CASE REPORT

A Chest Lump in a Toddler – A Report on Approach in Primary Care.

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Abstract
A chest wall lump is an uncommon clinical finding often indicative of underlying pathology, including abscesses, trauma, congenital deformities, or malignancy. Therefore, a systematic approach to evaluation is crucial. One such rare congenital anomaly is a bifid rib, typically asymptomatic but occasionally presenting as a palpable chest wall mass, potentially leading to unnecessary imaging or concern. Additionally, bifid ribs may coexist with syndromic conditions such as Gorlin syndrome, which is linked to an increased risk of skin malignancies. We present a rare case of a 4-year-old girl with a firm, immobile swelling in the right anterior chest wall, raising a diagnostic dilemma regarding the necessity of imaging. Given the clinical characteristics, radiological assessment was pursued, and a plain chest radiograph confirmed the diagnosis of a right bifid rib. This case highlights the importance of careful clinical evaluation and judicious use of imaging to avoid over-investigation while ensuring accurate diagnosis. Furthermore, we propose an evidence-based algorithm for evaluating chest wall lumps in primary care settings to inform clinical decision-making.

Keywords: *Anterior chest wall lump, Approach, Bifid Rib, Gorlin syndrome.*

Introduction

The evaluation of a chest wall lump in primary care requires a systematic approach to differentiate benign from potentially serious conditions. Chest wall masses may arise from a variety of aetiologies, including infectious, traumatic, congenital, or neoplastic causes [1]. While many lumps are benign, such as lipomas, fibromas, or congenital anomalies like bifid ribs, some may indicate malignancies, including soft tissue sarcomas or metastatic lesions [2]. The causes may also include bony growth, either benign causes (such as chondroma, fibrous dysplasia) or malignant (such as Ewing sarcoma or osteosarcoma) [1,2]. A thorough history and physical examination are essential in determining the need for further diagnostic imaging or specialist referral. Key clinical features, such as rapid growth, pain, systemic symptoms, fixation to underlying structures, or concomitant enlarged axillary lymph nodes, may warrant advanced investigations, such as ultrasonography, radiography, or cross-sectional imaging [3]. In primary care, establishing an evidence-based algorithm for assessing chest wall lumps can aid in optimizing diagnostic accuracy, minimizing unnecessary imaging, and ensuring timely intervention when required.

Congenital anomalies of the rib can be categorized into structural or numeric problems. Numeric abnormalities include the presence of an extra or absent rib, while structural abnormalities involve bifurcated, fused, hypoplastic, or forked ribs [4]. A bifid rib is a congenital abnormality of the anterior chest wall where the sternal end of the rib is divided into two. It is a rare congenital rib defect, occurring in approximately 1.2% of the population, and typically involves only a single site on the rib [4-6]. Bifid ribs most commonly affect a single rib and are usually asymptomatic, with the third and fourth ribs being the most frequently involved. In most cases, the diagnosis is made incidentally through an X-ray, although some patients may present with chest wall abnormalities [4,5]. If left uninvestigated, this chest wall swelling might cause confusion or concern for the patient or parents regarding its underlying cause.

The presence of a chest wall lump in a child often raises significant parental concern, as it may be perceived as a sign of a serious underlying condition, particularly malignancy. While most chest wall lumps in paediatric patients are benign, distinguishing them from neoplastic or infectious causes is crucial [7]. Parental anxiety is often heightened when the lump appears firm, immobile, or rapidly enlarges, prompting urgent medical consultations and requests for imaging [8]. Despite the rarity of malignant chest wall tumours such as Ewing sarcoma or rhabdomyosarcoma, healthcare providers must balance the need for thorough evaluation with the avoidance of unnecessary radiation exposure from imaging [9]. Clear communication and reassurance, combined with an evidence-based diagnostic approach, can help alleviate parental worries while ensuring appropriate clinical management.

Case presentation

A 4-year-old girl with no known medical illness was brought to a health clinic with a complaint of a right chest wall lump for almost one year, which had remained unchanged in size. She had no history of trauma, recent infections, or a family history of malignancy. However, the parents were worried due to the persistent nature of the condition, causing them to request further assessment. They have sought multiple opinions from other local clinics but were advised to observe and refer if persistent.

On examination, there were no abnormalities of the face or limbs. The child's anthropometric measurements were within normal ranges. Chest wall examination revealed a swelling over the anterior right chest wall, located medially and below the right nipple, as shown in Figure 1 and 2. The swelling was hard in consistency, approximately 4 cm x 5 cm in size, non-tender, and immobile. No axillary lymph nodes was palpable.

Although our initial clinical assessment suggested a benign condition, we opted for further imaging study due to its hard consistency. The one-year history of the swelling presented as a diagnostic challenge whether it represented a static anomaly or a progressively enlarging mass, such as a tumour. A plain chest radiograph revealed a bifid rib involving the anterior part of the right 5th rib (Figure 3). As the patient was asymptomatic with no other remarkable findings, no treatment was necessary at this time. Regular follow-up was planned to monitor for any future complications. Reconstructive surgery may be considered later if indicated. The parental worries were resolved, and the unnecessary tertiary referral has been avoided. However, we advised the family to return promptly should any new symptoms, changes in the mass, or concerns arise.

Discussion

Chest wall tumours are rare in infants and children; however, a significant proportion up to 50-70% are malignant. They most commonly present as a palpable mass, with pain or respiratory distress occurring less frequently. Therefore, most parents feel worried and request further referral or assessment. Radiographic evaluation should commence with chest radiographs, followed by computed tomography (CT) scan if clinically indicated [10].

Most clinical guidelines and literature propose obtaining an adequate history and performing a physical examination at the primary care level as the initial approach, as illustrate in Figure 3. This includes assessing the onset—whether it has been present since birth or acquired—and determining if it is stable or progressive [1,7,8]. It is important to evaluate other associated symptoms that might indicate infection rather than congenital deformities, such as fever, night sweats, pain, or redness. A history of recent injury or falls may suggest that the lesion could be a hematoma, soft tissue injury, fracture, or even malunion of the bone in cases of long-standing trauma [1,7,8]. A positive family history, meanwhile, may support the presence of congenital anomalies or cancer. Notably, asymptomatic masses may still represent malignancy, particularly if progressive [1,7,8].

In our case, we have a clear-cut history indicating that the mass is asymptomatic. However, its recent onset—within the past year—leaves us in a dilemma as to whether it exhibits benign or alarming features. During further clinical assessment, the patient should undergo a general examination to identify any abnormal vital signs. Anthropometric measurements should focus on signs of failure to thrive or underweight status, which may suggest malignancy or a chronic infection such as tuberculosis. Determining the exact location of the mass, its consistency, and any surrounding abnormalities including presence of palpable lymph node is crucial in assessing whether conservative management is appropriate [1,7,8]. In this patient, the lump was firm in consistency, but no other alarming findings were present. We had a strong clinical suspicion that the mass originated from bone; however, we were unable to confirm its nature. Due to our concerns, along with the parents' worries, we opted for an initial radiograph to further characterize the mass. Furthermore, at this age, there is still possibility of bone tumour such as fibrous dysplasia or chondroma [1,2].

Imaging findings suggestive of malignancy include a moth-eaten or permeative pattern of bone destruction, an adjacent soft-tissue mass, and invasive periosteal reactions such as onion-skin or spiculated patterns [11]. None of these features were present in our case, allowing us to confidently diagnose a benign condition—rib bifurcation, or bifid rib.

A bifid rib is a rare congenital abnormality of the anterior chest wall, typically an incidental finding and usually asymptomatic. It may be associated with a rare autosomal dominant condition known as Gorlin-Goltz basal cell nevus syndrome, which is characterized by multiple naevoid basal cell carcinomas, jaw cysts, and bifid ribs [1,5,6]. Some studies have also reported associations with Job’s syndrome and Kindler syndrome [6]. Under

normal conditions, ribs develop from the costal processes of the thoracic vertebrae. Embryologically, the development of bifid ribs is unclear but is likely caused by incomplete fusion of the cephalic and caudal segments of the sclerotome [4,6]. Bifid ribs most commonly involve the third and fourth ribs and predominantly affect the right side [6].

The diagnosis of bifid ribs can generally be made using a plain chest radiograph. In some cases, patients present with a noticeable anterior chest wall abnormality, as observed in our case. However, patients are often asymptomatic unless they exhibit clinical signs of Gorlin syndrome, which is characterized by a range of developmental abnormalities and a predisposition to basal cell carcinoma (BCC), a form of skin cancer [12]. In our case, the patient exhibited no other characteristics of Gorlin syndrome, and genetic testing was not performed due to logistical issues. However, given that adolescence and early adulthood are the most sensitive periods for diagnosing Gorlin syndrome, there remains a possibility for her to develop signs and symptoms in the future. The median age of onset for basal cell carcinoma (BCC) in Gorlin syndrome is approximately 25 years [12]. As in the algorithm, regular follow-up is essential to ensure early detection and prevention of complications, including missed diagnoses of Gorlin syndrome in this case.

Conclusion

Bifid rib is a rare finding in daily clinical practice, and most patients remain asymptomatic. A thorough history and complete physical examination are essential to distinguish benign from malignant features. Primary care physicians should be familiar with the characteristic imaging findings of this malformation, particularly on plain radiographs. When rib anomalies are identified, comprehensive screening for associated anomalies or syndromic conditions is warranted. Regular follow-up is recommended for all cases to monitor for serious complications, thereby ensuring optimal prognosis and quality of life.

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Authors' contribution:

MSE contributed to the study conceptualization, manuscript editing and finalisation. MYC was responsible for writing the case report and collecting clinical data.

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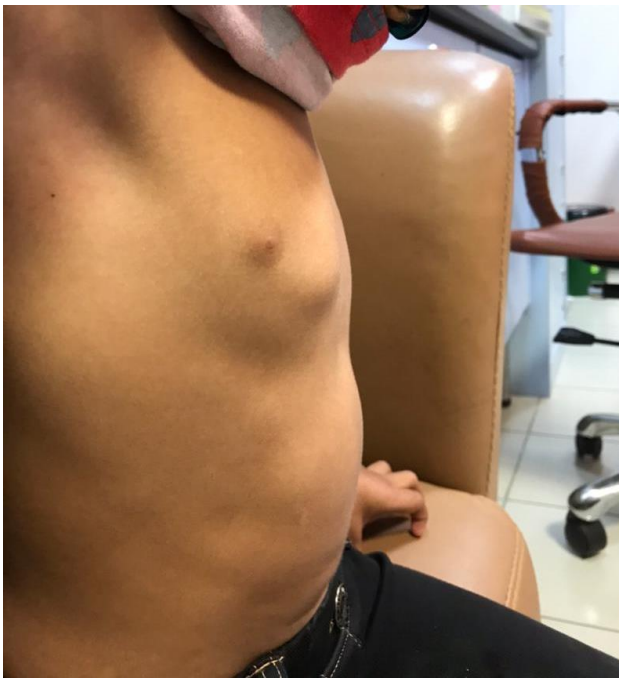

Figure 1. Lateral view of the anterior chest wall reveals the prominent swelling just below the right nipple

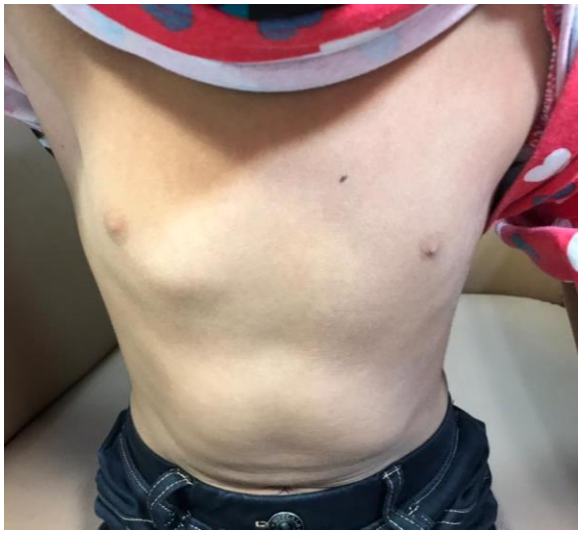

Figure 2. Anterior view of the chest wall

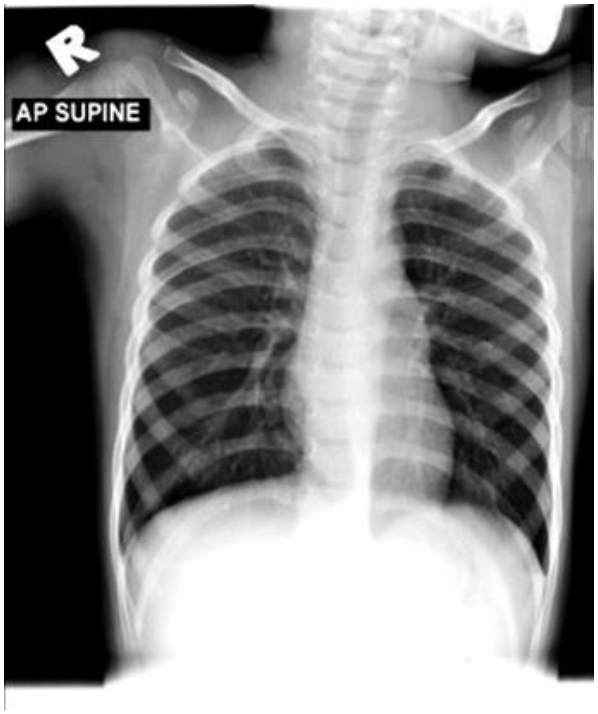

Figure 3. The chest X-ray in anteroposterior view confirmed the presence of the bifid rib of anterior fifth rib.

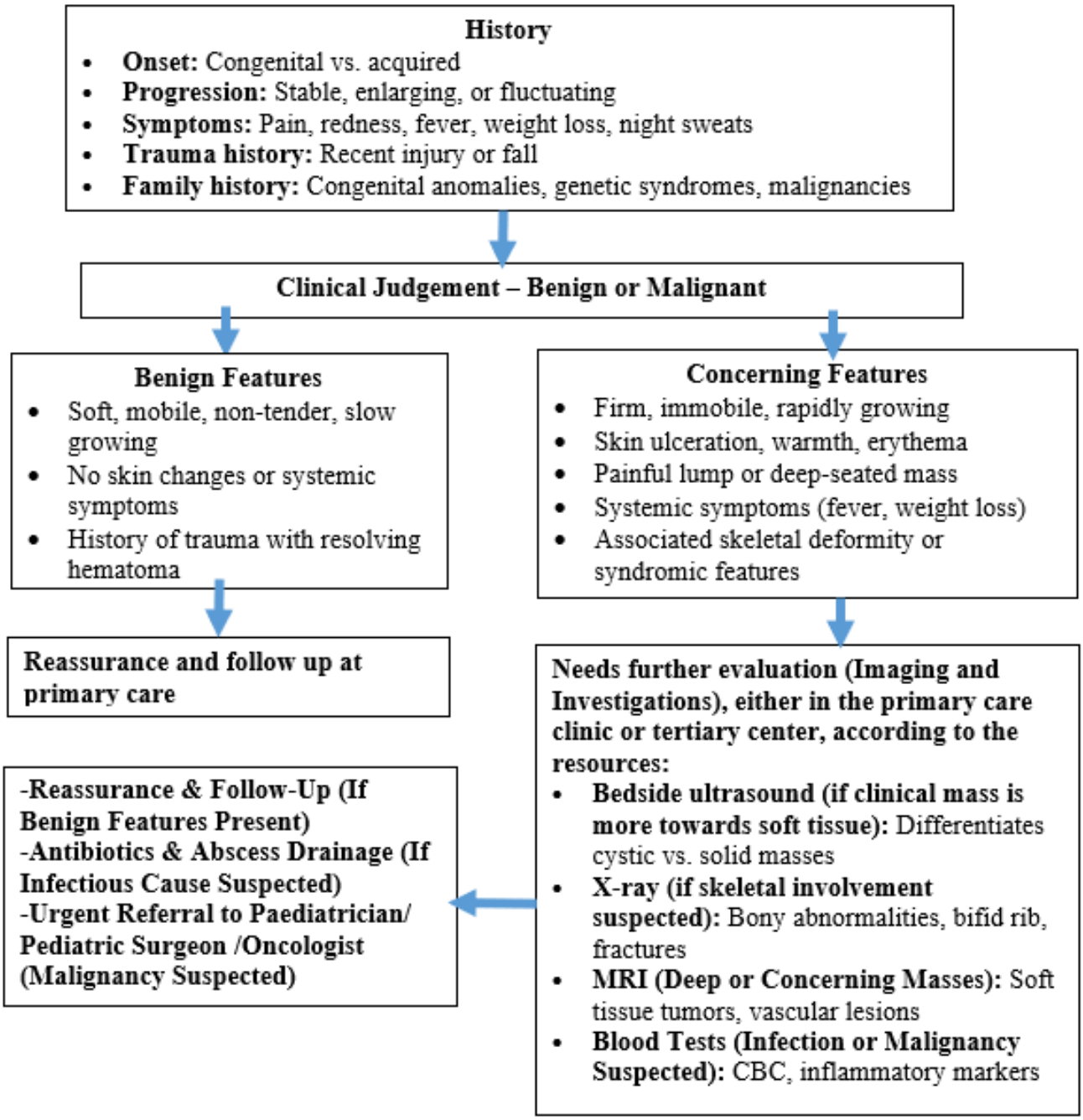

Figure 4. Algorithm of Approach of Chest Wall Lump in Toddler, at Primary Care Level.

References

[1]. Brown J, Harave S. Diagnostic imaging of benign and malignant pediatric soft-tissue masses. Pediatr Radiol. 2020;50(3):408-421. doi:10.1007/s00247-019-04567-8

[2]. Flis CM, Connor SEJ. Imaging of head and neck soft tissue lumps. Clin Radiol. 2019;74(1):16-27. doi:10.1016/j.crad.2018.09.006

[3]. Singh A, Chatterjee D, Bansal V, Singla V, Radotra BD, Dhir R. Evaluation of soft tissue tumors: A histopathological and immunohistochemical perspective. J Cancer Res Ther. 2021;17(6):1382-1389. doi:10.4103/jcrt.JCRT_593_21

[4]. Zeeshan S, Hussain SN, Mughal Z, Anwar SS, Naeem SN. Bifurcated rib with vertebral defects–A rare anatomical variant: Case report with literature review. International Journal of Surgery Case Reports. 2020 Jan 1;67:203-6.

[5]. Scheepers S, Andronikou S. Beware the bifid rib!: pictorial interlude. SA Journal of Radiology. 2010 Dec 1;14(4):104.

[6]. Rathinasabapathi MK, Perumallapalli LH. Bifid rib: A rare anomaly. Medical Journal of Dr. DY Patil University. 2015 Sep 1;8(5):670-1.

[7]. Brown J, Harave S. Diagnostic imaging of benign and malignant pediatric soft-tissue masses. Pediatr Radiol. 2020;50(3):408-421. doi:10.1007/s00247-019-04567-8

[8]. Stieber JR, Dormans JP. Manifestations of pediatric chest wall tumors. Clin Orthop Relat Res. 2018;466(12):3113-3126. doi:10.1007/s11999-008-0497-2

[9]. Davies HR, Reule CA, McHugh K. Imaging of paediatric soft tissue lumps. Clin Radiol. 2019;74(6):417-428. doi:10.1016/j.crad.2018.12.013

[10]. Shamberger RC, Grier HE. Chest wall tumors in infants and children. Semin Pediatr Surg. 1994 Nov;3(4):267-76. PMID: 7850367.

[11]. ZSun Y, Liu X, Pan S, Deng C, Li X, Guo Q. Analysis of imaging characteristics of primary malignant bone tumors in children. Oncol Lett. 2017 Nov;14(5):5801-5810. doi: 10.3892/ol.2017.6939.

[12]. Mehta DN, Raval N, Patadiya H, Tarsariya V. Gorlin-Goltz Syndrome. Annals of medical and health sciences research. 2014;4(2):279-82.