



Operative Techniques

Treatment of adolescent gynecomastia

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Abstract

Purpose: Adolescent gynecomastia is common but variable in severity. The disease may be self-limited. Although antiestrogen therapy can be used in persistent gynecomastia, results are mixed. Subcutaneous mastectomy via a circumareolar incision is familiar to most pediatric surgeons and provides excellent cosmetic results in most cases. Severe gynecomastia may require alternative procedures. There is little information in the pediatric surgical literature to provide the pediatric surgeon with treatment options for these children. A variety of techniques have been used by plastic surgeons for female patients requiring breast reduction and are sometimes a useful addition to the surgical repertoire for the management of very large breasts in adolescent gynecomastia. We reviewed our experience with the use of inferior pedicle reduction mammoplasty and subcutaneous mastectomy in adolescents with gynecomastia and describe the techniques used.

Methods: After obtaining institutional review board approval, a retrospective review was conducted on all patients operated on for gynecomastia from January 1999 to March 2009. Data recorded included patient demographics, diagnostic evaluation, medical and surgical treatment, complications, and outcome.

Results: Twenty patients underwent an operation for gynecomastia. Eight patients had bilateral inferior pedicle reduction mammoplasty, and 12 patients underwent either unilateral or bilateral subcutaneous mastectomy. The mean age at operation was 15.5 years (range, 14–18 years). In all cases, the histopathologic feature was consistent with gynecomastia. There were no postoperative wound infections. One patient developed a seroma after subcutaneous mastectomy requiring drainage. The mean amount of tissue removed after bilateral reduction mammoplasty was 275.1 g. No patients had devascularization of the nipple-areolar complex or nipple loss. One patient had mild subcutaneous asymmetry after a reduction mammoplasty that required no further intervention. Seven patients (87%) had an excellent cosmetic outcome after reduction mammoplasty. Mean length of follow-up was 18.8 months.

Conclusions: Although many adolescents with true gynecomastia have mild or self-limited disease, operative treatment may provide significant benefit to the remainder. Milder grades of gynecomastia can be managed with subcutaneous mastectomy. Selected severe cases can be safely and effectively treated with reduction mammoplasty.

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Gynecomastia occurs at all ages. Neonatal enlargement may be the result of maternal hormones, and adults may have altered androgen/estrogen ratios from lower testosterone levels or high estrogens. The process can be unilateral or

bilateral and is due to enlargement of the glandular breast tissue. There is no increased risk of breast cancer associated with gynecomastia.

The percentage of adolescent males affected has been reported to be as high as 30% to 65%, with involution in 1 to 2 years [1-3]. This remarkably high incidence referenced in standard textbooks may include boys with very subtle subclinical breast hypertrophy; the incidence of clinically symptomatic adolescent gynecomastia is much lower. Some authors have described the latter as “pathologic gynecomastia” [3]. The cause of gynecomastia in most adolescents is an estrogen/androgen imbalance from pubertal hormonal changes.

Mild gynecomastia that does not resolve is amenable to simple circumareolar subcutaneous mastectomy (SQM). However, severe persistent gynecomastia may be difficult to manage, especially for pediatric surgeons who see such consults infrequently and for whom there is little published information in the pediatric surgical literature. We reviewed our experience with the use of inferior pedicle reduction mammoplasty (RM) and SQM in adolescents with gynecomastia and describe the surgical management of the condition.

1. Methods

After obtaining institutional review board approval (institutional review board no. 08-09-148), we retrospectively reviewed the records of all males who underwent either RM or SQM for gynecomastia from January 1999 to March 2009. Data collected included patient demographics, evaluation and medical management, type of operation, amount of tissue removed and histopathologic findings, postoperative complications, and outcome. Patients were evaluated postoperatively for nipple-areola viability and symmetry.

1.1. Operations

Subcutaneous mastectomy via an inferior partial circumareolar incision is familiar to most pediatric surgeons (Fig. 1A and B). Although lateral and medial extensions of the circumareolar incisions can be used in cases with massive breast enlargement or a broad chest, the cosmetic appearance is sacrificed. Failure to remove enough tissue may result in a central “divot” and a cosmetically poor outcome. Liposuction-assisted SQM is another option. Because liposuction alone will not address the hypertrophic breast tissue, the combination of the 2 techniques may work well. However, most pediatric surgeons have little experience with liposuction, and it has its own complications. Submammary incisions with skin flap and nipple-areolar complex (NAC) elevation are another option but may yield suboptimal results if there is significant skin redundancy and displacement of the NAC.

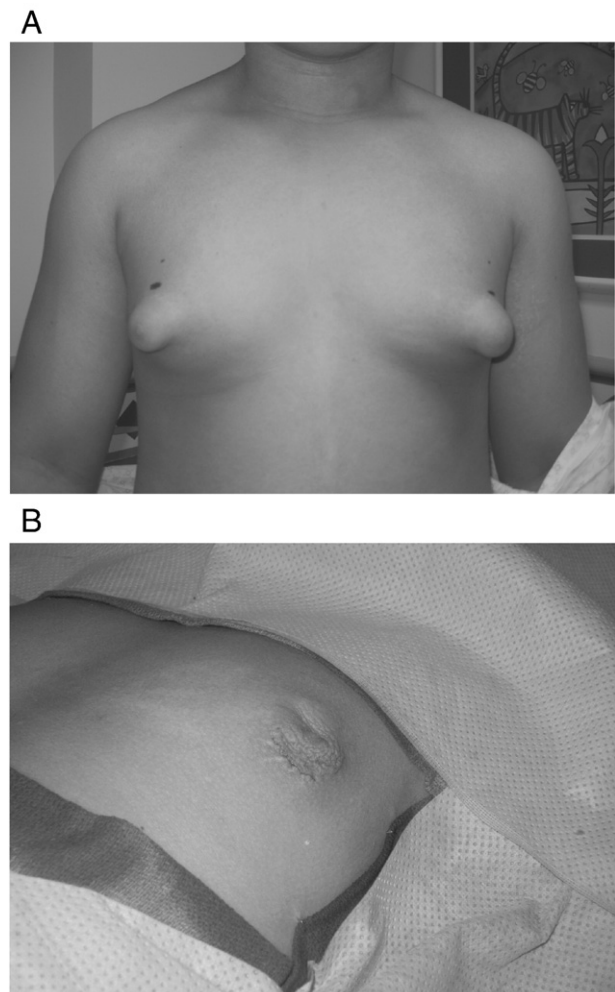


Fig. 1 A, Bilateral gynecomastia primarily contained to the subareolar area. Simple SQM via a partial circumareolar incision was performed. B, The postresection appearance after SQM.

The inferior pedicle RM is commonly used to treat female breast enlargement (macromastia). This procedure was used when massive gynecomastia, ptotic breasts, or a very broad chest would have resulted in a poor cosmetic outcome with SQM.

Reduction mammoplasty was performed as follows. In the preoperative suite, the patient is marked while upright and awake. A vertical line is drawn from the midclavicular area down to the position to which the NAC will be relocated (Fig. 2). In adolescent males, the top of the NAC is typically about 17 cm, although significant adjustments may be required to allow for variations in stature and habitus.

The patient is prepared and draped with the arms extended and carefully padded. A large NAC may need to be reduced in diameter. This can be done with a sterilized quarter (or similarly sized cutout) that is used to outline the NAC margins, and vertical lines are drawn from the medial and lateral edges of the NAC (Fig. 3). A keyhole or anchor incision is used. The vertically oriented band of tissue below the NAC will be deepithelialized but preserved as its blood



Fig. 2 The midclavicular line drawn to the future location of the NAC. The NAC may need to be positioned superiorly and medial to its current location. Equidistance from the midline should be maintained.

supply (Fig. 4). The incision is carried around the previously marked NAC, extending the incision down to the base of the triangle and inferiorly down to the mammary crease, excluding the deepithelialized central portion to maintain viability of the NAC. Excess breast tissue is removed medially, laterally, and superiorly; the weight of removed tissue is compared to the contralateral breast to insure symmetry. The vascularized NAC is buried, with the NAC directly under the new exit site. The skin incisions are closed (over a closed suction drain) in an inverted T fashion with layered interrupted sutures (Fig. 5A). The marker is used to inscribe the circle where skin is to be removed for the new

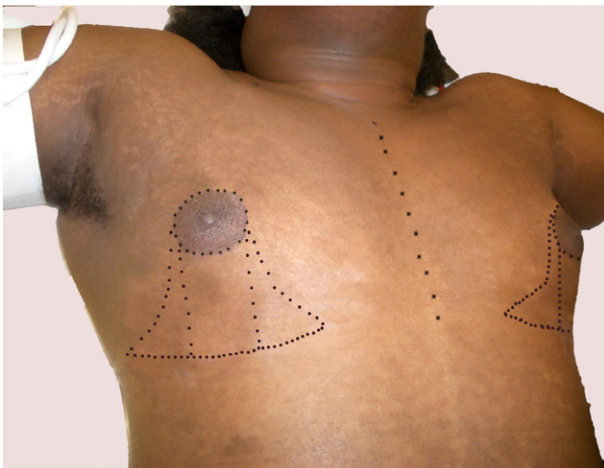


Fig. 3 Marks for the anchor keyhole incisions have been made. The lower border is the submammary fold, and the triangular lateral dotted lines will be incised down to the fascia. All of the tissue within the dotted lines will be excised, except the NAC and the inferior vertical band of tissue. The latter will be deepithelialized and preserved as the inferior blood supply of the NAC. Some of the breast tissue under the superior and lateral retained flaps may be removed as needed.

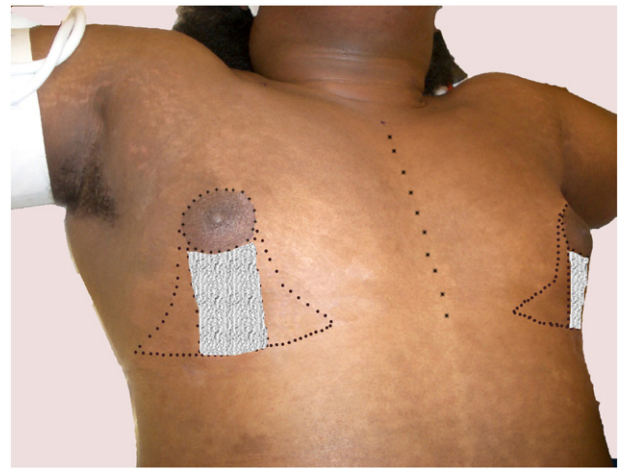


Fig. 4 The stippled rectangular area directly under the NAC delineates the deepithelialized vascular supply that is preserved and eventually buried.

NAC. The NAC is brought out through this area and secured with radially placed full-thickness skin sutures (Fig. 5B). Subcuticular sutures were sometimes used unless there was concern about the potential for dehiscence in an area subject to significant mobility. In cases where the old NAC location was lateral or ptotic, the anchor incision may need to be extended medially and superiorly to provide a location for

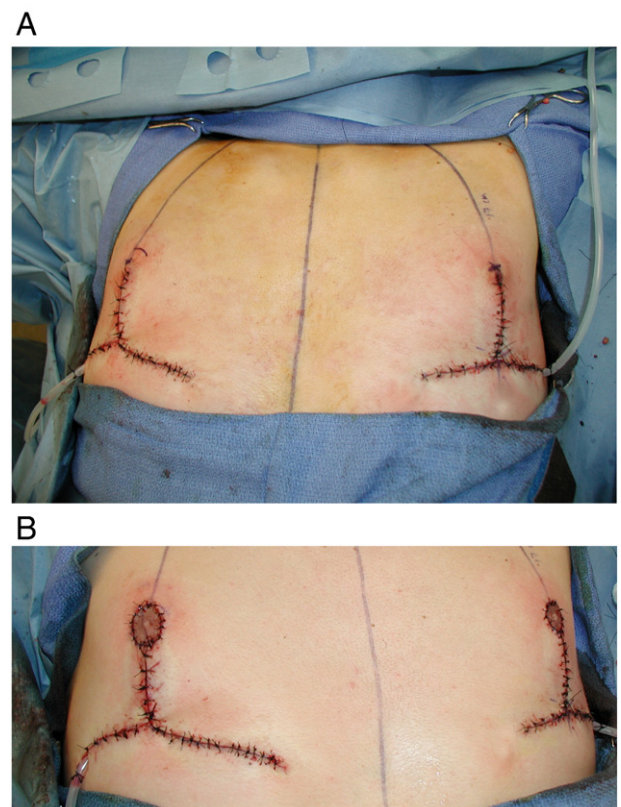


Fig. 5 A and B, The inverted "T" incision is shown, both before and after the NAC is brought up through the skin and secured in place.

A



B



Fig. 6 A and B, Before and after pictures in a young man who underwent RM for gynecomastia. Note the ptotic breasts with displaced NAC preoperatively. The postoperative picture shows some excoriation from eschar at the margins of the NAC, but this resolved completely, with an excellent cosmetic outcome.

the NAC. A pressure dressing (Ace wrap or chest binder) is applied to prevent seroma formation. Pre- and postoperative results are seen in Fig. 6A and B.

2. Results

We identified 20 patients: 8 underwent bilateral RM and 12 SQM (7 unilateral and 5 bilateral). Mean age at the time of operation was 15.5 years, with a range of 14 to 18 years. In all cases, the histopathologic feature was that of gynecomastia (periductal fibrosis, dilated ducts with focal epithelial hyperplasia) without other abnormal findings. There were no postoperative wound infections. One patient developed a seroma after SQM, requiring a single aspiration. The mean amount of tissue removed after a bilateral RM was 275.1 g, ranging from 137 to 553 g. No patient had devascularization of the NAC resulting in nipple loss. One patient had mild

subcutaneous asymmetry after RM, which required no further intervention. Seven patients (87%) had good cosmetic outcome (surgeon determined) with good chest symmetry after RM. All patients were very satisfied with the cosmetic outcome. No patients required revision. Mean length of follow-up was 18.8 months.

3. Discussion

Gynecomastia is felt to be the result of an imbalance between free estrogen and androgen actions in breast tissue [4]. In pubertal males, this may be idiopathic. Estrogen excess can be because of a variety of causes: testicular estradiol production (Sertoli or Leydig cell tumors), gonadal or extragonadal human chorionic gonadotrophin (hCG) secreting tumors, adrenal neoplasms (androgen precursors converted peripherally), through thyrotoxicosis or Klinefelter syndrome (increased aromatase activity), or drugs (marijuana, anabolic steroids) [5]. Many medications (spironolactone, cimetidine, antiviral agents) are causative, via displacement of bound estradiol and estrone, increasing the free estrogens [6]. Other medications are androgen receptor blockers. Alkylating chemotherapy agents may damage the testis. Leptin levels may play a role in some cases [7].

Most healthy adolescents with gynecomastia can be adequately evaluated by a history and physical alone [4-7]. Many patients referred for evaluation actually have pseudogynecomastia, an increase in subareolar fat often related to obesity. True gynecomastia has a palpable firm disc of tissue under the NAC. Boys with gynecomastia and abnormal findings after the initial evaluation (small testes, other endocrine abnormalities, and others) may need further studies such as liver function tests, assessment of luteinizing hormone and follicles-stimulating hormone, testosterone and estrogen/estradiol levels, hCG, and thyroid function studies. Imaging studies of the brain, testes, or adrenal glands may (uncommonly) be indicated. Mammography or breast ultrasound is rarely helpful. Biopsy or fine-needle aspiration is unnecessary in most cases.

In mild cases with minor or no symptoms, a period of observation is warranted. If gynecomastia persists, medical therapy such as tamoxifen or anastrozole has been recommended by some authors [8-12]. Most series involve small numbers of patients, and the often self-limited nature of gynecomastia limits conclusions [13]. In one study of 37 patients treated with tamoxifen for adolescent gynecomastia, pain and size reduction were seen in all patients [9]. Tamoxifen has been successfully used as prophylaxis against the development of gynecomastia in adult patients receiving chemotherapy for prostatic cancer [14]. Although the specific aromatase inhibitor anastrozole has been advocated by some [15], recent randomized studies indicated a response similar to that achieved with placebo [12]. One of our

patients received tamoxifen without improvement, and 2 additional patients were being treated by an endocrinologist for years without improvement.

Since the first recorded description of an RM by Paulas of Aegina in the seventh century AD, surgical treatments for gynecomastia have continued to evolve. A method for a 2-stage mammoplasty in females, transposing the NAC using an inferior pedicle flap, appeared in 1925 [16]. Various techniques have been subsequently described including liposuction, SQM, vertical mammoplasty, RM, breast reduction and mastectomy, or a combination of techniques [17-19]. These have been almost exclusively reported in the adult population.

Surgical management of adolescent gynecomastia depends on the individual patient. Gynecomastia confined to the subareolar area with an "average" body habitus is well suited to simple SQM. Some forms of gynecomastia do not lend themselves to SQM: those with very pronounced glandular enlargement, boys with a wide/broad chest and more diffuse gynecomastia, and patients with significant ptosis and enlargement or displacement of the NAC.

Although the technique of RM is not particularly difficult, the procedure is unfamiliar to most pediatric surgeons. In our case, one of the senior authors (GKG) was mentored at another institution by an experienced plastic surgeon. The first 5 cases performed by other pediatric surgical staff were then mentored by the senior surgeon. Plastic surgeons were not involved in the care of the patients in this study.

Evidence of fibrosis present within the breast tissue in male gynecomastia is associated with a higher likelihood of irreversibility. In our study, all patients had a component of fibrosis in the pathologic specimen.

In adult series, surgical revision was required in as many as 7% of patients [20]. No patients in our series required further surgeries, but this is a retrospective review of a small number of patients. Medical management was inconsistent, but the duration of symptoms was typically greater than 2 years.

The psychologic ramifications of significant gynecomastia are important and are often of major significance to these young men. They often avoid swimming, sports, and other activities in which their chests will be exposed and almost universally express relief when seen for postoperative follow-up. Many of these patients view incisional scars as a positive mark of distinction, in contrast to the negative stigmata of breast enlargement in the midst of puberty. Confoundingly, the clear cosmetic benefits are sometimes cited by third-party insurers as a reason to deny reimbursement.

Both SQM and RM had excellent outcomes, with low complication rates and success in restoring a more normal chest contour. Most of the milder grades of gynecomastia can be managed with SQM alone. Our plastic surgical colleagues have a multitude of techniques for managing

breast enlargement in adults, several of which may be applicable to select adolescents with severe gynecomastia. The goal of this article is not to advocate one procedure over another but rather to point out that a single procedure may not suffice for all patients with gynecomastia and raise awareness of alternative approaches.

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