Case Report

Self-Limiting Sternal Tumour of Childhood: a case report

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Keywords

Sternal mass; SELSTOC; ultrasound; paediatrics

Abstract

A child presenting with a sternal mass is rare. Here, we present a case report of a toddler with an acute sternal mass. At first, antibiotics were started as the differential diagnosis included osteomyelitis. However, the combination of young age, typical clinical characteristics and dumbbell-shaped appearance on ultrasound led to the diagnosis of self-limiting sternal tumour of childhood. To prevent invasive diagnostic interventions and unnecessary treatment, it is important to be able to identify the clinical features and ultrasound characteristics of this benign entity.

Case presentation

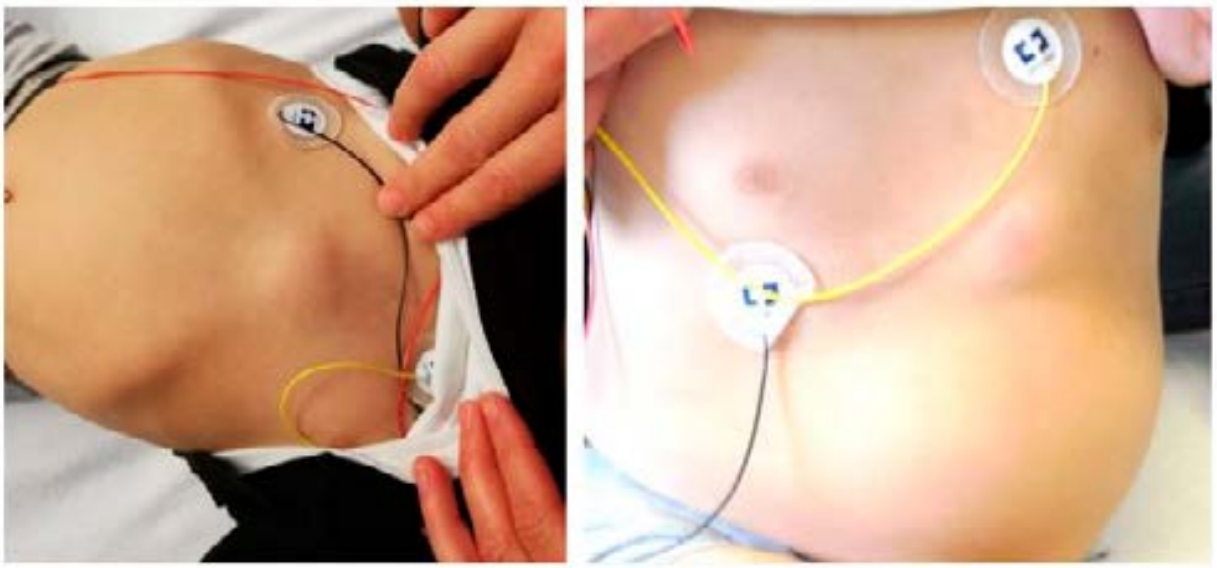
A 3-year old girl presented to the emergency department with signs of bronchitis. The evening before presentation, the parents had noticed a sternal swelling located at the xiphoid process. There was no history of trauma, she did not have a fever, nor was there a history of weight loss. On clinical examination, there was a solid swelling and the overlying skin had a red appearance (figure 1). Palpation seemed painful. No other abnormalities such as hepatosplenomegaly or lymphadenopathy were found.

Diagnostic evaluation demonstrated a marginally elevated C-reactive protein (13,6 mg/L, normal range <5,0 mg/L). X-ray imaging performed in the context of her respiratory symptoms revealed presternal tissue swelling without any periosteal reaction (figure 2 - A). On ultrasound, a hypo-echoic, sharply demarcated swelling of the soft tissue caudal to the sternum was observed. The lesion was dumbbell-shaped with a presternal, subcutaneous component and a spur to a retrosternal component (figure 2 - B). There was no sign of inflammation nor was there internal vascularization. With an abscess and osteomyelitis in the differential diagnosis, it was decided to commence with intravenous Amoxicillin/Clavulanic acid. To further investigate the lesion, an MRI (magnetic resonance imaging) was performed that demonstrated a structure on the caudal side of the sternum with a subcutaneous component which was connected to a smaller intrathoracic component without intrapleural or intrapericardial extension (figure 2 – C). Considering these imaging results, the relative asymptomatic presentation of the lesion and the typical dumbbell-sign on ultrasound, the diagnosis of Self-Limiting Sternal Tumour of Childhood (SELSTOC) was made. Antibiotics were stopped and she was discharged. The swelling disappeared spontaneously within a month after diagnosis. Repeat ultrasound examinations every two months demonstrated spontaneous involution of the lesion within 6 months after diagnosis.

Discussion

Sternal masses are infrequently encountered in childhood. Differential diagnosis is varied and includes both benign and malignant causes, as demon-

Figure 1 : *Sternal mass with red discoloration of the skin*



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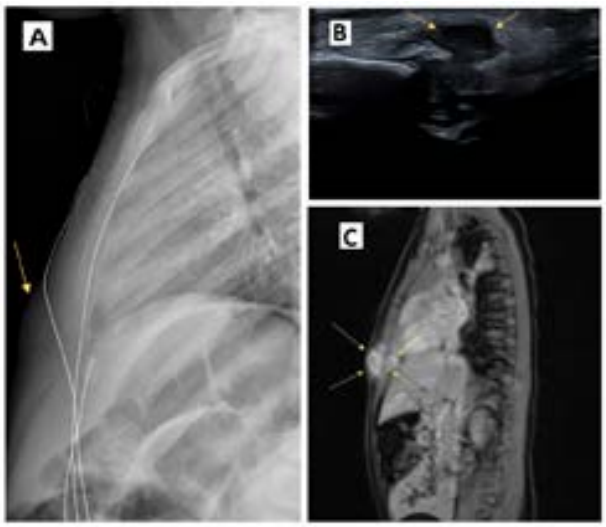

strated in table 1. Sternal tumours may arise from various tissues such as the subcutaneous soft-tissue, cartilage, bone or extra-pleural region. They may also arise from systemic diseases affecting connective tissue (1-3).

Rapidly growing sternal masses may raise the suspicion of malignancy, possibly leading to the performance of invasive diagnostic procedures. In a case series regarding self-limiting sternal tumours of childhood (SELSTOC) from 2010, it was reported that among approximately 1200 newly diagnosed paediatric malignancies in the Netherlands, there were no sternal malignant tumours (3). Therefore, to prevent unnecessary biopsies and invasive surgery, it is important to be able to distinguish malignant from benign processes. Self-limiting sternal tumours of childhood are benign processes that are asymptomatic and do not show any signs of local or systemic inflammation, in contrast with osteomyelitis. The aetiology is still unclear. As patients most often have no history of infection, trauma or neoplasms, it is postulated that the most likely aetiology is an aseptic inflammatory reaction to a stimulus of unknown origin such as a mild trauma (4). Another hypothesis applicable to our case is that the coughing associated with bronchitis led to raised intrathoracic pressure, thereby causing herniation of mediastinal fat (5). Median age is reported to be 16 months with a range between 7 and 50 months (3).

Ultrasonography is considered the most appropriate imaging examination for the diagnosis, even though most previously published case reports reported using other additional forms of radiological techniques such as CT, most likely due to a lack of knowledge regarding the existence of SELSTOC. Ultrasound is a non-invasive method which does not require sedation, as often needed for CT or MRI imaging in toddlers. However, to diagnose SELSTOC, paediatric radiologists should be aware of it and should look for the typical ultrasound findings, which include a dumbbell shape with a retrosternal component, a neck between the sternum and the cartilage of the adjacent rib, and a presternal component. Colour doppler ultrasound does not show any significant internal vascularisation, in contrast with abscesses that are known to show thicker, more echogenic contents with profuse vascularity (5, 6). Having had no knowledge of the specific ultrasound characteristics of SELSTOC, we decided upon performing an MRI to further investigate the lesion to rule out osteomyelitis. However, osteomyelitis would have shown either irregular margins or cortical irregularity on ultrasound (7). Therefore, retrospectively, performing an MRI would have not been necessary, had we known what to look for.

Literature regarding management of SELSTOC is rare and mainly consists of case reports. It is suggested that the combination of young age, sternum-related localization, rapid growth, typical radiological findings, lack of general illness and lack of other abnormalities on physical examination and biochemical evaluation justifies a wait-and-see approach. Close monitoring by repeat ultrasound is advised, especially in the first weeks after presentation. One case series from 2013 suggested a first follow-up ultrasound after 2-3 weeks, the next 1 month later and widening intervals thereafter (8). Spontaneous resolution is expected after an average of 6 months.

Conclusion

In conclusion, our case of a young child with a benign sternal aseptic inflammation represents an entity named SELSTOC. By recognizing the combination of young age, typical clinical characteristics, and typical dumbbell-shaped appearance on ultrasound, unnecessary diagnostic procedures and treatment may be prevented.

Informed consent

The family provided verbal consent to publish, and identifying information was excluded from the manuscript.

Conflict of interest

The authors have no conflicts of interest to declare.

REFERENCES:

1. Ketharanathan, N., te Winkel, M.L., Lequin, M.H., van den Heuvel-Eibrink, M.M. Een zuigeling met een sternale zwelling. Ned Tijdschr Geneeskd. 2011; 155: A3981.
2. Baez, J.C., Lee, E.Y., Restrepo, R., Eisenberg, R.L. Chest Wall Lesions in Children. American Journal of Roentgenology. 2013; 200: W402-W419.
3. Te Winkel, M.L., Lequin, M.H., de Bruyn, J.R., van de Ven, C.P., de Krijger, R.R., Pieters, R., et al. Self-Limiting Sternal Tumors of Childhood (SELSTOC). Pediatr Blood Cancer 2010; 55: 81-84.
4. Alonso Sanchez, J., Gallego Herrero, C., Garcia Prieto, J., Cruz-Conde, M.C., Casado Perez, C., Rasero Ponferrada, J., et al. Self-limiting sternal tumors of childhood (SELSTOC): a diagnostic challenge. Radiologia 2020: S0033-8338(20)30064-3.
5. Verhaeghe, L., & Herman, M. Subacute Sternal Mass in Childhood. Journal of the Belgian Society of Radiology. 2019; 103(1).
6. Grover, D.S.B., Rai, D.V., Grover, D.H., Kumar, D.D., Kundra, D.R., Gautam, D.V., Devra, D.A.G. Imaging diagnosis of sternal tuberculosis – A report of two cases of the ancient disease with a new demeanour. Radiology Case Reports 2021; 16: 3125 – 3133.
7. Eyer, M.M., Constatinescu, M., Sendi, P. Primary sternal tuberculosis: a case report and review of the literature. JMM Case Reports 2014; 1 (2).
8. Ilivitzki, A., Sweed, Y., Beck, N., Militaianu, D. Sternal pseudotumor of childhood. Journal Ultrasound Med 2013; 32: 2199-2203.