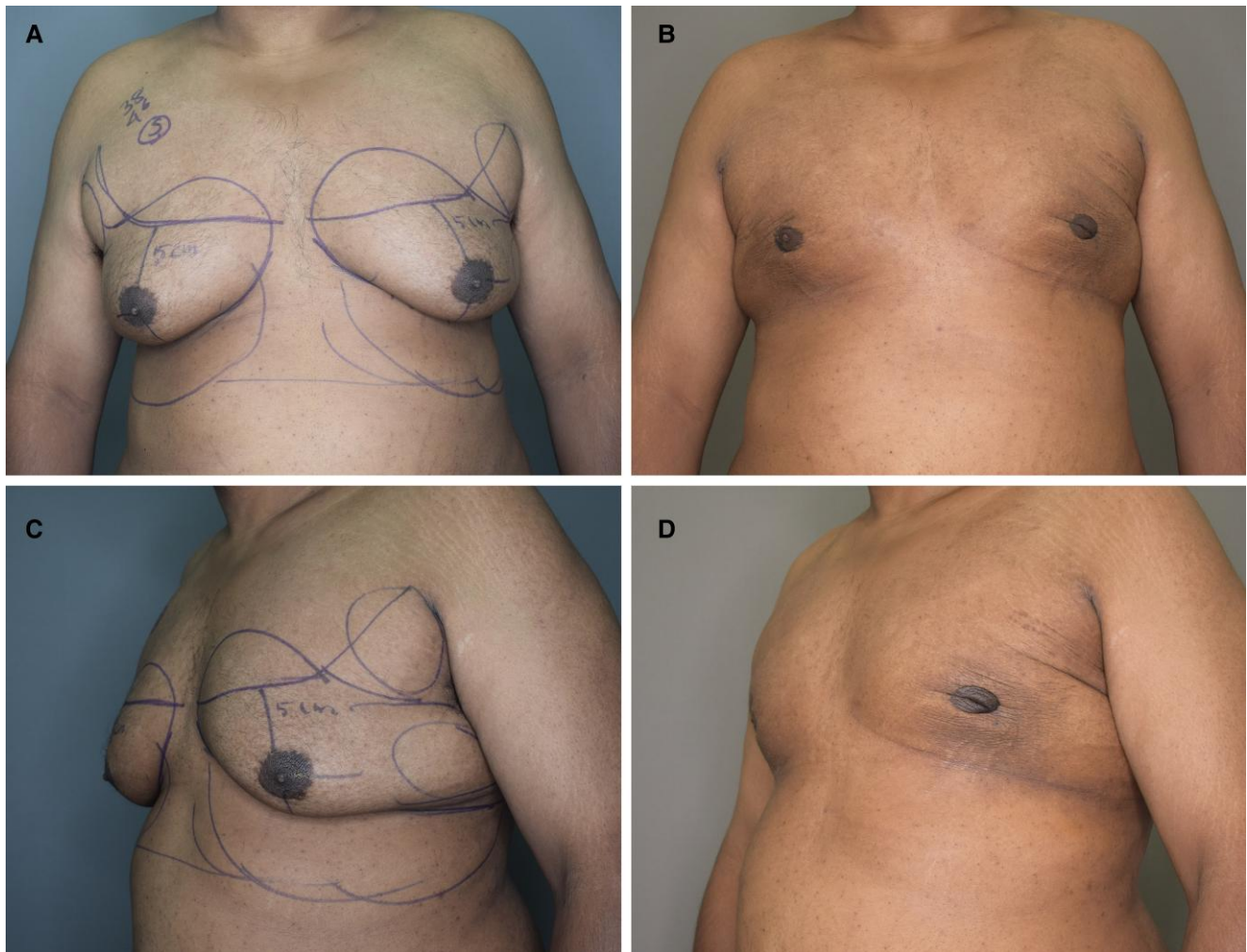


Figure 1. A 19-year-old male patient shown preoperatively at (A) front and (C) oblique views, and 6 months postoperatively at (B) front and (D) oblique views.

4.0 nylon suture. Touch-up liposuction was performed if necessary at this point.

In the case of skin redundancy, no excision was performed; rather NAC lifting plaster was applied (Video). Lifting plaster was applied for 1 week followed by compression garment for 1 month. All the patients were advised to wear compression garment 24/7 for that month. Patients were followed up on Days 3 and 7, and at 1 and 6 months after surgery (Figures 1-3).

RESULTS

A total of 448 patients (896 breasts) were included in our study with average age of 26.6 years (range: 14-55 years). All patients underwent liposuction followed by gland excision. According to Rohrich classification,⁸ most patients were presented with gynecomastia Grade II ($n = 236$,



Video. Watch now at <https://academic.oup.com/asj/articlelookup/doi/10.1093/asjof/ojac095>.

52.7%), followed by Grade III ($n = 133$, 29.7%), Grade IV ($n = 36$, 8%), and Grade I ($n = 21$, 4.7%). Twenty-two patients were presented with asymmetrical breasts.

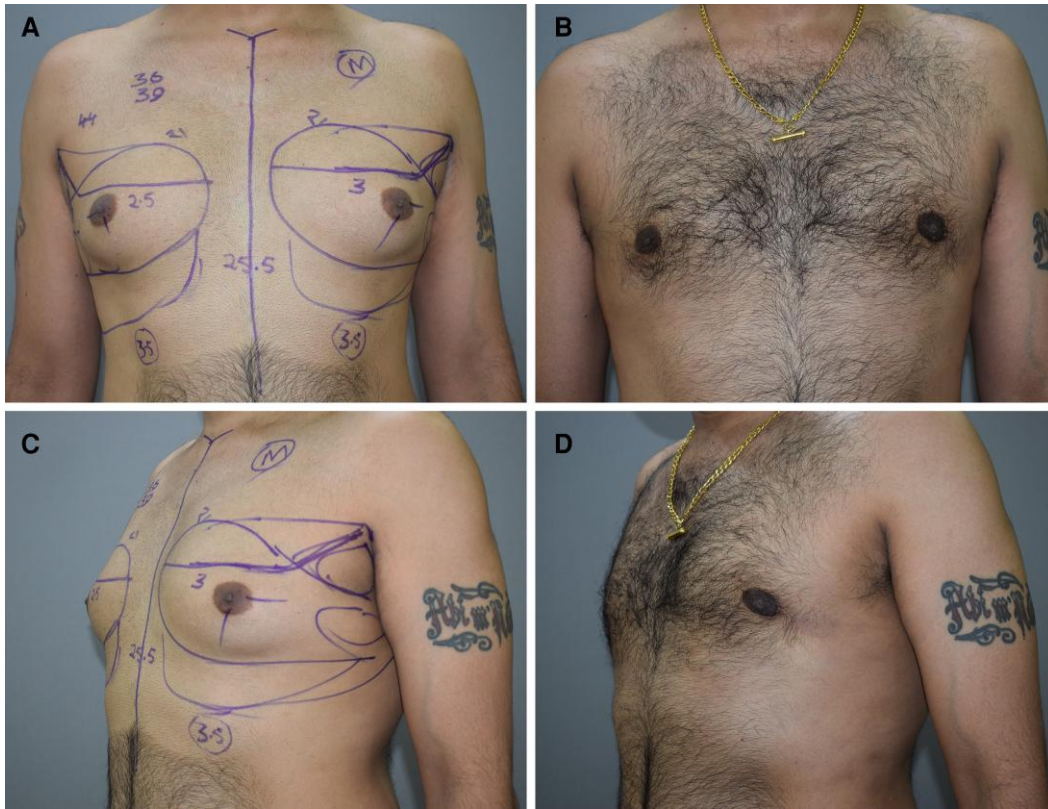


Figure 2. A 24-year-old male patient shown preoperatively at (A) front and (C) oblique views, and 6 months postoperatively at (B) front and (D) oblique views.

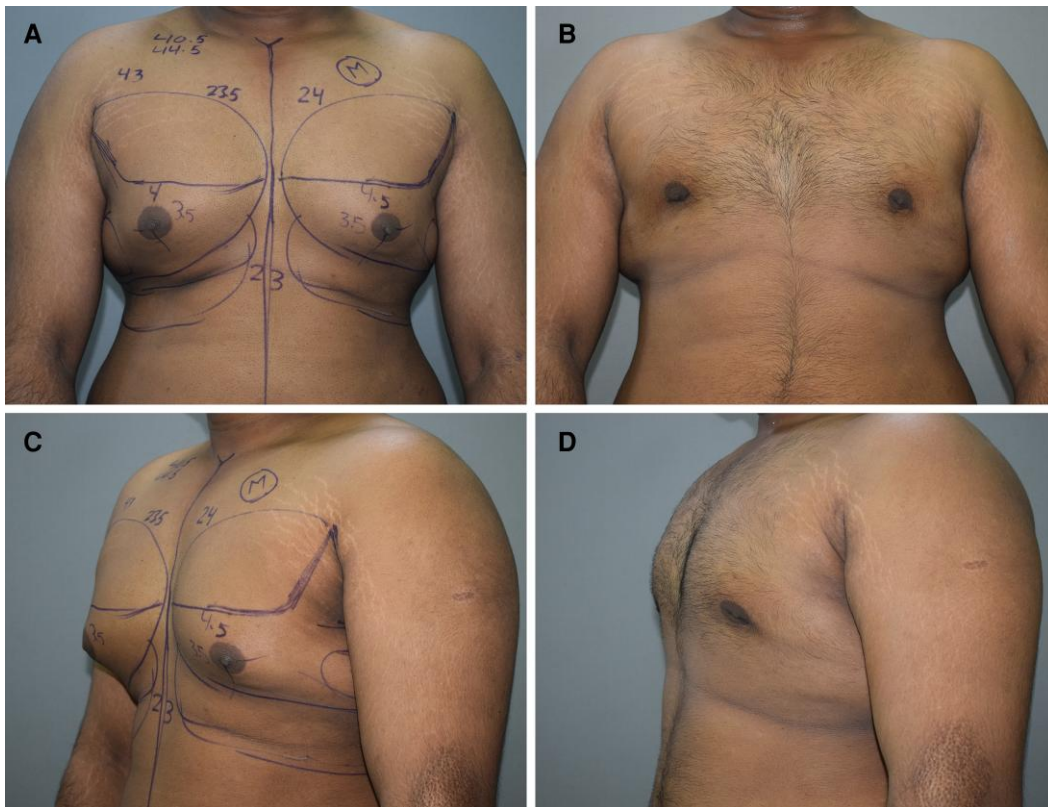


Figure 3. A 23-year-old male patient shown preoperatively at (A) front and (C) oblique views, and 6 months postoperatively at (B) front and (D) oblique views.

Table 1. Age Distribution of Gynecomastia Patient

Age group	No. of patients	%
10-19	43	9.6
20-29	287	64.1
30-39	106	23.7
40-49	9	2.0
50-59	3	0.7
Grand total	448	100.0

The average BMI of the patients was 27.31 kg/m² (range, 17.2-46.7 kg/m²). Patients with Grades III and IV had higher BMI compared to patient with Grades I and II. The follow-up period ranged from 6 to 14 months. We used lifting plaster technique in all patients with Grades III and IV gynecomastia. Table 1 shows the age distribution of the patients.

Complications

In our study group, 116 patients (25.9%) experienced some form of complication. The most common complication was seroma followed by superficial skin necrosis. There were 3 cases of hematoma in our study which was managed conservatively (needle aspiration and wait and watch). Some patients experienced more than one complication in our study. Table 2 illustrates the total number of complications. Complications were most commonly seen in patients with Grade II.

Patient Satisfaction

The follow-up period of the patients ranged from 6 to 14 months. Patient satisfaction questionnaires were sent to all the patients. Three hundred twenty-two of 448 patients (74%) returned the questionnaires. The summary of the patient satisfaction questionnaire is illustrated in Figures 4-7.

DISCUSSION

The surgical treatment for the management of gynecomastia is continuously evolving with the advent of technology. A number of surgical treatments have been published previously, but many lack clear guidelines for treatment.⁶ Earlier publications focused on gland excision, whereas more recent papers advocate on combination of liposuction and gland excision.⁶ Most of the studies reported the smaller sample size with inconclusive results. This study reports a larger sample size for gynecomastia treatment with combined technique and no skin excision over a period of 2 years.

Table 2. Complications After Gynecomastia Surgery

Complications	No. of complications	%
Seroma	55	43.7
Superficial skin necrosis	30	23.8
Others	18	14.3
Adherence of NAC	15	11.9
Hematoma	3	2.4
Puffiness	3	2.4
Cellulitis	2	1.6
Total	126	100.0

NAC, nipple areola complex.

Three peaks for gynecomastia development have been described:—neonatal period, puberty, and adult between 50 and 80 years.¹⁰ Most of the patients in our study were operated between 20 and 29 years of age. Patients in this age group are more vulnerable to psychological and peer pressure. Only 1 patient in our study was older than age 50. The most common grade of gynecomastia in our study was Rohrich Grade II (52.5%), which is consistent with other studies.^{11,12}

The overall complication rate in our study was 25.9%, which is comparable to other studies.^{13,14} Although some study reported very low complication rate, which might be due to low sample size.^{11,15} One hundred sixteen of 448 patients reported some form of complications in our study. Some patients experienced more than one complication. The most common complication in our study was seroma ($n = 30$, 45.5%). A study by Holzmer et al⁶ reviewed 17 studies with total of 1112 patients reported overall complication rate of 13.1% and hematoma (5.8%) as most common complication followed by seroma (2.4%). The same study reported overall complication rate of 13.1% ranging from 0% to 33%. Caridi¹⁶ in his recent study reported seroma followed by hematoma as the most common complication. Hematoma was reported in only 3 patients in our study, which was managed conservatively. Two cases of hematoma were managed with aspiration, followed by tight plaster application, and one case closely observed as hematoma was not severe. In our series, Grade II patients showed highest complication rate followed by Grade III. More complications might have been seen in Grade II because of higher number of patients in our study compared to Grade III and Grade IV.

No patient underwent revisionary surgery during our follow-up period. However, 7.1% of patient in our questionnaires reported that they desire revisionary surgery in future. Revision rates vary among published works, with some studies reporting an incidence up to 14% for revision surgery.¹⁷ Common reasons for revisions include scar,

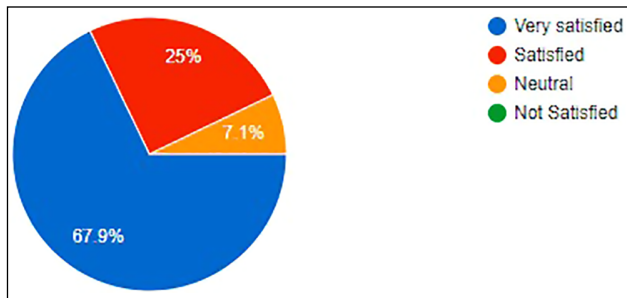


Figure 4. Satisfaction rating after surgery.

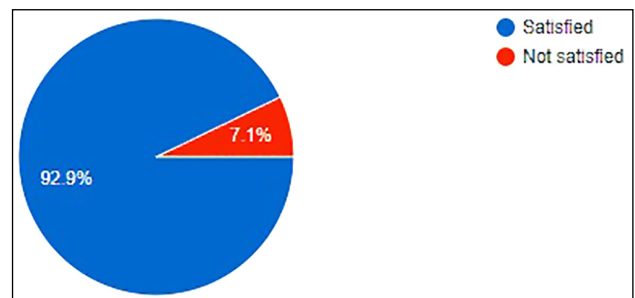


Figure 5. Scar rating after surgery.

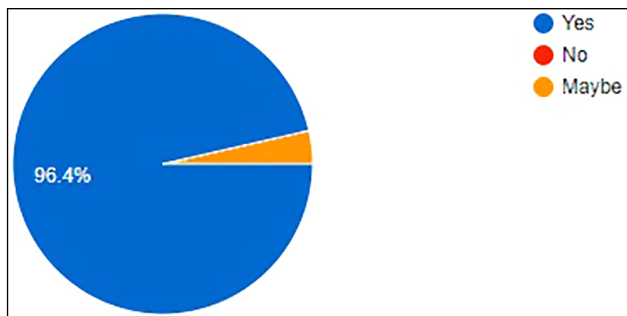


Figure 6. Confidence rating after surgery.

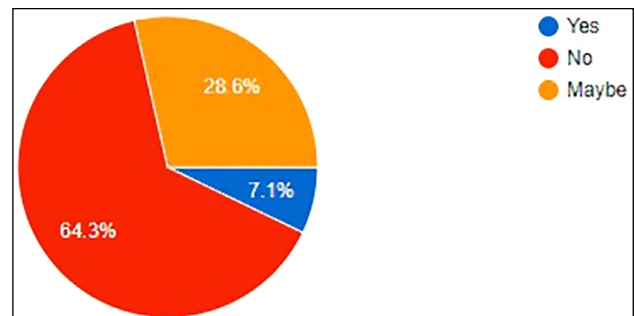


Figure 7. Rating of desire for revision surgery.

inadequate gland removal, and breast asymmetry. We use a smaller incision compared to standard semi-circular incision, and we regularly excise the gland completely. This might be the reason for lower revision surgery in our series. Another reason could be the shorter follow-up period in our study.

Some surgeon claims that complete removal of gland leads to a crater formation, which was not reported in our study. In order to avoid this complication, we preserve the muscle fascia and perform the liposuction of the surrounding fat.

The overall satisfaction rate in our study was 92.9%, of which 67.9% patients were very satisfied and 25% patients were satisfied. This rate is higher compared to other published work.^{18,19} Most patients (96.4%) in our study reported that they were more confident after their surgery. Similarly, most of the patients in our study were satisfied with the scar after surgery.

The use of NAC lifting plaster technique eliminates the need for skin excision in our study. Although in the case of poor skin quality or higher grade gynecomastia, a patient might require skin excision and free nipple transfer. This technique was used in a patient with Grade III and Grade IV gynecomastia with skin laxity. The patient satisfaction rate after NAC lifting plaster technique was similar to patient with Grade I or II gynecomastia. The limitation of our study is that it being a retrospective study and lack of control groups. Apart from that, short follow-up period in our study might have given inconclusive result.

CONCLUSIONS

Gynecomastia surgery is a safe and highly rewarding procedure for surgeons. No standardized treatment exists for gynecomastia. Various technologies and methods like liposuction, complete gland excision, and NAC lifting plaster technique should be adopted in gynecomastia treatment for better patient satisfaction. Complications are common in gynecomastia surgery but easily manageable.

Supplemental Material

This article contains [supplemental material](http://www.asjopenforum.com) located online at www.asjopenforum.com.

Disclosures

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REFERENCES

1. Kumanov P, Deepinder F, Robeva R, Tomova A, Li J, Agarwal A. Relationship of adolescent gynecomastia

- with varicocele and somatometric parameters: a cross-sectional study in 6200 healthy boys. *J Adolesc Health*. 2007;41(2):126-131. doi: [10.1016/j.jadohealth.2007.03.010](https://doi.org/10.1016/j.jadohealth.2007.03.010)
2. Bautista-Vidal C, Barnoiu O, García-Galisteo E, Gómez-Lechuga P, Baena-González V. Treatment of gynecomastia in patients with prostate cancer and androgen deprivation. *Actas Urol Esp*. 2014;38(1):34-40. doi: [10.1016/j.acuro.2013.02.013](https://doi.org/10.1016/j.acuro.2013.02.013)
 3. Devalia HL, Layer GT. Current concepts in gynaecomastia. *Surgeon*. 2009;7(2):114-119. doi: [10.1016/s1479-666x\(09\)80026-7](https://doi.org/10.1016/s1479-666x(09)80026-7)
 4. Deepinder F, Braunstein GD. Drug-induced gynecomastia: an evidence-based review. *Expert Opin Drug Saf*. 2012;11(5):779-795. doi: [10.1517/14740338.2012.712109](https://doi.org/10.1517/14740338.2012.712109)
 5. Rew L, Young C, Harrison T, Caridi R. A systematic review of literature on psychosocial aspects of gynecomastia in adolescents and young men. *J Adolesc*. 2015;43(1):206-212. doi: [10.1016/j.adolescence.2015.06.007](https://doi.org/10.1016/j.adolescence.2015.06.007)
 6. Holzmer SW, Lewis PG, Landau MJ, Hill ME. Surgical management of gynecomastia: a comprehensive review of the literature. *Plast Reconstr Surg Glob Open*. 2020;8(10):e3161. doi: [10.1097/GOX.0000000000003161](https://doi.org/10.1097/GOX.0000000000003161)
 7. Ramasamy K, Jagadish Kiran ACV, Jesudass J, Raj S. NAC plaster lifting technique for the management of skin redundancy in severe gynecomastia. *Plast Reconstr Surg Glob Open*. 2022;10(5):e4339. doi: [10.1097/GOX.0000000000004339](https://doi.org/10.1097/GOX.0000000000004339)
 8. Rohrich RJ, Ha RY, Kenkel JM, Adams WP Jr. Classification and management of gynecomastia: defining the role of ultrasound-assisted liposuction. *Plast Reconstr Surg*. 2003;111(2):909-923; discussion 24-25. doi: [10.1097/01.PRS.0000042146.40379.25](https://doi.org/10.1097/01.PRS.0000042146.40379.25)
 9. Graf R, Auersvald A, Damasio RC, et al. Ultrasound-assisted liposuction: an analysis of 348 cases. *Aesthetic Plast Surg*. 2003;27(2):146-153. doi: [10.1007/s00266-002-1516-x](https://doi.org/10.1007/s00266-002-1516-x)
 10. Lemaine V, Cayci C, Simmons PS, Petty P. Gynecomastia in adolescent males. *Semin Plast Surg*. 2013;27(1):56-61. doi: [10.1055/s-0033-1347166](https://doi.org/10.1055/s-0033-1347166)
 11. Bailey SH, Guenther D, Constantine F, Rohrich RJ. Gynecomastia management: an evolution and refinement in technique at UT southwestern medical center. *Plast Reconstr Surg Global Open*. 2016;4(6):e734. doi: [10.1097/GOX.0000000000000675](https://doi.org/10.1097/GOX.0000000000000675)
 12. Kim DH, Byun IH, Lee WJ, Rah DK, Kim JY, Lee DW. Surgical management of gynecomastia: subcutaneous mastectomy and liposuction. *Aesthetic Plast Surg*. 2016;40(6):877-884. doi: [10.1007/s00266-016-0705-y](https://doi.org/10.1007/s00266-016-0705-y)
 13. Arvind A, Khan MA, Srinivasan K, Roberts J. Gynaecomastia correction: a review of our experience. *Indian J Plast Surg*. 2014;47(1):56-60. doi: [10.4103/0970-0358.129624](https://doi.org/10.4103/0970-0358.129624)
 14. Kasielska A, Antoszewski B. Surgical management of gynecomastia: an outcome analysis. *Ann Plast Surg*. 2013;71(5):471-475. doi: [10.1097/SAP.0b013e31824e296a](https://doi.org/10.1097/SAP.0b013e31824e296a)
 15. Khalil AA, Ibrahim A, Afifi AM. No-drain single incision liposuction pull-through technique for gynecomastia. *Aesthetic Plast Surg*. 2017;41(2):298-303. doi: [10.1007/s00266-016-0749-z](https://doi.org/10.1007/s00266-016-0749-z)
 16. Caridi RC. Total gynecomastia removal with layered closure: a study of 567 cases. *Plast Reconstr Surg Glob Open*. 2022;10(4):e4256. doi: [10.1097/GOX.00000000000004256](https://doi.org/10.1097/GOX.00000000000004256)
 17. Sim N, Tan G, Tan BK, Goh T. Review of the microdebrider excision and liposuction technique (MELT) for the treatment of gynecomastia. *J Plast Reconstr Aesthet Surg*. 2020;73(2):303-312. doi: [10.1016/j.bjps.2019.09.003](https://doi.org/10.1016/j.bjps.2019.09.003)
 18. Singamsetty R, Rout SK. Aesthetic outcome of gynecomastia management with conventional liposuction and cross-chest liposuction: a prospective comparative study. *Aesthetic Plast Surg*. 2022;46(3):1063-1070. doi: [10.1007/s00266-021-02611-x](https://doi.org/10.1007/s00266-021-02611-x)
 19. Ridha H, Colville RJ, Vesely MJ. How happy are patients with their gynaecomastia reduction surgery? *J Plast Reconstr Aesthet Surg*. 2009;62(11):1473-1478. doi: [10.1016/j.bjps.2008.04.042](https://doi.org/10.1016/j.bjps.2008.04.042)