

A Dermatological Intervention of Gynecomastia in Young Asian Man with a History of Soy Product Consumption: A Case Report

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Abstract: Gynecomastia is an enlargement of the breasts in men, which is usually benign but can also manifest as a result of malignancies, and can be either unilateral or bilateral. Pseudogynecomastia is male breast enlargement due to excessive fat, while true gynecomastia is a proliferation of glandular tissue. Gynecomastia is common in infants, adolescents, and elderly men, with the most common cause is related to hormonal changes associated with aging. Medical intervention is usually required for true gynecomastia that has lasted more than a year. Here, we report a case of a 33-year-old Chinese-Indonesian decent with enlarged breasts. The patient reported frequent consumption of homemade soybean milk (1/2 to 1 liter daily) accompanied by bland chicken during his body-building regimen. The patient had discontinued the regimen and the diet for 2 years prior to the initial visit. During physical examination, both breasts were enlarged and had firm nodule, mobile, and attached at the sub-central areola mammae with a diameter of 8 cm. The patient was then diagnosed with true gynecomastia Simon degree 2A and Geschikter and Copeland type 3. As the gynecomastia had persisted longer than a year, a dermatological intervention was planned. Ultrasound-assisted liposuction was performed with a solid probe and glandular excision. Fat tissue was obtained, 130 mL from the right breast and 120 mL from the left breast. A dense 2.5 cm × 2.5 cm × 2 cm glandular tissue was obtained from both breasts. The patient was satisfied with the surgery outcome.

Keywords: Asian, gynecomastia, soy product consumption, surgical treatment, ultrasound-assisted liposuction

Introduction

Gynecomastia is a condition in which breast enlargement occurs in men, unilaterally or bilaterally.¹ Gynecomastia is usually benign, but it can also manifest as a result of malignancies, such as prolactinoma, adrenocortical carcinoma, testicular germ cell tumors, Leydig cell tumors, and lung cancer.^{2–8} The term comes from the Greek gyne meaning woman, and mastos meaning breast.⁹ Breast enlargement in men generally causes irritability and can limit or affect social interaction and participation in various activities due to loss of confidence due to feminine self-image.^{10,11} While some studies have shown some beneficial breast-size reduction from weight-loss regimens, weight-loss is not effective in reducing breast size for true gynecomastia where there is an overproliferation of breast glands.¹ Weightlifting exercises are often counterproductive: the increase in chest muscle mass only increases breast projection.¹⁰

It is often seen as a transient phenomenon of 60% to 70% in pubescent boys and is considered a normal part of developments in adult boys.⁹ The highest peak among boys is usually between 13 and 14 1/2 years of age and spontaneous disappearance can occur within 1 to 2 years after initial onset. However, 30% to 40% of the adult males are found to have gynecomastia.⁹

Classically, male breast enlargement is divided into two groups. Pseudogynecomastia is an excessive deposit of fatty tissue in the male breast. This occurrence is quite frequent, affecting 50–60% of the adult males.¹⁰ In contrast, true

gynecomastia is an overproliferation of breast glandular tissue.^{9,10} True gynecomastia is rarer than pseudogynecomastia.¹⁰

The causes of gynecomastia include idiopathic, endocrine causes, as well as tumors. The idiopathic causes is the most common, and are expected to be approximately 25% of the cases.¹ Experts have theorized this condition as a result of excessive estrogen-like circulation or substances resembling estrogen.¹ Recent investigations have revealed pathophysiological mechanisms involving relative or absolute excess estrogen, decreased circulating androgen levels, or androgen receptor defects.¹ There is strong evidence of the effect of estrogen stimulation on the development of breast tissue, as well as support for inhibiting androgenic effects.¹ Elevated estrogen levels lead to increased growth of glandular tissue. This effect is achieved both by directly stimulating the glandular tissue and by suppressing luteinizing hormone, which reduces testosterone production in the testes, thereby further increasing the already high estrogen-to-androgen ratio.¹²

Previously, a case of gynecomastia has been reported in an elderly man where the authors associated it with the patient's heavy soy product consumption.¹³ Soy-based foods have been recognized as a source of isoflavones, a group of chemicals referred as phytoestrogens. Soy isoflavones' structures mimic 17- β estradiol, and act similarly to endogenous estrogen by binding to estrogen receptors. Thus, the high consumption of the soy-based product has been theorized as the cause of gynecomastia in this case.¹³

Physiological gynecomastia usually occurs in newborn or adolescents boys, and will regress overtime. Gynecomastia of long duration is unlikely to regress spontaneously and will often progress to irreversible dense fibrosis and hyalinization despite pharmacological therapy. Patients should consider having surgery once diagnosed with nonphysiological gynecomastia or persistent gynecomastia for more than 12 months.¹

Prior to liposuction, direct excision with a scalpel knife was the only surgical method available to reduce male breasts. The liposuction procedure results in a more natural look, minimal scarring and general patients' satisfactions.¹⁰ Ultrasound-assisted liposuction (UAL), is known to have mechanical gains for dense, fibrous lipodystrophy.¹ Liposuction can not remove highly fibrous glandular tissue; therefore, some patients need glandular excision performed by sharp excision.^{14,15}

Here, we present a case of persistent gynecomastia in an adult male with a history of high soy-based product consumption. This case report aims to present the utility of UAL in true gynecomastia patient.

Clinical Presentation

A 33-year-old man, with a Chinese-Indonesian ethnicity, came to our dermatology clinic on April 2024 with complaints of feeling that both breasts had enlarged approximately 2 years prior to initial visit. The patient had been actively engaged in fitness activities, mainly in body-building regimen, since adolescence. The patient reported that his regimen included a routine consumption of homemade soybean milk (approximately $\frac{1}{2}$ to 1 liter daily), accompanied by bland chicken breasts. He reported that he had terminated this regimen on his own decision, approximately 2 years prior to the initial visit. At this initial visit, the patient complained that his breasts were getting bigger, his body often felt weak. The patient reported that his weight, when engaged in fitness, was between 65 and 70 kg, but his weight had increased to 80 kg at the time of the visit. The patient reported never feeling pain in either testicle. He also reported that he did not take drugs, hormonal supplements, or drank alcohol. He requested for the reduction of unnatural breast enlargement without compromising the aesthetics of his breast shape.

On physical examination, the patient's condition was good, *compos mentis*, and had good vital signs (blood pressure: 110/70 mmHg; pulse: 78 bpm; weight: 80 kg; and height: 173 cm). Upon examination by palpation, both breasts appeared to be enlarged and nodules were found to be elastic, mobile, and attached to the sub-central area of the mammary areola with a diameter of 8 cm (Figure 1). No tenderness was found and no breast surgery was ever performed. Lymph nodes were within normal limits.

By performing a pinch test, it was found that the glandular tissue was predominant. The degree of ptosis glandular tissue, excess skin, nodules or mass, nipple abnormalities or the presence of discharge, were not found. A complete blood count, bleeding time, and clotting time showed no abnormalities.

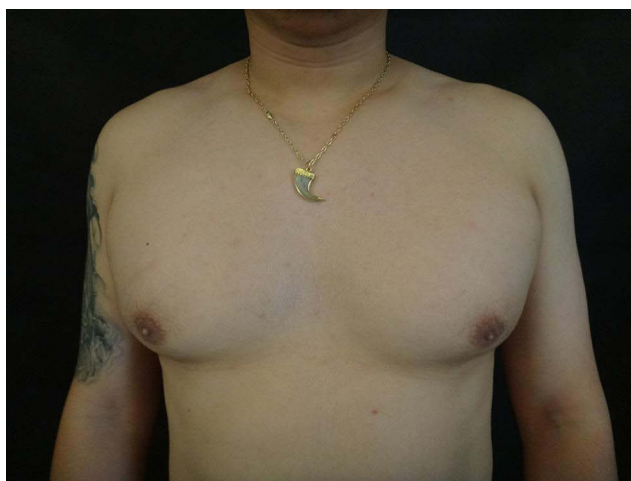


Figure 1 Both breasts before ultrasound-assisted liposuction and glandular excision. Both breasts show fat accumulation in the anterior and lateral axillary areas of the chest wall. The nipple-areolar complex point laterally.

The patient was diagnosed with true gynecomastia of Simon 2A degree and Geschikter and Copeland type 3 from clinical examination. Surgery was planned in two weeks after diagnosis, involving UAL and direct excision of the glandular tissue.

Treatment

Beginning from 10 days before surgery, patient was advised not to take aspirin or other nonsteroids anti-inflammatory, β -blockers, vitamin E, omega 3s, and herbal medicines. The oral antibiotic cefalexin was taken 1 day before surgery to 7 days postoperatively. Patient took bath with chlorhexidine 1 day before and in the morning of the operation day, especially in the area where liposuction was planned to be performed.

On the day of surgery, with the patient in a supine position, the area to be aspirated was cleaned with povidone-iodine from the neck to the axilla and down to the umbilicus. Local anesthesia was injected with 2% lidocaine with 1:100,000 epinephrine. Infiltration of an anesthetic fluid was performed using a modified Klein's tumescent solution. The right breast was infiltrated with 650 mL, and the left breast was with 600 mL. Fat aspiration yielded 130 mL from the right breast and 120 mL from the left breast. Sharp excision was then performed through an inferior semicircular incision in the sub-areolar region of both breasts. Dense glandular tissue was found in both the left and right breasts, each measuring $2.5 \times 2.5 \times 2$ cm, reduced from the previous size of 8 cm in diameter (Figure 2). Breast symmetry and irregularities were

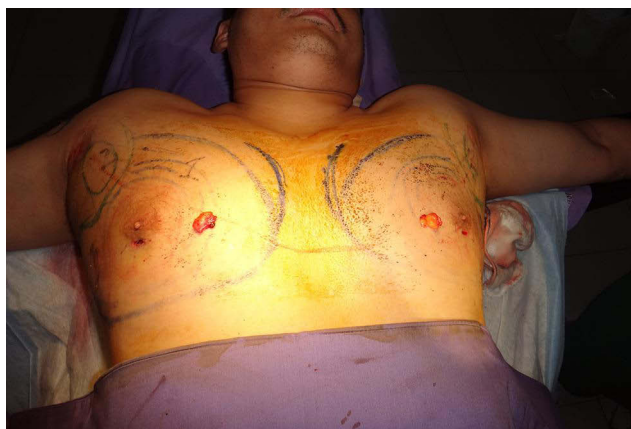


Figure 2 Dense glandular tissue was extracted from both breasts.



Figure 3 Both breasts after 5 months of ultrasound-assisted liposuction and glandular excision. Fat in the anterior and lateral axillary areas of the chest wall is reduced. The nipple-areolar complex now point medially. The breasts appear more proportional.

assessed, especially around the nipples and areolas, to check for any sunken areas that could become permanent. The patient was fitted with Tegaderm™ + Pad, an elastic bandage, and a compressive garment.

Post-Operation

On postoperative day 1, the Tegaderm™ + Pad at the incision site was replaced. Pressure pain persisted in both breasts, and antibiotics were still being taken. On day 5, stitches at the incision site were removed. A seroma measuring $2 \times 2 \times 1$ cm was observed on the inferior lateral aspect of the left breast, and it was monitored without intervention. On day 30, the patient reported pain around the areola, though it was manageable without painkillers. The breast fat enlargement had decreased, and no lumps were found around the nipple. The seroma had resolved, and there were no other complaints. At 5 months postoperatively, the patient occasionally experienced itching in the areola. The volume of both breasts had decreased and appeared proportional. The areola-nipple complex had shifted medially from its previous lateral position (Figure 3).

Discussion

Gynecomastia is not a modern symptom as several historical studies have shown this symptom since the ancient time. A study identified a gynecomastia case in the mummified remains of a 17th-century Northern Finnish vicar, revealing subareolar masses linked to aging and obesity.¹⁶ Another study analyzed a statue from Hellenistic art period, between 300 and 30 BC, of showing gynecomastia, marked by male breast tissue hypertrophy due to age-related endocrine changes.¹⁷ However, gynecomastia can have a psychological impact to men due to the perception of a normal male body shape.

In normal adult males, breast tissue is confined to the area directly under the nipple and areola and usually does not present as a palpable mass. While some chest enlargement is acceptable, especially in muscular men, the ideal male chest is flat and devoid of any prominent features other than the nipple-areola complex.⁹

The most accepted gynecomastia classifications are based on physiological, pathological, pharmacological, and idiopathic causes. Physiological gynecomastia is then divided into neonatal, puberty, and old age. Estrogen circulation from the mother's side transferred through the placenta-fetal circulation is thought to contribute to the overdevelopment of neonatal breast tissue. This condition can resolve on its own, typically lasting from weeks to months, and treatment is rarely indicated. Adults show varying degrees of gynecomastia, affecting up to 65% of this population, with resolution usually occurring within a few months to a few years.¹ Older men (starting at age 65) will often develop breast enlargement due to a decrease in testosterone plasma levels and the conversion of peripheral testosterone to estrogen (peripheral aromatization), effectively increasing the ratio of estrogen plasma to androgens. Pathological gynecomastia occurs as a result of various metabolic disorders, endocrine diseases, acquired hypogonadal states, congenital

hypogonadal states, and elevated estrogen states. Pharmacological gynecomastia can occur through several mechanisms, such as increased direct estrogenic activity, increased estrogen secretion, decreased testosterone synthesis, and decreased androgen sensitivity. Additionally, various drugs with poorly understood mechanisms of action can also contribute to this condition.¹

Diet of a patient can affect the estrogen levels, especially in products containing high phytoestrogen.^{18,19} Soy-based products (soybeans, soy flour, soy flakes, soy beverages and fermented soy products such as miso and tempeh) have a high amount of isoflavones.^{18,19} Isoflavones are categorized as phytoestrogens and these molecules mimic the activity of estradiol, and in turns affect the body.^{18,19}

The impact of isoflavones in men's physical attribute have been debated but current knowledge is inconclusive. Several case reports have been published investigating the association of isoflavones, which mainly come from patients' diets, with changes in features commonly associated with masculinity, such as testosterone level. Gardner-Thorpe et al found that men who ate soya flour (containing isoflavones 120 mg/day) for 6 weeks showed a moderate decrease in serum testosterone levels (from 19.30 nmol/L to 18.20 nmol/L).²⁰ However, the study was conducted for a short time in 20 participants and the results focused on the biochemical effects instead of physiological changes.²⁰ One report by Martinez and Lewi, suggests a direct association of soy consumption to physiological manifestation in a 60-year-old patient. The authors reported that the patient's daily consumption was around 2.8 L of soy milk, which translated to 361 mg/day of isoflavones, and concluded that the patient's breast tenderness resolved after discontinuing the soymilk consumption, and patient's estradiol concentration slowly returned to normal in approximately 1 year.¹³ In another case, Siepmann et al reported a case of a 19-year-old man with a vegan diet exhibited erectile dysfunction, a diminished libido, and a low free testosterone level, caused by high consumption of isoflavones containing diet (approximately 360 mg/day for a year). Similarly, the patient reported a gradual improvement in symptoms and normalization of free testosterone and estradiol after discontinuing soy products within 12 months.²¹ Both cases reported favorable results after the discontinuation of consuming soy products. In a more recent case, Imai et al reported that a 54-year-old man, drinking approximately 1.2 L of soy milk (equivalent to approximately 310 mg of isoflavones) per day for the past 3 years prior to the initial visit. The patient then developed erectile dysfunction, gynecomastia, and moderate loss of axillary and pubic hair. Malaise, gynecomastia, and the loss of axillary hair improved gradually within about 6 months after stopping the soy milk consumption.²² However, the notion of isoflavones feminizing effect to men has been challenged several times. Messina reported that these investigations concluded that isoflavones do not affect testosterone and other reproductive hormone levels in men.²³

While the impact of phytoestrogen and the feminization of men is a debated topic, much of the discussions are concentrated on the carcinogenic effect, infertility, or testosterone level. Nevertheless, gynecomastia has a significant psychological impact on men and it has been suggested that intervention is needed for persistent gynecomastia that has lasted for more than a year.²⁴ Our patient had stopped his diet that supposedly had a high amount of soy isoflavones for a two-year period without any beneficial resolutions. We acknowledge the limitation of our case is that the patient reported this information retrospectively, and we could not test for his hormonal level, while he was still under the high soy-product regimen. However, as the gynecomastia in our patient had not regressed even after discontinuing the soy consumption and with no other known factors such as medication, we concluded to perform the surgery. Patient had reported his satisfaction with the outcome of the surgery and felt more confident in his social life.

Conclusion

Gynecomastia in adults requires a comprehensive medical history and a thorough physical examination. Pathological gynecomastia in adults is quite rare. If gynecomastia persists for 12 months, even after discontinuing other possible factors, surgical intervention should be considered. The available options include excision or liposuction techniques; the choice of surgical procedure depends on the degree of breast enlargement, the presence of excess skin, and the patient's preference, guided by the doctor's advice. The selected method aims to restore the normal male chest shape while minimizing scarring. Pharmacological treatments are not recommended for adults with gynecomastia due to insufficient data on their risks and benefits. Overall, patients have reported satisfaction with the results achieved through ultrasound-assisted liposuction with solid probes and glandular excision.

Abbreviation

UAL, ultrasound-assisted liposuction.

Consent Statement

The authors certify that they have obtained all appropriate written informed consent forms from the patient. The patient was informed and signed the form for the publication of the case details and images. This case report was prepared at Raymond Skin Clinic, an independent clinic not affiliated with any Institutional Review Board (IRB). This case report was prepared and published with the informed consent of the patient, but IRB approval was not required.

Disclosure

The authors report no conflicts of interest in this work.

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