

# Innovative surgical management of gestational gigantomastia

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## ABSTRACT

Gigantomastia is a rare condition characterized by excessive breast enlargement, which can lead to physical and psychological distress. Gestational gigantomastia (GG) occurs during pregnancy, often presenting significant management challenges. This case contributes to the limited literature on GG management by highlighting the successful use of the Goldilocks technique combined with free nipple grafting, offering insights into an effective surgical approach. A pregnant woman presented with severe GG. She underwent bilateral skin-sparing mastectomy and immediate reconstruction using the Goldilocks technique with free nipple grafting. The intervention provided both functional and aesthetic outcomes, significantly improving the patient's quality of life. This case underscores the effectiveness of modern reconstructive surgical techniques in managing GG, particularly in complex cases where hormonal therapy is insufficient.

**KEYWORDS:** gestational gigantomastia; breast hypertrophy; pregnancy; Goldilocks technique; free nipple grafting

## INTRODUCTION

Gigantomastia is a rare medical condition characterized by an extreme enlargement of the breasts in women. This condition often leads to discomfort due to the excessive weight and can result in skin stretching severe enough to cause ulceration [1]. According to Dafydd et al., Gigantomastia is defined as the presence of excessive breast tissue accounting for over 3% of an individual's total body weight [2]. Gestational gigantomastia (GG), initially documented by Palmuth in 1648, is a condition that develops during pregnancy [3-5]. While it typically involves both breasts, it can occasionally affect only one and may sometimes continue after pregnancy [6-9]. The etiology remains unclear, and several theories have been proposed. For example, GG has been linked to the hypersensitivity of breast tissue receptors to gestational hormones and hyperprolactinemia [10].

GG happens in approximately 1/28,000 to 1/100,000 [11]. It is more prevalent in multiparous women [11,12]. It can cause physical and psychological problems that significantly affect a patient's quality of life. Despite this, the treatment methods remain unclear. One of the available options is hormonal therapy. However, surgical treatment such as reduction mammoplasty and mastectomy should be considered if hormonal therapy fails. Given recent advancements in surgical techniques, mastectomies with

reconstruction have become the preferred approach, as they provide improved clinical and psychological outcomes for patients [5].

We present a rare case of GG successfully treated with bilateral skin-sparing mastectomy, followed by reconstruction using the Goldilocks technique, complemented by free nipple grafting.

## CASE PRESENTATION

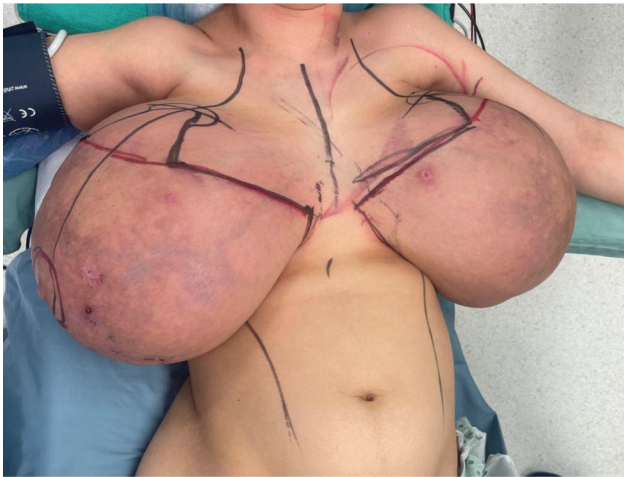
A 29-year-old pregnant woman (Gravida 1, Para 0) presented to our clinic at 23 weeks of gestation with complaints of significant and rapid breast enlargement. This condition has severely impacted her quality of life, manifesting as breast tenderness, severe back pain, dyspnea, poor sleep, and difficulty performing daily activities. She first noticed the rapid increase in breast size at 16 weeks of gestation. There was no significant personal or family history of breast pathology.

Physical examination revealed significant hypertrophy and pitting edema of both breasts, each weighing approximately 7 kg. Additionally, distended and indurated superficial veins were observed, along with areas of skin ulceration.

Breast ultrasound was performed first, given its safety during pregnancy (no ionizing radiation) and its efficacy in evaluating dense breast tissue common in younger and pregnant patients. It demonstrated skin thickening and diffuse hypoechoic areas with distended retroareolar ducts, findings consistent with breast hypertrophy. Mammographic

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**Fig. 1.** T-wise pattern incision marked preoperatively.

evaluation was subsequently performed to complement the ultrasound findings but was limited by technical factors and did not reveal any suspicious lesions warranting further imaging such as MRI. Biopsies of both breast tissue and skin were performed to address the diffuse nature of the findings and ensure adequate sampling but were negative for malignancy. Her blood tests, including prolactin and thyroid function tests, were unremarkable.

The patient did not receive any medical treatment for her condition between the 16th week of pregnancy, when the rapid breast enlargement began, and the time of presentation at 23 weeks. The decision to offer breast surgery was based on the patient's poor quality of life, the presence of skin ulceration, and the significant weight of her breasts, which were abutting her gravid uterus.

Skin markings were made prior to surgery (Figure 1), and the procedure was performed during the second trimester after organogenesis was complete. A multidisciplinary team—including an obstetrician, neonatologist, general surgeon, plastic surgeon, anesthesiologist, and endocrinologist—collaborated in the preoperative planning. The obstetrics and NICU teams were notified and remained on standby to manage potential complications, such as premature labor or fetal distress. To prevent aortocaval compression, the patient was positioned in a supine position with a uterine wedge. Maternal blood parameters, including hemoglobin, coagulation profile, and electrolytes, were optimized preoperatively. Fetal well-being was continuously monitored intraoperatively using fetal heart rate monitoring.

General anesthesia was induced with pregnancy-safe agents, including propofol, rocuronium, and fentanyl. Sevoflurane was used for maintenance due to its minimal risk of fetal exposure.

Intraoperatively, the presence of vessels of varying calibers and significant subcutaneous edema posed challenges to hemostasis. Hemostasis was achieved with a combination of electrocautery, Ligasure, and ligation using Vicryl sutures for larger vessels. Prominent subcutaneous veins contributed to an estimated blood loss of approximately 800 cc.

The mastectomy was performed using preoperatively marked T-wise pattern incisions, facilitating the planned reconstruction. Immediate reconstruction was achieved using the Goldilocks technique, supplemented with free nipple grafting. This approach was deemed optimal as it is



**Fig. 2.** Bilateral mastectomy specimens.

efficient, reduces the risk of intraoperative bleeding, and minimizes anesthesia exposure. Additionally, the Goldilocks technique provides the patient with the option for future reconstructive enhancements, such as the insertion of breast implants, to achieve greater breast volume if desired.

After the bilateral mastectomy, the specimens were weighed in the operating room. Each breast weighed approximately 7 kg (Figure 2). Notably, the anesthesia team had to adjust the rate of intravenous anesthetic medication infusion due to the patient's weight change after the removal of nearly 14 kg from her total body weight. Jackson Pratt (JP) drains were inserted bilaterally.

Compression dressings were applied to the bilateral mastectomy incisions for 24 hours to reduce ecchymosis and edema. Postoperatively, the patient was positioned supine with a slight left lateral tilt, rather than prone, to minimize tension on the surgical sites and promote wound healing. This position also ensured optimal functioning of the JP drains, preventing obstruction and allowing effective fluid drainage.

Mastectomy specimens were sent for pathological studies. The results indicated that the specimens were composed of 90% fibroglandular tissue and 10% adipose tissue. The nodular aspect predominantly displayed lobulated, reddish edematous fibrosis interspersed with areas of fatty tissue. No definitive lesions were identified. Additionally, both breasts exhibited a diffuse, extensive proliferation of small blood vessels throughout the stroma. These findings were consistent with capillary-type angiomatosis.

Postoperatively, the patient experienced a hemoglobin drop, which responded well to the transfusion of two units of packed red blood cells (pRBCs). Her JP drains produced minimal serosanguinous output and were removed on postoperative day two.

Given the intraoperative challenges in achieving hemostasis and the subsequent need for a blood transfusion, deep venous thrombosis (DVT) prophylaxis with anticoagulation was withheld to minimize the risk of further bleeding and additional transfusion requirements. After thorough risk-benefit assessment, this approach was deemed safe as the patient was ambulating independently by postoperative day one. With stable vital signs, minimal incisional pain, and satisfactory recovery progress, the patient was discharged in stable condition on postoperative day two.

At her one-week follow-up, breast examination revealed no signs of infection, and the incisions were healing well (Figure 3). She expressed great satisfaction with both the cosmetic and functional outcomes.



Fig. 3. Post-operative results.

The patient had a full-term, uncomplicated vaginal delivery. Both maternal and neonatal outcomes were favorable, with no reported postpartum complications.

## DISCUSSION

Despite being first described in 1945 by Palmuth, there are less than 100 reported cases of GG in the literature [5]. Even less established is the pathogenesis and etiology of gigantomastia. Many hypothesis have been proposed, such as excessive estrogen or prolactin secretion during puberty and pregnancy [13]. The correlation between increased breast size and the highest levels of gonadotropin in the first trimester supports the excess hormone theory [5]. Although a correlation exists, causation remains unproven, as gigantomastia has been observed in patients with normal hormone values and even in those undergoing hormonal suppression [9,14]. Additionally, some cases have been associated with the use of penicillamine [15]. That said, cases of gigantomastia with normal hormone levels may be attributed to heightened breast sensitivity to hormones [5]. In a case similar to ours, Agarwal et al. reported a case of GG in which the patient exhibited normal prolactin levels [16]. The authors hypothesized that the breast hypertrophy may have been due to estrogen receptor sensitivity to prolactin [16].

Given the uncertainties around GG, it is imperative to consider other diseases before diagnosing benign GG. The diagnoses could be benign, like infectious mastitis, juvenile breast hypertrophy, fibrocystic change, and fibroadenoma [6]. The malignant differential of phyllodes tumor and Inflammatory breast cancer with *peau d'orange* should also be considered [6]. Thus, a thorough workup should be done, including a tissue biopsy. Key histopathological findings on biopsy indicative of GG include acinar fibrosis, abundant stromal tissue, and lymphocytic infiltration [5,10].

Similar to pathogenesis and etiology, the treatment procedures are still disputed. Non-surgical treatment options, though not definitively established, include hormonal therapies such as progesterone, tamoxifen, bromocriptine, and danazol [17]. The most commonly utilized

medication for managing GG is bromocriptine. While it may help stabilize breast size and prevent further enlargement, it rarely restores the breasts to their original size [12,18]. However, when medical treatment is ineffective, or complications such as ulceration and necrosis arise, surgical treatment is indicated as the physical complications associated with GG, such as breast tenderness and back pain, are debilitating [14,19]. Local complications, such as ulceration and severe bleeding, can be critical and, at times, life-threatening. Currently, two surgical procedures are commonly used with direct or delayed reconstruction: breast reduction and mastectomy [19]. The choice between these options depends on several critical factors, including gestational age, risks to fetal development, infectious risks, and physical complications such as breathing difficulties and postural strain. When maternal or fetal danger is suspected, mastectomy is preferred as it is a quicker procedure that minimizes blood loss and reduces fetal exposure to anesthesia. While breast reduction offers better aesthetic outcomes and preserves breastfeeding capability [10], it carries risks such as bleeding due to fragile blood vessels and a 100% recurrence rate with significant hypertrophy in future pregnancies, as residual tissue remains [5].

For women who plan future pregnancies and do not prioritize breastfeeding, bilateral mastectomy with reconstruction appears to be the preferred treatment option [20]. Feng Qin et al. presented a case of GG managed with bilateral mastectomy, followed by tissue expander placement and free nipple grafting [18]. The tissue expanders were replaced eight months later with implants, marking the completion of reconstruction [18].

Ho Yoon Jeong et al. reported the first case of GG treated with total mastectomy and immediate reconstruction using the Goldilocks procedure [21].

Similarly, we present a case of severe GG managed with bilateral skin-sparing mastectomy and immediate Goldilocks reconstruction. The Goldilocks procedure involves creating a dermal flap by de-epithelializing the lower pole of the breast. This flap is then folded inward and sutured to the muscle fascia to reconstruct and shape a new breast mound, enhancing projection.

While this procedure will preclude breastfeeding, we determined it to be the safest option for our patient, particularly given the significant intraoperative blood loss and the challenges with achieving hemostasis.

Additionally, after thorough discussion with the patient, this option offers greater flexibility for future decisions. It will allow the patient to assess her breast morphology and shape post-pregnancy, providing her with the opportunity to select her preferred size and projection when considering future reconstruction options, including implant placement.

## CONCLUSION

Despite the unknown etiology of GG, its adverse psychological and physical effects are well established. Following a thorough workup to rule out underlying disease processes, definitive surgical treatment can be discussed with the patient. Women who desire future pregnancies and do not wish to breastfeed should consider mastectomy, as it carries a significantly lower risk of recurrence. Otherwise, breast reduction may be a suitable option.

## Conflict of Interest

The authors declare that they have no competing interest.



## Informed consent

Written informed consent was obtained from the patient for publication of this case report and accompanying images.

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