Bilateral giant juvenile multilobulated fibroadenomas of the breast: a case report

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INTRODUCTION

Fibroadenoma is relatively commonly found in young women, and when it occurs between the ages of 11 and 18 years, it is referred to as juvenile fibroadenoma [1]. The term “giant” is applied when the tumor’s diameter reaches 5 cm or more, its weight exceeds 500 g, or it replaces over 80% of the total breast volume [2]. Typically, giant juvenile fibroadenoma presents unilaterally as a single mass in one breast [3]. While the exact cause remains unclear, this condition has been linked with increased estrogen levels during adolescence [4,5]. Although benign, the tumor can grow rapidly in a short time, sometimes exceeding 20 cm. This can lead to breast asymmetry, nipple retraction, superficial vein dilation, kyphosis, self-consciousness, and anxiety. The risk of malignant transformation in a fibroadenoma is exceedingly low, with reported rates ranging from 0.002% to 0.125% [6]. Diagnosis is effectively achieved through ultrasound and fine-needle aspiration, with treatment involving surgical excision and reconstruction. During surgery, care must be taken to preserve the breast’s appearance and lactation potential. In this report, the authors describe a particularly rare and challenging case in terms of size and morphology relative to other giant juvenile fibroadenoma cases. The patient underwent successful surgical treatment and reconstruction, preserving both the shape and function of the breast.

CASE REPORT

A 21-year-old woman presented with a history of rapidly growing, painless, solid masses in both breasts over the previous 5 years. Upon physical examination, both breasts were found to contain multiple solid masses, exceeding 20 cm in diameter. Examination also revealed expansion of superficial veins but no skin dimpling, ulceration, redness, or nipple inversion. The breasts were symmetrical without ptosis (Fig. 1), and no lymph node enlargement was detected in the axillary or supraclavicular regions. The patient reported experiencing back and bilateral shoulder pain due to the heaviness in her anterior chest. Her height was 134.5 cm, her weight was 53 kg, and her body mass index was calculated to be 29.3 kg/m². She had no significant medical history or family history of breast disorders. Breast ultrasound revealed multiple oval circumscribed hypoechoic masses in both breasts, with nearly the entire breast tis-
sue replaced by the masses (Fig. 2). Fine-needle aspiration was performed, and histological examination confirmed the diagnosis of fibroadenoma. Specifically, given the diameters exceeding 5 cm and the rapid growth beginning at the age of 16 years, the case corresponds to giant juvenile fibroadenoma.

The patient underwent nipple-sparing mastectomy for giant juvenile fibroadenomas in both breasts, with preservation of the skin, nipple-areolar complex, and normal breast parenchymal tissue. An inframammary fold incision was utilized for the surgical approach. During the procedure, multiple well-encapsulated masses, each measuring at least 5 to 10 cm, were scattered throughout the entire breast in a multilobulated, conglomerate configuration, which presented a substantial challenge to the dissection process. From the right breast, a multilobulated conglomerate mass exceeding 20 cm in maximum diameter and weighing 636 g was removed, and a similar mass from the left breast, also over 20 cm in maximum diameter and weighing 752 g, was excised (Fig. 3). The specimens were submitted for histopathological examination, and the diagnosis of giant juvenile fibroadenoma was confirmed a few days later (Fig. 4). The masses did not involve the pectoralis major muscle, which was thus preserved.

After the breast surgery team completed the excision procedure,
the plastic surgery team commenced immediate reconstruction. Due to the size of the excised masses, the post-mastectomy defect was considerable. Additionally, the mastectomy skin flap was markedly thin. To assess tissue perfusion of the mastectomy skin flap, an intraoperative indocyanine green test was employed. The test revealed no areas of significant hypoperfusion that might lead to flap necrosis, so no additional excisions were performed (Fig. 5). The patient, a woman of childbearing age with the intention to have children in the future, expressed a preference to avoid surgery or scarring outside of the breast area. Considering the possibility of recurrence and her reproductive considerations, we opted for implant-based reconstruction. Intramammary fold fixation was performed, and 350-cc Mentor Smooth Round Moderate Plus implants were inserted bilaterally in the prepectoral space. Following surgery, the patient was discharged without complications. The wounds healed completely, and she continues to attend outpatient follow-up appointments (Fig. 6). As of the writing of this report, wrinkles were visible in the nipple-areola complex of the left breast. If recurrence does not occur after adequate follow-up and the wrinkles remain, this can be resolved by inserting a slightly larger implant or performing fat grafting.

Fig. 5. Intraoperative assessment of the nipple-sparing mastectomy flap. The indocyanine green (ICG) test was utilized to visualize tissue perfusion. An ICG image displays no areas of hypoperfusion that could lead to necrosis of the nipple or mastectomy skin. [A] Right breast. [B] Left breast.

Fig. 4. Epithelial hyperplasia in the ductal component of a fibroadenoma, with ducts exhibiting a pericanalicular pattern along with stromal hyperplasia (hematoxylin and eosin stain, × 200).

Fig. 6. Photograph of the patient 5 months after surgery.
DISCUSSION

Giant juvenile fibroadenomas represent only 0.5% of all fibroadenomas. Sosin et al. [3] reported that among these cases, 14.4% present with multiple masses, and 8.5% manifest bilaterally in both breasts. The patient in the present case falls into an exceedingly rare category. Despite their rapid growth to substantial sizes, giant juvenile fibroadenomas are benign tumors. This necessitates differential diagnosis to distinguish them from conditions such as phyllodes tumors, virginal hypertrophy, hamartomas, and carcinomas. Histologically, fibroadenomas consist of both epithelium and stroma and do not exhibit the leaf-like growth pattern characteristic of phyllodes tumors, which aids in their differentiation [7]. Phyllodes tumors are composed of stromal tissue and are predominantly benign, although a minority may be malignant. In contrast, fibroadenomas only very rarely undergo malignant transformation [8].

Giant juvenile fibroadenomas and normal large breasts both involve substantial breast tissue but differ in several key aspects. Giant juvenile fibroadenomas typically appear in adolescents and young women before the age of 20 years and is characterized by rapid and significant enlargement. In contrast, the development of normal large breasts is gradual and proportional to overall body growth, and it is not typically confined to a specific age group. Regarding texture, giant juvenile fibroadenomas are firm, well-defined, and potentially rubbery or hard to the touch. In contrast, normal large breasts tend to be softer with variable textures. On ultrasound imaging, a giant juvenile fibroadenoma often presents as a distinct mass; in normal large breasts, such a mass is less likely to be observed.

The exact cause of fibroadenomas remains elusive, but it is thought that factors such as excessive estrogen stimulation, heightened sensitivity of estrogen receptors, or reduced sensitivity to estrogen antagonists may contribute to the development of the condition [9]. Additionally, fibroadenomas have been linked to genetic syndromes, including Beckwith-Wiedemann syndrome, Maffucci syndrome, and Cowden syndrome [10]. O’Brien and Kowdley [11] noted that the incidence of fibroadenoma was highest among individuals with a body mass index ranging from 25 to 29.9 kg/m². Furthermore, studies have identified being younger than 35 years old as a risk factor for developing fibroadenoma [8]. The patient in this report exhibited both of these risk factors.

In diagnosing fibroadenoma, mammography has limitations in young women due to high breast density and poor image quality. Additionally, mammography carries the drawback of radiation exposure. However, ultrasound has been shown to be superior to mammography in excluding malignancy, with a negative predictive value of 99.5% [12]. Diagnosis is frequently accomplished through fine-needle aspiration biopsy, which is often performed alongside an ultrasound examination. While core needle biopsy is more precise, fine-needle aspiration biopsy is widely preferred for its less invasive approach and the generally lower level of emotional resistance it encounters, especially among young women [13].

Among patients opting for reconstruction, two broad categories of methods can be employed: prosthetic (or implant) reconstruction and autologous tissue reconstruction. Notably, the choice between these approaches following the resection of a giant juvenile fibroadenoma is complex and should be made on an individual basis. While some patients may value the perceived benefits of implant reconstruction, others may prefer the natural feel and potential longevity of autologous tissue reconstruction. The decision between methods should involve thorough discussions between the patient and the surgical team, considering individual goals, expectations, and the characteristics of the fibroadenoma.

Breast implants offer more predictable and consistent outcomes regarding breast shape and size. Surgeons can precisely control the final aesthetic result, which is key to achieving symmetry. Implants allow for customization in size, shape, and projection of the reconstructed breast, allowing patients to meet their desired aesthetic objectives. The incisions for implant reconstruction are often strategically placed to minimize visible scarring, in contrast to autologous tissue reconstruction, which requires harvesting tissue from another part of the body and may result in additional scarring. The choice of reconstruction method and the timing of the procedure can vary, but three common principles should be considered. These include the preservation of lactation function, the maximization of nipple-areolar complex and normal breast parenchymal tissue conservation, and the achievement of symmetry between both breasts.

The recurrence rate of giant juvenile fibroadenoma is generally low. Cowan et al. [14] reported a 3% rate of recurrence in cases with phyllodal features and positive surgical margins, while in a separate study, larger masses over 2 cm exhibited a 15% recurrence rate over 22 months [15]. Recurrence is not significantly influenced by surgical margins, patient age, or the location of the mass. Surgical plans should aim to preserve as much normal breast tissue and function as possible, including the lactation ducts, to minimize the impact on breastfeeding. Conservative surgical approaches, such as partial excision or enucleation, are preferred to minimize the removal of healthy tissue. Surgeons should consider the size, location, and characteristics of the fibroadenoma and utilize preoperative imaging to inform surgical planning, especially to safeguard ductal structures. Regular follow-up is crucial for managing recurrence, with appointments at 4 and 8 weeks postoperatively, every 3 months during the first year, every 6 months in the second year, and then annually [15]. This follow-up schedule was also implemented in our case study.

NOTES

Conflict of interest
No potential conflict of interest relevant to this article was reported.
Ethical approval
The study received approval from the Institutional Review Board of Seoul National University Bundang Hospital (IRB No. B-2401-874-701).

Patient consent
The patient provided written informed consent for the publication and use of her images.

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