

Extreme Oncoplasty; Combining Oncoplastic Techniques for Breast Conserving Excision of A Large Phyllodes Tumor

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ABSTRACT

Phyllodes are large fibroepithelial tumors of the breast that have the potential for rapid growth. Excision with a negative margin is necessary to reduce the risk of recurrence. When the size of the tumor is very large, it is challenging to conserve an aesthetically acceptable breast after excision. Mastectomy with or without reconstruction is a frequently chosen option by breast and plastic surgeons. However, it is associated with higher rates of depression, lower self-esteem, poor quality of life (QOL), and surgical complications. Extreme oncoplasty is a promising surgical concept that has allowed successful large-volume breast conserving surgery (BCS) excision, and reduced the need for mastectomy and the subsequent operations for breast reconstruction. Here, we describe the combined utilization of two oncoplastic techniques to excise a large phyllodes tumor while conserving the breast with an acceptable cosmetic outcome.

Keywords

Breast tumor, Phyllodes, Oncoplasty, Plastic surgery, Breast conserving surgery.

Introduction

Phyllodes of the breast are uncommon fibro-epithelial tumors first described by Johannes Muller in 1838. It accounts for 0.5-1% of all breast tumors [1-3]. It commonly affects premenopausal ladies between 35-40 years of age [1]. They are rarely diagnosed in young adolescents, and treatment varies in the literature [4]. They have high potential for rapid growth, and twenty percent will grow larger than 10cm [5]. The mainstay of treatment is surgical excision with at least 1 cm safety margin. Additional treatment modalities are less efficient, as these tumors are resistant to chemotherapy and radiation therapy. These large tumors represent a significant challenge to the breast surgeon to conserve the breast with an acceptable cosmetic result while achieving a safe margin of excision. If the safety margin cannot be achieved, many will end with a mastectomy, resulting in a negative impact on body image and quality of life [6,7]. Limited reconstructive options have been reported. Some surgeons prefer mastectomy with reconstruction using either an implant or autologous tissues alone

or a combination of both [8-10].

In the modern era of oncoplastic surgery, large excision volumes with the conservation of cosmetically acceptable breasts have become possible with the use of certain reconstructive techniques. We report a case of an adolescent female presenting with a giant phyllodes tumor, successfully treated with an extreme oncoplastic wide local excision. We provide the details and photographs of the operative technique of the reconstruction using a combined round block mastopexy and inferior pedicle mammoplasty as a single-stage procedure to avoid mastectomy.

Case Report

Our patient presented at the age of 13. She was a healthy adolescent with no relevant personal or family history of cancer. She had her first menstruation 2 months before her presentation. She presented to the breast surgical oncology clinic with a 6-week history of a left breast mass that was rapidly increasing in size. No other breast-related symptoms. She was seen by two different surgeons and was offered a mastectomy. However, her parents disagreed and decided to seek a second opinion. Physical examination revealed an obvious discrepancy in the size of both breasts. While the right breast was a size B, non-ptotic, the left breast was a size C,

ptotic, and was occupied by an upper pole mass extending to the retroareolar area, causing the areola to stretch to an 8cm diameter, compared to 4cm on the right side. The mass measured 12 cm x 10 cm in size, and was not attached to the overlying skin, nipple areola complex, or the chest wall (Figure 1). There were no palpable axillary lymph nodes. Ultrasonography showed a circumscribed 12 x 11.4 x 8 cm complex cystic mass with a solid component, suspicious for phyllodes tumor (Figure 2).



Figure 1: Physical examination showing a left breast large mass causing significant asymmetry.

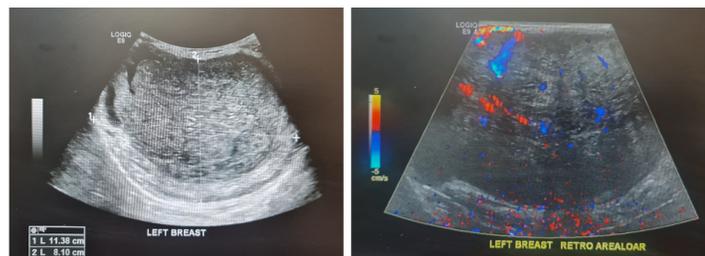


Figure 2: Left breast ultrasound showing the large vascular tumor.

A core needle biopsy revealed a fibro-epithelial lesion with subepithelial cellular stroma favoring a benign/borderline phyllodes tumor.

Considering the patient's age and the fact that it is not a malignant phyllodes, BCS was offered. After discussing the risks and benefits of BCS versus mastectomy with the patient and her parents, they consented to BCS. An oncoplastic wide local excision through a modified round block mastopexy with inferior pedicle mammoplasty was performed. Final histopathology showed a borderline phyllodes tumor, completely excised with negative margins. However, the distance from the tumor to the closest inked margin (anterior) was 5 mm. The surgical pathology result was explained to the patient and her parents. They were informed about the risk of recurrence due to a close anterior surgical margin at the nipple areola complex (NAC), and they were given the options of re-excision of the anterior (NAC) margin or observation. They opted for observation and close follow-up with physical examination and imaging.

Surgical Technique

As shown in Figure 1, the tumor has occupied most of the central part of the breast, displacing the glandular breast tissue posteriorly and stretching the areolar skin. A wide local excision is obviously necessary to achieve a negative margin. However, the difficulty lay in reconstructing the breast and preserving the blood supply to the nipple-areola complex (NAC). What added to the challenge was that the patient and her parents requested the minimal possible hidden scar!

Using a wise pattern mastopexy or vertical scar mastopexy would be the easiest choice to gain access to excise such a large tumor and re-drape the skin over the remaining breast tissue, while preserving the NAC over a vascularized pedicle. However, both techniques would result in significant scarring. Therefore, we decided to modify the technique by utilizing a round-block mastopexy incision to hide the scar in the peri-areolar line, while preserving the NAC over an inferior pedicled flap mammoplasty.

Marking was done preoperatively in the setting position to determine the new location of the NAC and the amount of extra skin to be excised (Figure 3). Measurement was calculated with an intention to preserve more skin than usual, taking into consideration that the patient is at the beginning of puberty. The breast is expected to grow more after removing the suppressing tumor.



Figure 3: Preoperative marking of round block mastopexy of the left breast.

The upper half of the round block marking was incised to gain access to the tumor (Figure 4a). After undermining the superior skin flap, the tumor was dissected from the NAC and remaining breast tissue and completely excised with a surgical margin, along with some peri-areolar skin marking the anterior margin (Figure 4b). The NAC was undermined close to the anterior margin of the tumor and was preserved on an inferior pedicled flap (Figure 4c). The remaining donut skin around the NAC was de-epithelialized (Figure 4d). The glandular breast tissue was re-arranged to fill the cavity and the pedicled nipple flap was centralized into the new NAC location. The round block incision was reduced by a purse string technique using non-absorbable suture to decrease the

chance of NAC stretching as the breast grows (Figure 4e). Eight clockwise interrupted absorbable sutures were used to fix the NAC into the new position, followed by a running subcuticular suture. The final intraoperative result is shown in (Figure 5a, b). The excised tumor measured 10 x 10 x 5 cm. (Figure 6).

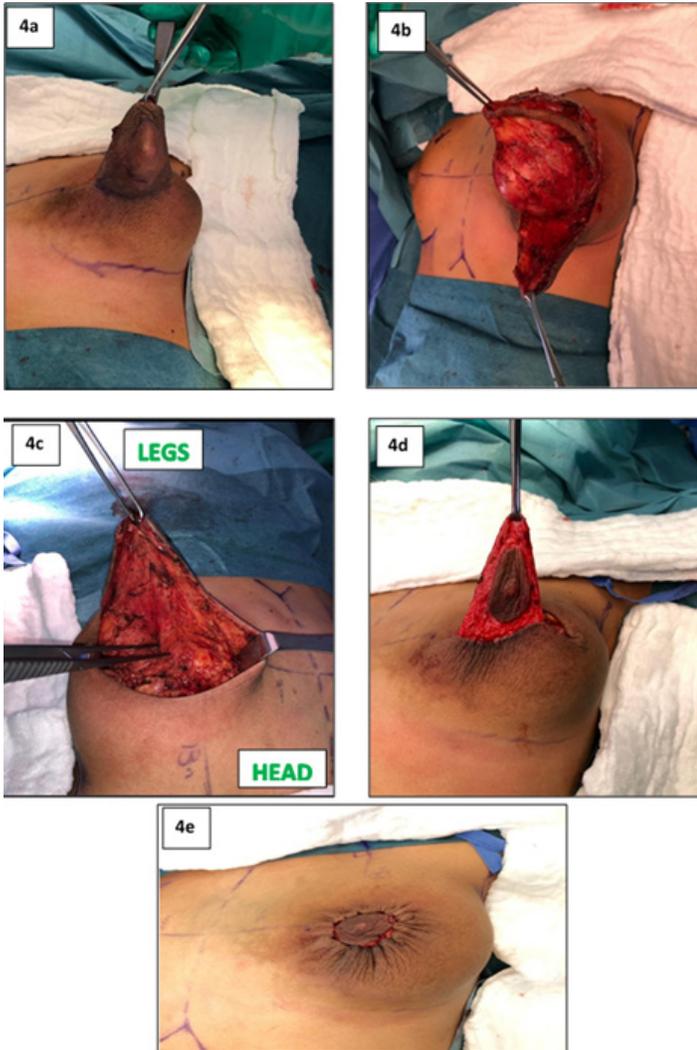


Figure 4: a) Intraoperative technique: a; incision at upper half of the round block, b) excision of tumor, c) NAC preserved on inferior pedicled flap, d) de-epithelialization of donut skin, e) purse string reduction of incision and fixation of NCA in new location.



Figure 5: a) Anterior, and b) lateral views of the final intraoperative result.



Figure 6: The resected tumor with some of the excised peri-areolar skin marking the anterior margin.

Follow up

The patient had a smooth recovery with no postoperative complications. The NAC flap survived with minimal pseudoptosis, which corrected over time (Figure 7). She was followed up on a regular basis for 5 years, with no evidence of recurrence. Annual breast ultrasonography revealed left breast retroareolar post-surgical changes with no evidence of new or recurrent tumors, classified as BIRADS-II (Figure 8). The most recent examination showed that the left breast is slowly catching up with the growing size of the contralateral breast, but still appears smaller, especially after the patient has gained weight. The left NAC had no stretching deformity and was at the same level as the right NAC with preserved sensation (Figure 9a, b). The patient and her parents were satisfied with the results after 5 years, with no recurrence and an acceptable aesthetic outcome.



Figure 7: Three-week postoperative picture, showing smaller left breast with mild pseudoptosis that corrected over time.

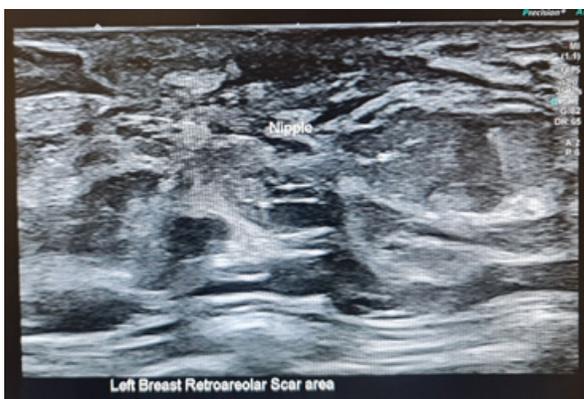


Figure 8: Recent ultrasound of the left breast showing postoperative changes with no recurrence.



Figure 9: Five -years after surgery; anterior and lateral views showing the left breast is still smaller, but NAC is at same level of the right side with no stretching deformity.

Discussion

Phyllodes tumors commonly affect premenopausal women around the age of 35. They are rarely reported in younger adolescents of our patient's age. The youngest patient with Phyllodes tumor found in the literature was a 6-year-old girl, reported by Sasa et al. [11].

Giant Phyllodes tumors measuring 10cm or greater remain a challenge for breast and plastic surgeons. It requires a wide local excision with a sufficient negative margin, given the high recurrence rate. Borderline phyllodes have recurrence rates ranging from 14% to 25%, and transformation to malignant phyllodes is seen in 12% to 54% of cases [12-14]. Considering the high recurrence rate, achieving a margin of safety with wide excision is the most important predictor of a recurrence-free rate, especially for malignant phyllodes [15,16]. According to the National Comprehensive Cancer Network (NCCN), narrow surgical margins are associated with a higher risk of local recurrence. Still, they are not an absolute indication for mastectomy when partial mastectomy fails to achieve a margin width ≥ 1 cm [17]. A published review from the Memorial Sloan Kettering Cancer Center included 293 Phyllodes tumors showed that the local recurrence rate between breast conserving surgery and mastectomy was not statistically significant if margins were adequate [18].

If there is a discrepancy between the tumor and breast size with a poor cosmetic outcome, a simple mastectomy is justifiable. However, patients who receive a mastectomy may feel less attractive, have poor sexuality, and low self-esteem [19]. Around

20% of patients will have unacceptable defects post-breast volume excision [20]. Previous studies have constantly found that women with more extensive surgery report worse quality of life. A meta-analysis conducted by Ng et al. suggested that quality of life and body image outcomes were significantly better for breast conserving surgery compared to mastectomy [21]. In 2020, a cohort study by Rosenberg et al. reported that women below the age of 40 years who had undergone mastectomy had worse body image, sexual health, and anxiety compared to those who had less extensive surgery [22]. In addition, analysis by Aerts et al. revealed that women who undergo mastectomy are at risk for post-operative sexual dysfunctions in terms of desire and arousal [23]. Davis et al. reported that mastectomy was associated with 19% increased risk of depression compared with lumpectomy plus radiation therapy in patients with breast cancer [24]. Arndt et al. showed that patients' quality of life (QOL) is also superior in BCS over mastectomy with respect to physical function, social function, and body image [25]. Jonczyk looked at medical morbidity from the American College of Surgeons NSQIP database over 13 years. The mastectomy group had the highest complication rate at around 6% compared to 2% in the BCS group [26].

Considering all the physical, psychological, sexual, and emotional side effects of mastectomy, switching to oncoplastic breast conserving surgery can be a significant game-changer. The term oncoplastic breast surgery was originally coined in the 1980s, aiming to sustain quality of life with satisfactory breast appearance while achieving oncological effectiveness [27]. The American Society of Breast Surgeons (ASBrS) defines oncoplastic breast surgery as: "Breast conservation surgery incorporating an oncologic partial mastectomy with ipsilateral defect repair using volume displacement or volume replacement techniques with contralateral symmetry surgery as appropriate" [28].

Immediate breast reconstruction improves quality of life and body image with less psychological impact compared to a delayed staged procedure [29,30]. Multiple techniques have been described to reconstruct the breast immediately after the excision of larger breast lesions. These procedures can be either volume displacement or volume replacement techniques, using implants only, autologous tissue, or a combination of both. From case reports and literature review, methods used to reconstruct the breast following excision of giant Phyllodes tumors included musculocutaneous flaps such as latissimus dorsi and rectus abdominis, nipple-sparing mastectomy with implant reconstruction, skin-reducing mastectomy with implant, Wise pattern mammoplasty, and Batwing mammoplasty. Yamamoto and Sugihara applied reduction mammoplasty techniques using superior and inferior pedicles to treat giant benign breast tumors [31]. Beier et al. presented a 17-year-old female with benign Phyllodes treated with reduction mammoplasty and had a good cosmetic outcome 13 years later with no local recurrence [32]. Yilmaz et al. in 2003 excised a Phyllodes tumor using superior pedicle reduction mammoplasty [33]. Erginel et al. performed breast conservative surgery on a 13-year-old girl by mobilizing the areola, using skin flaps, and inserting an implant [5]. Kubo et al.

applied mammoplasty using the inverted T technique with nipple-areolar transplanted as a free graft to excise a giant Phyllodes [34]. Khanal et al. used the Batwing technique as a volume displacement method to excise a 15cm Phyllodes [35]. Ciancio et al. presented a case of a female with a giant Phyllodes tumor (>10cm) excised using skin-reducing mastectomy and reconstruction with implant (Bostwick technique) [36]. Crenshaw et al. treated a Phyllodes tumor with nipple sparing mastectomy and immediate breast reconstruction using saline implant and Alloderm [37]. The “round block” technique, which is also known as donut or Benelli mastopexy, has been used by Khanal et al. and Lovasić et al. to treat large benign multiple or multicentric fibroadenoma [35,38].

Most of the aforementioned oncoplastic techniques result in significantly large, multiple, and obvious scars. When dealing with adolescents, physical appearance plays a major role in their self-esteem and psychological well-being. Less scarring is less traumatic to these young patients. In such situations, extreme oncoplasty is very helpful. “Extreme oncoplasty” is another term developed by Melvin Silverstein [39] to describe a set of different breast-conserving techniques that allow successful wide local excision in selected patients with tumors greater than 5 cm or multifocal/multicentric tumors, who would otherwise receive a mastectomy. Savioli et al. showed that extreme oncoplastic breast conservation surgery is oncologically safe even in patients with large multifocal and multicentric breast cancer [40]. It was evident from Elrahman et al. experience that extreme oncoplasty is a safe and feasible surgical option without compromising aesthetic outcomes with a low complication rate [41]. Koppiker et al. also reported a relatively low rate of overall complications [42,43].

To our knowledge, this is the first case report describing a combination of different oncoplastic techniques to achieve the desired outcome with the least possible scars to avoid mastectomy.

Conclusion

Oncological resection of large Phyllodes tumors while achieving a satisfactory cosmetic outcome can be a unique challenge to breast surgeons. Extreme oncoplasty is a potent surgical tool that can be utilized to avoid mastectomy. A trained breast surgeon should be able to modify or combine different oncoplastic techniques to achieve an outcome that addresses each patient’s needs and wishes, while also maintaining a good quality of life.

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