Coc Cer Derg/Turkish J Ped Surg 2022;36(3):6-11
doi: 10.29228/JTAPS.63033

Research Article

Çocuk Cerrahisi Dergisi
Turkish Journal of Pediatric Surgery
Volum 36
Number 3
2022

Outcomes in Paediatric Patients Presenting with a Complaint of Breast Swelling: A Retrospective Single-centre Study

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ABSTRACT

Objective: Although malignancy is very rare in paediatric breast lesions, the presence of breast swelling is generally worrying for patients and their families. Breast masses affect approximately 2% to 3% of females in childhood . However, the rate of breast swelling associated with normal pubertal development in children admitted to hospital with a complaint of breast swelling is unknown. This study aimed to retrospectively examine the diagnoses of children presenting with a complaint of breast swelling.

Methods: A retrospective sample comprising the medical case records of paediatric patients (N=50; male:13; female: 37; mean age: 13.2 years old) admitted to the Mustafa Kemal University hospital with a complaint of breast swelling between April 2017 and December 2021 was included in the study

Results: For males, the most common cause of breast swelling was normal pubertal development (53.8 %; n=7), followed by gynecomastia (30.7%; n=4), and neonatal breast hypertrophy (15.3%; n=2). For females, the most common cause of breast swelling was a mass in the breast (35.1%; n=13), followed by a breast cyst (16.2%; n= 6), normal pubertal development (29.8%; n=11), and finally asymmetric breast development (18.9%; n=7). The majority of cases (86%; n=43) were treated conservatively; the remainder (14%; n=7) underwent surgical treatment.

Conclusion: There is a wide spectrum of diagnoses in children presenting with a complaint of breast swelling, most of them are benign. It should be kept in mind that anxious patients who present with a complaint of breast swelling may only be experiencing normal pubertal development. Although all the patient cases examined in the present study involved benign masses, it is important to plan diagnosis and treatment without delay to ensure the early diagnosis of malignant diseases.

Keyword: *Children, Breast swelling, Normal pubertal development, Fibroadenoma*

Received / Geliş: 17.06.2022
Accepted / Kabul: 08.11.2022
Published Date: 15.12.2022

Cite as: Atıcı A, Çelikkaya ME, Korkmaz İK, Akçora B. Outcomes in Paediatric Patients Presenting with a Complaint of Breast Swelling: A Retrospective Single-centre Study. Coc Cer Derg/Turkish J Ped Surg 2022;36(3): 6-11.

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Introduction

Although malignancy is very rare in paediatric breast lesions, the presence of breast swelling is generally worrying for patients and their families[1, 2, 3]. Children generally present with new-onset pubertal-related breast development or a palpable mass such as fibroadenoma, these tend to be benign[1, 4, 5]. If children present complaining of such a mass related to breast swelling, then the consistency and size of the mass, duration, associated symptoms (weight loss, fatigue, fever, skin changes, nipple discharge, lymphadenopathy), details about menarche, history of previous trauma to the area, and known malignancy or chest radiation history is essential for diagnosis[1–5]. Breast masses affect approximately 2–3% of females in childhood [1]. However, the rate of breast swelling associated with normal pubertal development in children admitted to hospital with a complaint of breast swelling is unknown. The majority of such lesions are benign; the incidence of breast cancer in children is very rare (0.02%)[1, 5]. This study aimed to retrospectively examine the diagnoses of children presenting with a complaint of breast swelling.

Methods

The study was approved by the Ethics Committee of Mustafa Kemal University (02/06/2023-05). The study used a retrospective sample comprising the medical case records of paediatric patients (*N*=50; male: *n*=13; female: *n*= 37; mean age: 13.2 years old) admitted to the Mustafa Kemal University hospital with a complaint of breast swelling between April 2017 and December 2021. The masses were evaluated via physical examination, ultrasonographic imaging (USG), and pathological results if surgical treatment was performed. Patients who were operated on by a non- paediatric surgeon and who were not subject to follow-up were not included in the study. Demographic data (age at surgery, gender, medical history, family history of breast disease, mass size, and accompanying symptoms) were electronically collected. Statistical analysis was performed using the SPSS statistical package (version 18.0) (SPSS, Inc, Chicago, IL). All numerical data are expressed as means (SD) or percentages. The between-group categorical variables are expressed as n (%).

Results

For males, the most common cause of breast swelling was normal pubertal development (53.8 %; n=7), followed by gynecomastia (30.7%; n=4), and neonatal breast hypertrophy (15.3%; n=2). For females, the most common cause of breast swelling was a mass in the breast (35.1%; n=13), followed by a breast cyst (16.2%; n= 6), normal pubertal development (29.8%; n=11), and finally asymmetric breast development (18.9%; n=7). On physical examination, 13 of the patients had a palpable solid mass. There were solid masses in the left breast in five patients (left upper quadrant in three patients, the retroareolar region in one patient, and the left lower quadrant in one patient.) and in the right breast in eight patients (right upper quadrant in five patients, the retroareolar region in one patient, and the left upper quadrant in two patients). The ultrasound findings of patients with solid masses indicated fibroadenoma (rubbery, smooth-sided); the smallest was 6 mm and the largest was 7 cm. The ultrasound findings of patients with cysts indicated the presence of simple cysts; the smallest was 5 mm and the largest 15 mm. The ultrasound findings of our patients with gynecomastia indicated fibroglandular tissue. The majority of cases (86%; n=43) were treated conservatively; the remainder (14%; n=7) underwent surgical treatment. In patients with a solid mass, surgical treatment was performed if the size of the mass was >3 cm. Conservative follow-up was performed with patients with smaller solid masses. In patients with cysts, the largest cyst size was 15 mm; all cases were treated conservatively. Surgery was recommended and performed on seven patients who had a solid breast mass of >3cm. Of the seven patients who underwent surgery, the masses were on the right side in four patients and on the left side in three patients. In one of the patients who underwent surgery for a mass in the right breast, a new mass was detected in another location 3 cm below the identified mass (also in the right breast; 1.5 cm in size). Other than that, no recurrence or the discovery of a new mass was not observed in our patients. The follow-up duration was between 3 months and 4 years (median= 36 months). Patients with a mass of <3 cm were called for follow-up every three months; follow-

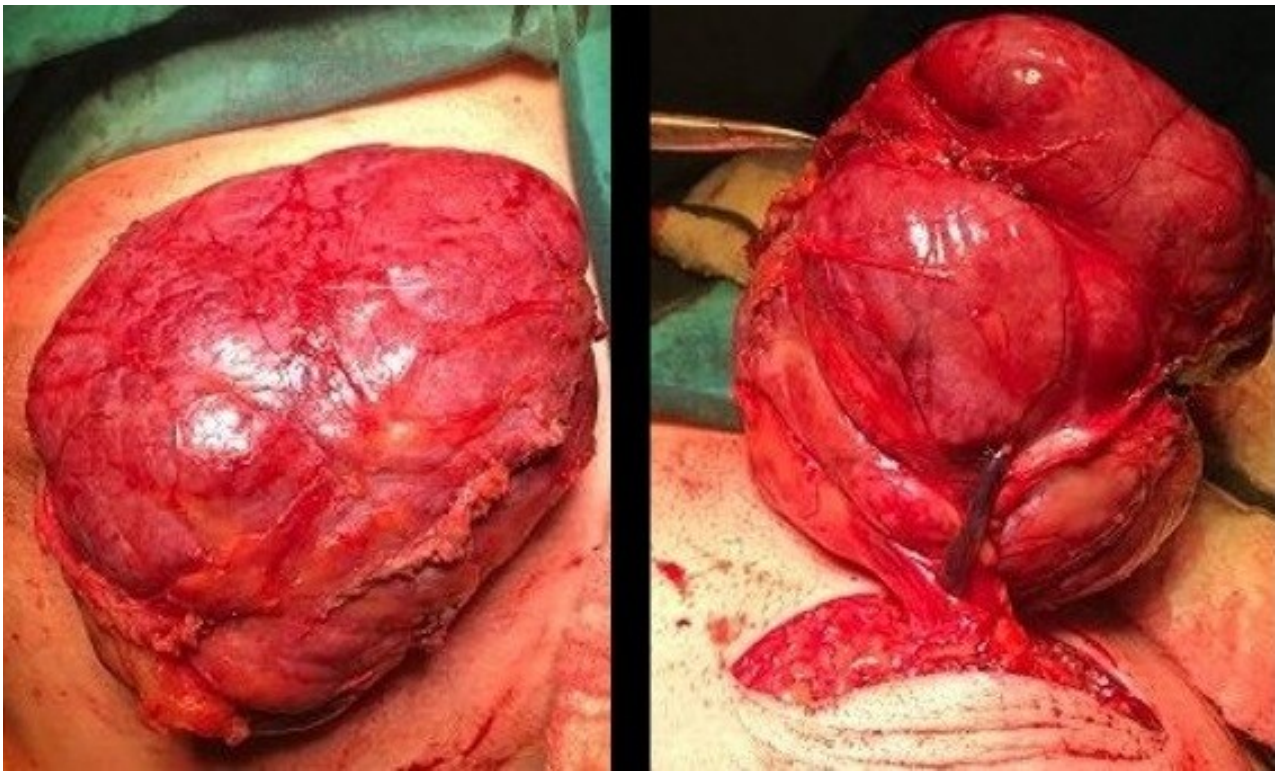

Figure 1. A case of fibroadenoma, the most common cause of breast masses in women.

	Female		Male	
	n	%	n	%
Number of patients	37	100	13	100
Puberty	11	29.8	7	53.8
Gynecomastia		-	4	30.7
Breast mass	13	35.1	-	-
Breast cyst	6	16.2	_	-
Asymmetric breast development	7	18.9	_	_
Neonatal breast hypertrophy	-	-	2	15.3

Table 1. Breast mass diagnoses in the paediatric patient sample

up was also recommended in the case of a sudden change in the size of the mass.

Patients who were called for follow-up every three months were evaluated in the outpatient clinic using ultrasonographic imaging and physical examination. To date, in the follow-up periods, the masses persisted at <3 cm in size; no patients have required surgery to date.

The pathology results of the patients who underwent operations indicated that fibroadenoma was the most common cause of the masses (85.7%; n=6) (see Figure 1), followed by benign phyllodes in the

remainder (14.3% (n=1). The diagnoses of male and female patients are summarised in Table 1.

Discussion

There are many clinical diagnoses for paediatric patients who present with symptoms of breast swelling, and most masses are benign[1]. In patients with a mass detected via physical examination, it is estimated that more than 90% of the masses found are fibroadenoma[1, 2, 5]. Differential diagnosis in patients with breast swelling during childhood should consider normal puberty development, neonatal breast hypertrophy, benign masses (fibroadenoma, phyllodes tumours, haemangioma, vascular malformation), fibrocystic changes, malignant tumours (secretory breast carcinoma, rhabdomyosarcoma, fibrosarcoma, leiomyosarcoma and angiosarcoma), and metastatic lesions, lymphoma, neuroblastoma, hepatocellular carcinoma[1, 2, 5, 6].

It was notable that although 29.8% (n=11) of the patients were diagnosed as undergoing normal pubertal development, 18.9% (n=7) had asymmetric breast development where one breast is larger than the other (or perceived to be so by the patient); such patients also present with a high degree of anxiety on admission.

Although fibroadenomas typically occur in adolescents, they can also be seen in premenarchal girls and boys[1, 5]. Fibroadenomas occur as rubbery, smooth-sided, painless, mobile masses[2]. There may be more than one lesion in a single breast or they may be present bilaterally[1]. Fibroadenomas are usually 2–5 cm in size and tend to grow slowly; fibroadenomas may rarely regress[1, 5, 7]. A conservative treatment follow-up study reported that 48% of such lesions resolved spontaneously, 33% were excised, and 19% persisted throughout the study [8]. In the present study, among the patients who were followed up for fibroadenoma, none of the masses resolved spontaneously. The decision to treat fibroadenoma conservatively or surgically depends on the patient. Asymptomatic patients with a clinical suspicion of fibroadenoma can be followed-up safely without surgery[4, 7]. Surgical treatment is recommended for patients with markedly growing lesions, patients with a known cancer history, severe anxiety in the patient and family, and patients with significant risk factors for malignancy[4, 7]. The patients included in the present study had a known and none of them had a family history, an anamnesis of malignancy, or the risk factors mentioned above. Physical examination requires a complete examination of the axilla and both breasts. On examination, the size of the mass, its firmness, border regularity, mobility, skin changes, nipple retraction, nipple discharge, inflammatory changes, and palpation of the axillary, cervical, and supraclavicular lymph nodes are also important [2].

Phyllodes tumours are fibroepithelial tumours that can be benign, borderline, or malignant according to their histopathological features[1, 2, 9, 10]. Phyllodes tumours affect approximately one in 100,000 children[4]. Phyllodes tumours are the second most common malignancy (after invasive carcinomas), accounting for 22–39% of all paediatric breast malignancies [1]. Clinically, phyllodes tumours usually appear as rapidly growing masses >6 cm [1, 3, 9]. In order to differentiate between a phyllodes tumour and fibroadenoma, while core needle biopsy is rarely performed in children, direct surgical treatment is recommended in children to avoid repeated traumatic procedures [2, 3]. In the present study, the benign phyllodes tumour detected in one patient was surgically excised; no recurrence was encountered during the two-year follow-up observation period.

USG is preferred as the primary imaging method after physical examination in patients presenting with a complaint of breast swelling[2]. Mammography is not effective and is rarely used in paediatric and adolescent populations due to dense breast tissue [5, 6]. Computed tomography (CT) has no role in the evaluation of breast masses in paediatric patients due to the risks associated with the use of radiation. Magnetic resonance imaging (MRI) can be used in patients where it is necessary to evaluate vascular and lymphatic malformations, chest wall lesions, or lesions involving multiple anatomical spaces[1, 5]. In the present study, the diagnosis of our patients was achieved via physical examination and USG. None of the patients required the use of other imaging methods such as CT or MRI. BI-RADS (Breast Imaging-Reporting and Data System) is routinely used in the adult population to standardise the classification of adult breast lesions by the probability of malignancy based on specific mammogram, ultrasound, and MRI findings. However, BI-RADS is not routinely used in paediatric patients because the risk of malignancy is much

lower than in adults, and few studies have examined its applicability in children [8].

Fibrocystic changes in the breast in children — the second most common breast lesion after fibroadenomas — are not typically seen in the first decade of life and are thought to be caused by estrogen and progesterone imbalances[8]. These cysts may become tender and enlarged according to the menstrual cycle. Conservative treatment and rarely oral contraceptives are recommended [1]. Simple cysts, galactoceles, retroareolar (a cyst of Montgomery) and macrocysts should be considered in the differential diagnosis[1]. In the present study, all patients (n=6) with simple cysts were followed up conservatively; none needed surgery during the follow-up period.

Neonatal breast hypertrophy is a common condition in newborns in the first week of life. It occurs secondary to high circulating prolactin levels triggered by a decrease in maternal estrogen at the end of pregnancy [1, 11]. It can affect male and female newborns and may be self-resolving [1, 11, 12]. Stimulation or massage of the breast can lead to persistent hypertrophy or neonatal mastitis and abscess formation. Therefore, non-invasive observation is recommended[11]. In the case of neonatal mastitis or abscess, intravenous antibiotics are preferred[11]. In rare cases of abscess, ultrasound-guided aspiration is recommended [1, 11]. Rarely, incision and drainage may be required [12]. In the present study, two patients with neonatal breast hypertrophy were treated conservatively and their complaints regressed with non-invasive observation. No patients required drainage or surgical treatment.

Pubertal gynecomastia affects 64% of all males and typically occurs between 6 months and 1 year after the onset of puberty [1, 13]. Pubertal gynecomastia is benign and usually resolves after 1–2 years [1]. The exact cause is unknown[1, 13]. Pathological gynecomastia accounts for 2–3% of all gynecomastia cases; some abnormalities such as tumours and hyperthyroidism may be present; causes include testicular trauma, drugs such as spironolactone, anabolic steroids, and cannabis; or it may be idiopathic [1]. Rarely, mastectomy may be required for selected cases [1]. However, none of the patients in the present study required a mastectomy.

Conclusion

There is a wide spectrum of diagnoses in children presenting with a complaint of breast swelling; most of them are benign. It should be kept in mind that anxious patients who present with a complaint of breast swelling may only be experiencing normal pubertal development. Although all the patient cases examined in the present study involved benign masses, it is important to plan diagnosis and treatment without delay to ensure the early diagnosis of malignant diseases. In the present study, all the patient cases in which the breast mass was surgically excised were benign; fibroadenoma was found to be the most common breast mass. Despite its merits, the retrospective data on which the present study was based, and the small patient sample are acknowledged as shortcomings.

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