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GIANT JUVENILE FIBROADENOMA IN A 12-YEAR-OLD GIRL: A CASE REPORT

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ABSTRACT

The Juvenile Giant Fibroadenoma (JGF) is a rare and benign clinical condition that affects young patients between the ages of 10 and 18. Histologically, it is characterized as a circumscribed lesion with rapid proliferation of the stromal and mammary epithelium, which may be associated with genetic mutations. For diagnosis, clinical and histological evaluation of the lesion is necessary to rule out other breast conditions, such as phyllodes tumor. In this case, it concerns a 12-year-old patient with a large lesion in the right breast, which appeared six months prior to the consultation. Ultrasonographic evaluation revealed a solid, hypoechoic mass with well-defined borders, which, along with the biopsy, confirmed the diagnosis of JGF. Given the characteristics of the lesion and its impact on the patient's life, a surgical approach was chosen, prioritizing the preservation of healthy breast tissue. The excised mass was anatomically analyzed and confirmed the diagnosis of JGF, ruling out other pathologies. Management of this condition requires a personalized approach that considers both the lesion's and the patient's characteristics to balance aesthetic concerns with breast health. In the reported case, the surgical approach resulted in a satisfactory outcome, addressing the medical, aesthetic, and psychosocial needs of the patient. This work, therefore, highlights the importance of early diagnosis and the multidisciplinary approach necessary for treating patients with JGF.

Keywords: Juvenile giant fibroadenoma; Benign breast neoplasm; Adolescent; Breast surgery; Ultrasonography.

INTRODUCTION

Fibroadenoma is a benign breast neoplasm characterized by the abnormal proliferation of epithelial and stromal tissue, representing one of the most common breast lesions in young women, particularly those under 30 years old.[1] These lesions show a preference for the left breast, especially in the upper outer quadrant, although they can occur in any breast region.[2] Simple fibroadenoma, the most prevalent form, accounts for 70% to 90% of cases, typically exhibiting slow growth with an average size ranging between 2 and 3 cm.[3]

A rare and clinically significant variant is the giant juvenile fibroadenoma, which accounts for 0.5% to 4% of fibroadenoma cases and predominantly affects patients aged 10 to 18 years.[4] This form is characterized by rapid growth, reaching diameters greater than 5 cm, a weight exceeding 500 g, or occupying more than 80% of the breast volume.[5] The etiology of giant juvenile fibroadenoma remains incompletely understood, but evidence suggests an association with hormonal imbalances, particularly an increased sensitivity to estrogens.[6,7]

The management of giant juvenile fibroadenoma presents unique challenges due to its potential to cause significant breast deformity, physical discomfort, and substantial psychosocial impact in adolescent patients. The therapeutic approach should consider not only the removal of the lesion but also the preservation of healthy breast tissue and the final aesthetic outcome.[8]

The differential diagnosis includes other benign and malignant breast lesions, such as juvenile phyllodes tumor, breast hamartoma, and, rarely, malignant neoplasms. Therefore, careful clinical, imaging, and histopathological evaluation is essential for accurate diagnosis and appropriate management.[1]

This case report aims to describe the clinical presentation, diagnostic approach, and therapeutic management of a 12-year-old patient with giant juvenile fibroadenoma in the right breast, with a six-month progression, who underwent definitive surgical treatment. Additionally, it seeks to discuss the clinical and psychosocial implications, as well as the therapeutic considerations specific to this age group, contributing to the body of knowledge on this rare and challenging condition.

LITERATURE REVIEW

Fibroadenomas are benign fibroepithelial lesions of the breast, characterized by the proliferation of epithelial and stromal tissue. They are typically found in young women and present as well-circumscribed, mobile masses in the breast. Histologically, they are composed of a biphasic proliferation of epithelial and stromal elements, originating from the terminal duct-lobular units. The size of these lesions typically ranges from 1 to 3 cm, but larger variants, such as giant juvenile fibroadenoma, may occur. Despite their benign nature, fibroadenomas can, in rare cases, present with atypical features, as observed in a case reported in a patient with Li-Fraumeni Syndrome.[9]

Fibroadenomas (FAs) constitute a significant proportion of benign breast lesions, representing approximately 68% of these cases. Their clinical presentation is variable, ranging from asymptomatic lesions to larger tumors that cause breast deformities with considerable aesthetic impact. In imaging evaluation, particularly in ultrasonography, FAs present distinctive features, often described as hypoechoic, well-circumscribed masses with an oval or rounded shape. These ultrasonographic characteristics are crucial for the differential diagnosis and appropriate clinical management of these lesions.[1] Elastography, an emerging imaging technique, has demonstrated high specificity in differentiating between benign lesions, such as fibroadenomas, and malignant lesions, thus complementing conventional ultrasonographic diagnosis.[10]

Giant juvenile fibroadenoma (GJF) represents a rare and clinically significant variant of fibroadenomas, accounting for 0.5% to 2% of all cases. This distinct form is characterized by a lesion with pronounced stromal and epithelial hypercellularity, with dimensions exceeding 5

cm in diameter or a weight surpassing 500g.[5] Histologically, GJFs exhibit a more pronounced proliferation of both the epithelial and stromal components compared to conventional fibroadenomas. Recent genetic studies have identified recurrent mutations in the MED12 and RARA genes in GJFs, suggesting a molecular basis for their distinct growth behavior.[11] Additionally, immunohistochemical analyses have shown increased expression of estrogen and progesterone receptors in these lesions, indicating a possible hormonal influence on their development and growth.[6]

Giant juvenile fibroadenoma (GJF) is predominantly observed in patients aged 10 to 18 years, with an increased incidence in African American women, suggesting possible genetic or environmental factors in its etiology. Clinically, GJFs are characterized by their rapid growth, representing the most common cause of unilateral macromastia in adolescents. The typical clinical presentation includes rapid and asymmetric breast enlargement, often unilateral, which can cause considerable anxiety in patients and their families.[6] Due to their rapid development and large volume, these lesions can reach significant proportions, occasionally associated with complications such as skin ulceration, necrosis, and local venous engorgement. The differential diagnosis includes other breast lesions such as juvenile phyllodes tumor, breast hamartoma, and, rarely, malignant neoplasms, making histopathological evaluation crucial for definitive diagnosis.[12]

The management of giant juvenile fibroadenomas (GJFs) has evolved significantly in recent years, with an increasing trend toward more conservative approaches. The initial evaluation typically includes imaging exams such as ultrasound and, in selected cases, magnetic resonance imaging (MRI). Ultrasound usually reveals a well-circumscribed, hypoechoic mass with smooth borders and posterior acoustic enhancement.[1] Biopsy is often required to confirm the diagnosis and rule out malignancy. Treatment options range from vigilant observation in selected cases to surgical intervention. Surgical techniques such as subareolar enucleation and reduction mammoplasty have been successfully employed, aiming to preserve breast tissue and achieve favorable aesthetic outcomes.[8] Post-treatment follow-up is essential, not only to monitor for potential recurrences but also to assess normal breast development and address any psychosocial concerns. A multidisciplinary approach involving surgeons, radiologists, pathologists, and psychologists is crucial to optimize outcomes and the overall well-being of patients with GJF.

Microscopically, giant juvenile fibroadenoma (GJF) exhibits distinct histological features that differentiate it from conventional fibroadenomas and other breast lesions. A frequently observed characteristic is the presence of usual ductal hyperplasia with micropapillary features, reflecting increased epithelial proliferation in these lesions.[12] This hyperplasia contributes to the structural complexity of the GJF and may play a significant role in its rapid growth. Another notable aspect is the stromal mitotic activity, which is typically low, usually presenting fewer than 2 mitoses per 10 high-power fields.[1] This low mitotic activity is an important criterion in differentiating GJF from potentially more aggressive lesions, such as juvenile phyllodes tumors. Additionally, the stroma of GJF often exhibits hypercellularity and may present areas of myxoid degeneration, features that contribute to the lesion's increased volume.[1] Immunohistochemical evaluation may reveal an increased expression of estrogen and progesterone receptors in both the epithelial and stromal components, suggesting heightened hormonal sensitivity that could

explain the accelerated growth typical of these lesions in adolescents.[6]

Although giant juvenile fibroadenoma (GJF) is generally considered an isolated condition, in rare cases, it may be associated with specific genetic syndromes, thus broadening the differential diagnostic spectrum.[12] Among these are Beckwith-Wiedemann syndrome, characterized by macrosomia and a predisposition to embryonal tumors[13]; Cowden syndrome, associated with mutations in the PTEN gene and an increased risk of benign and malignant breast lesions[14]; Maffucci syndrome, marked by multiple enchondromas and hemangiomas[15]; and McCune-Albright syndrome, which features fibrous dysplasia of the bones and precocious puberty.[16] Additionally, isolated cases of GJF have been reported in patients with Neurofibromatosis type 1 and Li-Fraumeni syndrome.[9] Recognizing these rare associations is crucial for comprehensive clinical management, as it may influence not only the treatment of GJF but also guide the investigation of other potentially associated systemic manifestations, as well as provide a basis for genetic counseling. Therefore, in the presence of a GJF case, particularly when accompanied by atypical clinical features or a suggestive family history, consideration of these rare diagnoses becomes relevant.

CASE REPORT

Patient YVPS, female, 12 years old, without comorbidities, menarche at 10 years, with a family history of benign breast nodule (aunt). She presented to the consultation with a mastologist reporting cyclical breast edema since the age of 11, with spontaneous resolution after menstruation. In June 2024, she noticed progressive growth of the right breast, accompanied by pruritus, local erythema, the appearance of stretch marks, and denied nipple discharge or mastalgia. Upon physical examination, there was breast asymmetry, with the right breast showing significant volume increase, flattened nipple, erythematous skin with fine desquamation, and presence of violaceous stretch marks. The temperature was elevated to touch, but it was painless upon palpation.

Ultrasound (Figures 1 and 2) showed breasts with a predominance of fibroglandular echotexture and moderate fatty replacement. The right breast presented with a nodular lesion (6.8 x 4.5 cm), solid, palpable, hypoechoic, with well-defined margins, and a slight vascular flow inside, involving the lateral quadrants. BI-RADS classification 4A. Given the clinical presentation, the main diagnostic hypothesis was juvenile giant fibroadenoma. Surgical resection was recommended due to the large size of the lesion (Figure 3).

Figure 1 and 2 – Preoperative Ultrasound

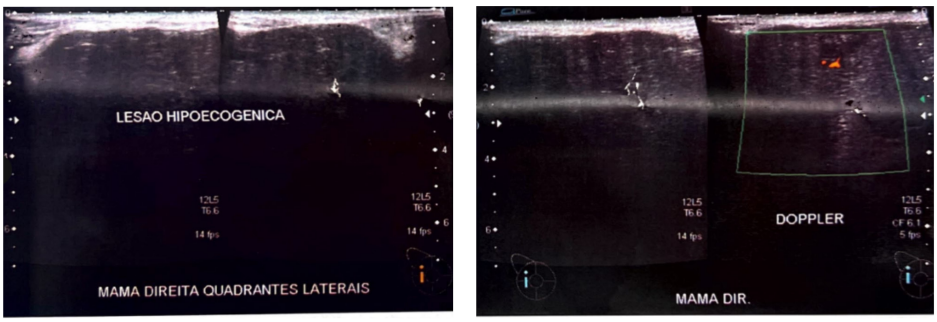
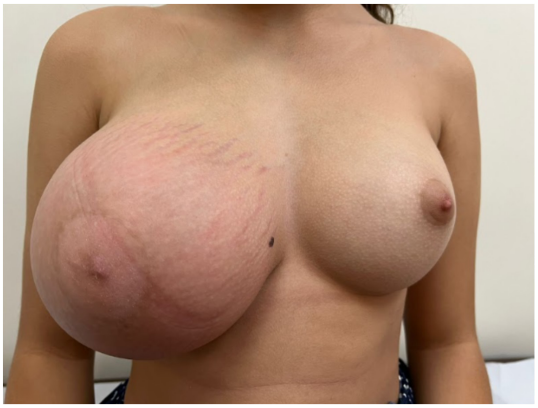
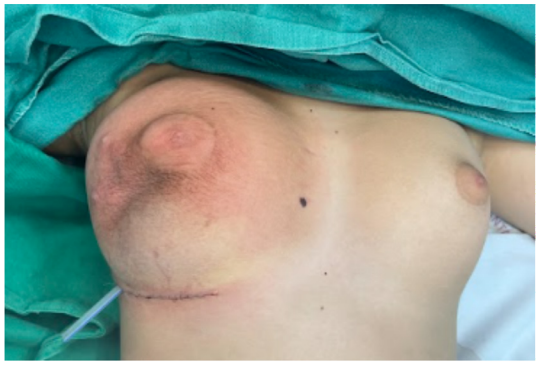


Figure 3 – Lesion before surgical excision



The chosen surgical technique was a simple mastectomy with preservation of the skin and the areolar-papillary complex. The incision was made in the inframammary fold, as it provides an excellent aesthetic result and facilitates future reconstruction if necessary, in addition to reducing the risk of contractures (Figure 4).

Figure 4 – Immediate result after excision.



Macroscopically, the specimen received in formalin consists of a segment of tissue with a nodular shape, brownish-white coloration, and rubbery consistency, measuring 14.5 x 13.0 x 3.8 cm at its largest dimensions (Figures 5 and 6). Upon sectioning, the surface appears homogeneous, solid, and brownish-white. Part of the material was submitted for histological examination (5 blocks; 5 fragments), using hematoxylin and eosin (H&E) staining. The histological analysis of the surgical specimen showed benign breast tissue with a nodular, pseudo-encapsulated arrangement, exhibiting loose, delicate fibrocellular stroma, sometimes with a reticulated pattern and slight increase in cellularity surrounding glandular spaces. These spaces are lined by a dual population of cells with various shapes, including rounded, oval, or narrowed, collapsed lumens with a cord-like pattern. The histopathological findings are consistent with a giant juvenile fibroadenoma.

Figure 5 and 6 – Surgical specimen

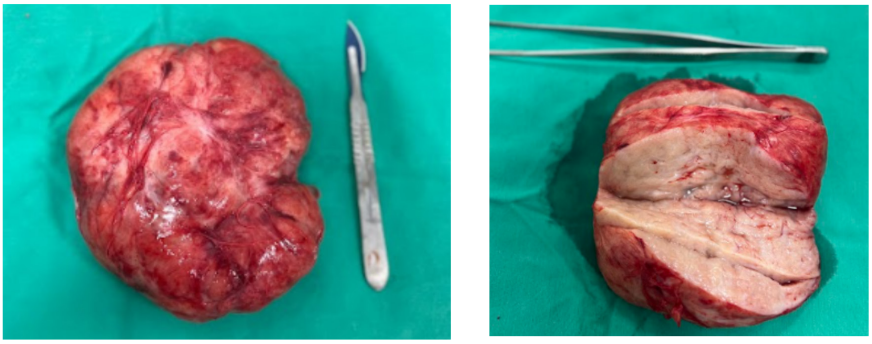
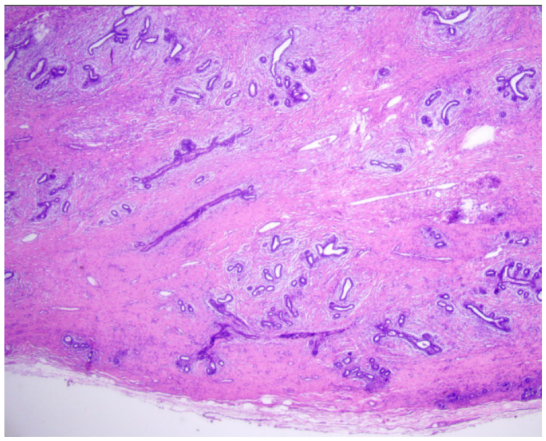


Figure 7 – Histopathological slide showing a well-circumscribed fibroadenoma, hypercellular stroma, and pericanalicular growth pattern.



Figures 8 and 9 – Histopathological slide at higher magnification, highlighting hypercellular stroma and pericanalicular growth pattern.

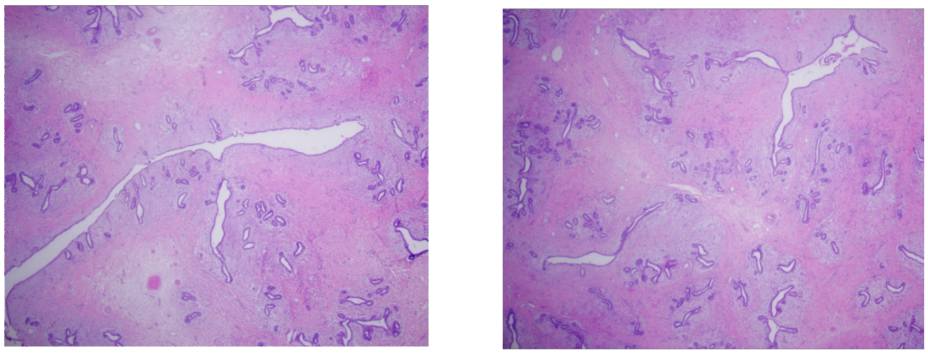
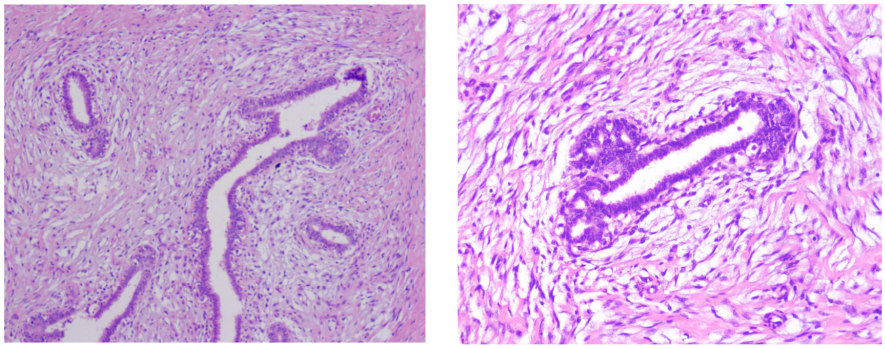
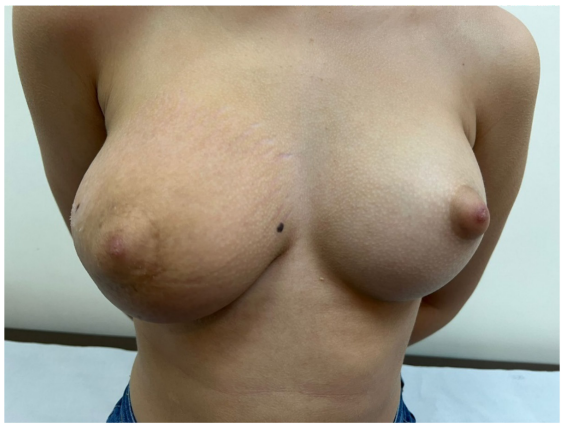


Figure 10 – Histopathological slide showing increased stromal cellularity, pericanalicular growth pattern with conspicuous epithelial hyperplasia, as well as ducts with micropapillary hyperplasia.



In the late postoperative period, approximately two weeks after the surgical resection, the patient showed satisfactory healing, and the right breast exhibited a significant reduction in volume (Figure 11).

Figure 11 - Late postoperative period.



DISCUSSION

The case report presents a typical example of juvenile giant fibroadenoma (JGFA), a rare variant of fibroadenoma that poses a significant diagnostic and therapeutic challenge, particularly in adolescent patients. The patient's clinical presentation, with rapid and unilateral breast growth, is consistent with the typical characteristics of JGFA described in the literature.[5]

The patient's age (12 years) falls within the most commonly affected age range for JGFAs, which spans from 10 to 18 years.[4] The history of cyclic breast edema prior to the rapid growth could suggest increased hormonal sensitivity of the breast tissue, a factor often associated

with the development of JGFAs.[6]

The ultrasound findings observed in this case, including a solid, hypoechoic, and well-defined nodular lesion, are typical of JGFAs and align with descriptions found in recent studies.[1] The BI-RADS 4A classification, indicating a low suspicion of malignancy, is appropriate for this type of lesion, although it highlights the importance of histopathological confirmation.

The decision to perform surgical resection was based on the significant size of the lesion (6.8 x 4.5 cm) and the aesthetic and potentially psychological impact on the patient. This approach aligns with current recommendations for the management of large-volume JGFAs.[8] However, it is important to note that more conservative techniques, such as subareolar enucleation, have been increasingly successfully employed in selected cases, aiming to preserve breast tissue and optimize aesthetic outcomes.[6]

Post-operative management and long-term follow-up are crucial aspects that deserve attention. Monitoring normal breast development, evaluating potential recurrences, and providing psychological support are essential elements in the ongoing care of these patients.

This case contributes to the body of knowledge on giant juvenile fibroadenomas (FGJs) by emphasizing the importance of early diagnosis, careful imaging evaluation, and appropriate surgical approach. Additionally, it highlights the need for a multidisciplinary approach in managing these lesions, involving breast specialists, surgeons, radiologists, pathologists, and, when necessary, geneticists and psychologists.

Future studies focused on minimally invasive surgical techniques and understanding the molecular mechanisms underlying the development of FGJs may help further improve the management of this rare but clinically significant condition.

CONCLUSION

Giant juvenile fibroadenoma is a rare condition that, due to its rapid growth and potential aesthetic and psychosocial impact, requires early diagnostic intervention and assertive therapeutic management. Existing literature suggests that whenever possible, surgical resection with preservation of breast tissue and the areola-papillary complex is the recommended approach, to minimize deformities and functional complications. The surgical treatment in this patient proved effective, achieving both aesthetic and functional goals. The patient is satisfied and showing good clinical progress.

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