Gynecomastia: A Clinical Review

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Background: Male breast enlargement can occur transiently in up to three fourths of adolescent boys and is persistent in 7% of cases. The development of lipoplasty techniques has enabled treatment of this condition with only inconspicuous scarring.

Objective: This article reviews the causes, diagnosis, and treatment of gynecomastia in the light of the authors’ clinical experience.

Methods: The causes and development of congenital, puberal, and acquired/induced gynecomastia are summarized. Indications for obtaining (1) endocrine tests, (2) plasma levels of estrogen, testosterone, and prolactin, and (3) biopsy are reviewed. Treatment methods focus on blunt cannula techniques and combination suction lipoplasty/excision procedures.

Conclusions: Suction lipoplasty, often combined with excision, can be performed on an outpatient basis with local anesthesia with dependable results and no adverse effects.

Gynecomastia is a term applied to the development of enlarged male breasts. These may be quite small (only a few cubic centimeters in volume) but located right at the nipple-areolar complex (Figure 1), causing a pointed protrusion. They can also be massive, involving liters of subcutaneous fat and glandular tissue (Figure 2).

Gynecomastia has been recorded since ancient times. Until the 1970s, the only treatment was direct surgical excision.1,2 Often, the cure was worse than the disease, resulting in disfiguring scars.3 The development of suction lipoplasty now allows the removal of all subcutaneous fat from a remote incision site in the region of the axilla without any scarring in the breast area, although excision of some glandular tissue may be necessary in some cases.4-7

In this article, we review the causes, diagnosis, and treatment of gynecomastia, on the basis of the literature and our nearly 20 years of experience with the described techniques.

Congenital and Puberal Gynecomastia

The mammary gland has a mesodermal origin, but it is derived primarily from the epidermal layer. By the ninth week of gestation, a recognizable nipple bud has formed from a mass of basal cells in the pectoral region. By the end of the third month, squamous cells from the surface begin to invade the nipple bud and ducts develop; these later
become canalized to form lactiferous ducts. Although mammary glands are minute at birth, the potential breast tissue is already developed.

At puberty, gonadotropin-releasing hormone stimulates production of follicle-stimulating hormone and luteinizing hormone. Mammary growth accelerates at a rate greater than body surface growth; consequently, thelarche (breast development) may be the first sign of puberty.

Some accelerated development of breast tissue occurs in most young boys between the ages of 12 and 17. This development is usually transient and subsides within a few months. It can be unilateral or bilateral and range from only an unnoticeable few cubic centimeters of tissue that is not noticed by the patient to large, pendulous development.

Puberal gynecomastia is usually self-limiting. Although studies have shown that approximately three fourths of boys have some breast development, it resolves after 1 year in one third of cases and within 3 years in 93% of cases. Persistent gynecomastia in a patient older than age 17 years is unlikely to subside, and surgical intervention may be indicated. If prominent gynecomastia is a complaint of either the boy or his parents, surgical intervention at a younger age may be indicated if the protuberance does not subside within a few months.

Figure 1. A, A serious bodybuilder, 26 years old and a national award-winner (“Mr. Texas”), who may have included some anabolic steroids in his training regimen in years past. In addition to substantial hypertrophy of his muscles, he shows hypertrophy of the rudimentary mammary gland. B, The bodybuilder seen in Figure 1, A after combined lipoplasty and direct excision with a periareolar incision. The nipple-areolar complex can be seen to be flatter and less conspicuous and the periareolar scar is not noticeable.

Figure 2. A, This 67-year-old white man has been taking prednisone for approximately 10 years for arthritis. This case shows hypertrophy of the breast tissue and subcutaneous fat and would probably be classified as cortisone-induced pseudogynecomastia. B, The patient seen in Figure 2, A after removal of 1 L of subcutaneous fat through transaxillary lipoplasty with no direct excision.
The cause of puberal gynecomastia is not clear. It may be related to a hormonal imbalance, or there may be some unusual sensitivity of the breast tissue to the normal levels of circulating hormones. A familial incidence has been reported, and gynecomastia can of course be an integral part of Klinefelter syndrome13 and hypogonadism.14,15 Other pathologic states that may be associated with gynecomastia are testicular and adrenal tumors, cirrhosis of the liver, severe starvation, lung cancer, tuberculosis, and hyperthyroidism.16-23

Acquired/induced Gynecomastia

Therapy with either estrogen or androgen can produce gynecomastia. Estradiol is a metabolic product of testosterone, and this fact might explain the phenomenon. Carcinoma of the prostate is treated with stilbestrol, an estrogen that causes gynecomastia. (Breast enlargement resulting from such treatment may be prevented by small doses of radiation to the breast.) Other pharmacologic agents that may also cause gynecomastia include antiandrogens, chorionic gonadotropin, spironolactone, reserpine, phenothiazines, methyl-dopa, meprobamate, ergotamine, diazepam, hydantoin, hydroxyzine, marijuana, digitalis, and isoniazid.

Recently, we have seen an increasing number of cases of steroid-induced gynecomastias in overzealous athletes who self-administer anabolic steroids to rapidly increase their muscle mass (Figure 3). An unwanted side effect is a protrusion of their nipple and/or areolar and/or breast gland complex, causing an undesirable feminine shape.

Such recreational use of anabolic steroids is to be condemned, inasmuch as it is known to cause behavioral problems, liver tumors, sterility, acne, baldness, and psychological changes.24

Pseudogynecomastia

The term pseudogynecomastia refers to a deposit of fat (not breast tissue) in the breast and is commonly seen in obese men. Some cases of drug-induced gynecomastia may have a significant pseudogynecomastia component.

Differential Diagnosis

Transient breast enlargement of a few months does not need any formal diagnosis. However, prepuberal gynecomastia may be associated with interstitial cell tumors of the testes, and testosterone levels should be measured in these patients. In adolescents there is no reason to consider endocrine tests unless enlargement is massive or the gynecomastia persists for more than 2 years. Gynecomastia persisting after puberty may be associated with serious disease; when there is no obvious cause, the patient should have a complete examination, and plasma levels of estrogen, testosterone, and prolactin should be obtained. A breast biopsy or excision can establish a diagnosis, especially in older patients, in whom gynecomastia may be unilateral. Carcinoma of the breast can occur in males with Klinefelter’s syndrome25,26 and in patients treated with estrogen. Mammography and biopsy are the definitive evaluation methods.
Pathologic Findings

A connective tissue proliferation that is characterized by increased fibrosis and hyalinization is usually present regardless of cause. There may be a proliferation of ducts with epithelial hyperplasia with a characteristic halo effect. True glandular globules are not present (Figure 4).

Psychological Considerations

Body image problems during adolescence are common in most individuals. Peer group pressure may cause a young man with gynecomastia to alter his activities so as not to participate in gym class or any sports. A parent’s justifiable concern may cause even more anxiety. The adolescent boy with this condition may have difficulty developing normal relationships with girls and ultimately may experience severe maladjustment. Psychotherapy may be considered if anxious or psychologically depressive behavior persists.

Treatment

Hormonal manipulation is ineffective in the management of gynecomastia. Until the 1970s, surgical excision was the only available treatment. Since then, the development of lipoplasty by Illouz, Lewis, Teimourian et al., Hetter and Herhahn, Mladick and Morris, and others has made it possible to treat many of these patients with the inconspicuous lipoplasty technique.

Surgical treatment depends on the size and the degree of fat and fibrous tissue present. For massive gynecomastia, direct surgical excision and mastectomy may be indicated. In most cases, the volume of the breast hypertrophy is less than 1 L and lipoplasty can be performed with a small (4 or 5 mm) blunt cannula introduced from a remote incision site in the axilla. This can be performed as an outpatient procedure with the patient under local anesthesia through sedation.

In approximately one half of cases, all of the excess tissue can be removed by lipoplasty. In other cases, a collection of fibrous tissue persists beneath the areolae after the removal of the subcutaneous fat from the area over the pectoralis major muscle. In this circumstance, the fibrous tissue cannot be removed with the blunt cannula and direct excision is required. An incision placed in the areolar skin junction on the medial aspect will avoid most of the branches of the fourth intercostal nerve that innervate the nipple-areolar complex, and it will leave an inconspicuous scar at this areolar skin junction. Only in the most massive cases are further incisions and scars necessary. With extensive lipoplasty to this area of the chest, postoperative pressure garments are necessary for several weeks to avoid seromas. If direct excision is necessary, a smoother result can be achieved by using liposuction to taper the areas of the excision area and remove the subcutaneous fat around the pectoralis major muscle.

In every case, we explain to the patient preoperatively that we will attempt to remove the tissue by suction lipoplasty only but that we reserve the option to make a
small incision in the periareolar region to remove the glandular tissue. In some cases in which we used lipoplasty only and a small amount of fibrous tissue left at the nipple was not excised, patients have returned after approximately 6 months to have the small nubbin removed. They were very insistent that all the tissue be removed from this area. Consequently, if there is any doubt at the time of surgery, the excision is indicated.

Adrian Aiache’s recommendation of direct excision for those cases of gynecomastia associated with steroid abuse by bodybuilders is borne out by his excellent results. However, our experience is that in this setting as well, lipoplasty alone is sufficient in approximately one half of cases, whereas a combination of lipoplasty and direct excision to provide a smooth, even contour is appropriate for other patients.

**Sharp suction**

In years past, sharp curetting was tried with disastrous results, including skin necrosis, loss of sensation and/or blood supply, and irregularities in the excised area. Suction lipoplasty became a practical reality in 1978 with the development of the blunt cannula for the subcutaneous aspiration of localized fat deposits. The Illouz-style cannula has a blunt tip and orifice that enable the noble structures, arteries, nerves, and veins to be gently pushed aside, and the amorphous fat is easily avulsed by the passing blunt orifice. When this blunt technique is combined with subcutaneous infiltration, fat can be safely removed with a minimum of blood loss and with no permanent anesthesia or paresthesia (Figure 5). Sharp suction curettes or cannulas are not recommended at this time.

**Suction source**

Illouz and de Villers first described a high-volume suction machine that develops maximum vacuum to quickly pull the amorphous fat into the cannula for avulsion. More recently, systems have been developed that use wide-mouthed plastic syringes. The vacuum machines have a 1- to 2-L reservoir and a safety trap and vacuum gauge. After the cannula is introduced, the vacuum is switched on and left on until the case is completed. When the syringe method is used, it is necessary to have a duplicate set of syringes and cannulas so that when the aspirating orifice is close to the skin wound and vacuum is lost as air rushes into the chamber, the operator can pass off one syringe and receive another that is prepositioned and evacuated.

Such a vacuum machine costs between $4,000 and $10,000; the syringe method is less expensive. The latter method has the added advantage of involving a closed system in which the vacuum and sample are contained within the syringe barrel, whereas the machine method continually pulls vacuum over the sample and expels that air into ambient air. Although most machines have submicron filters, it has been shown that virus can be spread through this airborne route.

**Results**

Since 1985, we have treated patients with all degrees of gynecomastia, ranging in age from 16 to 68 years, with these methods; the results have been universally good. During this period, we have occasionally had to secondarily excise the fibrous portion in patients whom we attempted to treat with lipoplasty alone. We have had no incidence of infection, skin slough, persistent paresthesia, or anesthesia and no incidences of postsurgical psychological disturbance.

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**References**


