J Pediatr Res 2025;12(1):48-51
DOI: 10.4274/jpr.galenos.2025.90836

Case Report

Chest Wall Mass in a Healthy Infant: Considering Self-Limiting Sternal Tumors of Childhood (SELSTOC)

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ABSTRACT

Chest wall tumors, especially those with rapid growth are one of the main reasons for consultation due to their risk of developing into a threatening situation. Differential diagnosis must be made regarding osteoarticular infections, inflammatory or connective tissue diseases and bone, vascular or muscle neoplasm in this region. Self-limiting sternal tumors affect children below two years of age, having a benign origin, typical ultrasound image and complete clinical recovery with conservative management within 1-3 months. We present a new case with this condition and make a brief review of recent publications in the literature.

Keywords: Tumor, sternal, children

Introduction

Sternal masses are not frequent in children and include a variety of benign bone cyst, fibrous dysplasia, osteoblastoma, osteochondroma, and venolymphatic malformations among others, or malign (Ewing's sarcoma, Langerhans histiocytosis, chondrosarcoma or soft tissues sarcomas) tumors as well infectious or inflammatory diseases such as arthritis, recurrent chronic multifocal osteomyelitis or anatomical variants of the ribcage. We present a case in a toddler aged 8 months with a non-painful, palpable and inflamed sternal lesion who was finally diagnosed with self-limiting sternal tumors of childhood (SELSTOC) after repeated ultrasound studies and progressive involution of the mass after careful and patient follow-up.

Case Report

An 8.5-month-old girl who came to the emergency room showed a 2.5x2.5 cm supraxiphoid mass of solid consistency along with mild skin erythema around it (Figure 1). She had no fever and her parents explained that the erythema had grown quickly over the previous 5 days. A blood test was ordered and no alterations in hemogram, but elevated pro-inflammatory biomarkers were observed; the erythrocyte sedimentation rate was 56 mm/h and C

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Received: 16.10.2024 **Accepted:** 23.01.2025 **Epub:** 25.02.2025 **Publication Date:** 17.03.2025

Cite this article as: Sanz-Santaeufemia FJ, Gato Moro B, Rozas Gómez I, García Talavera ME, Calleja Gero ML, Retuerta Oliva A. Chest wall mass in a healthy infant: Considering self-limiting sternal tumors of childhood (SELSTOC). J Pediatr Res. 2025;12(1):48-51

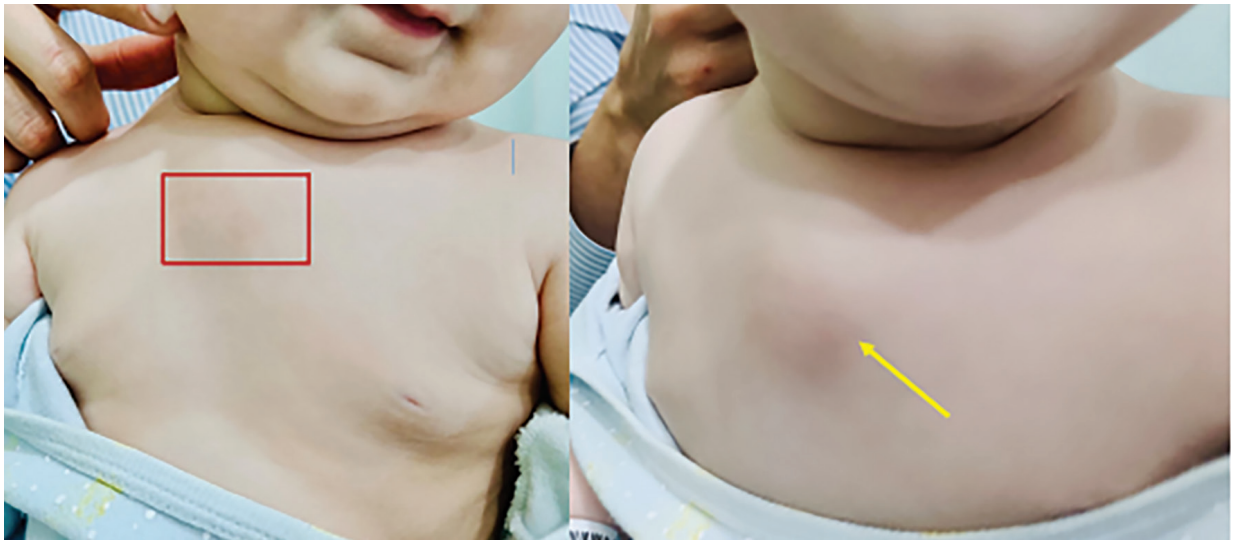

Figure 1. Sternal mass over 2.5 cm of diameter (square) with mild erythema around it (arrow)

Reactive protein was 3 mg/dL. In a chest X-ray, no unusual findings were seen.

The thoracic ultrasonography showed a dumbbell-shaped hypoechoic non-vascularized image with the following measurements: 10x4 mm on the left side and 8x4 mm on the right (Figure 2), which had no connection to the skin and did not affect the underlying bone and muscle. Despite being apyretic, the infant received endovenous cefotaxime as the initial therapy for osteoarticular sternal infection.

The radiologist warned that the image was highly suggestive of SELSTOC, recommending a new ultrasound study after a further 48 hours. In this second study, a slight decrease in the size of the lesion (8x3.3 mm and 7x3 mm for left and right sides respectively) was seen, and so the antibiotic therapy was removed given the low likelihood of osteomyelitis and a new appointment in 3 weeks at the outpatient level was proposed in order to conduct another ultrasonography. At this follow-up ultrasonography, the practical disappearance of the tumor previously seen in ecography was observed (Figure 3) and the chest wall tumor was mildly palpable and nearly unappreciable, confirming the suspected diagnosis from one month earlier.

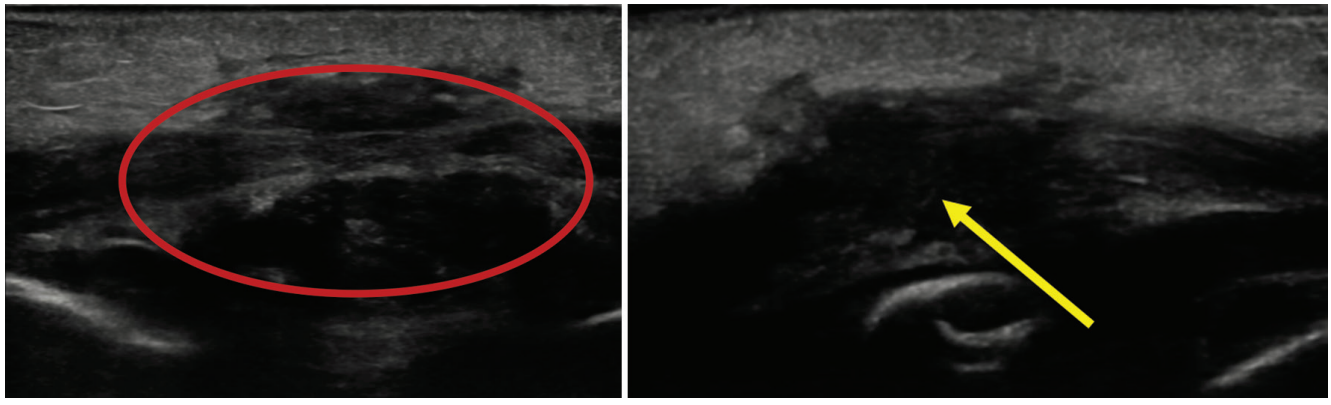

Figure 2. Dumbbell-shaped hypo-echoic and avascular lesion (arrow) with integrity of bone and muscle structures (circle)

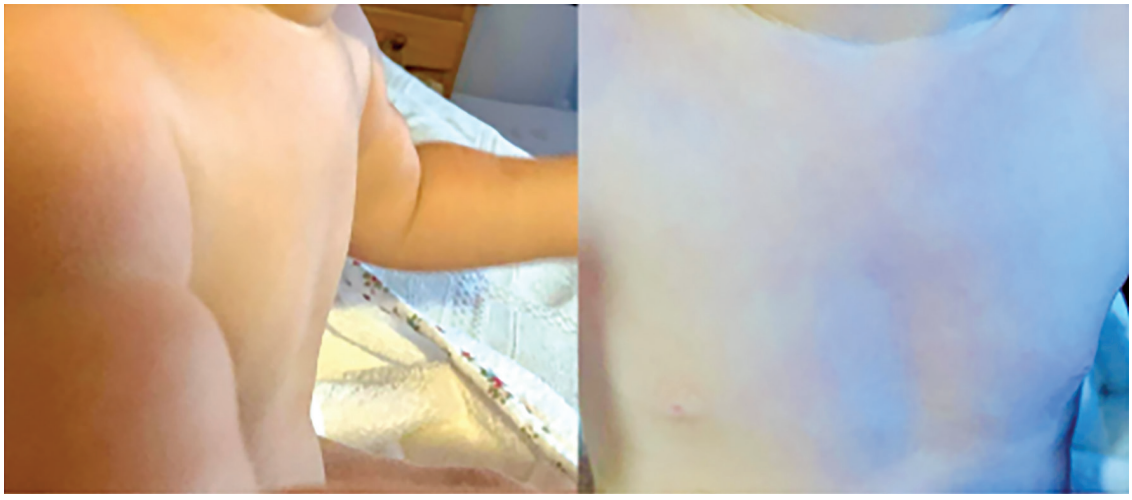

Figure 3. Picture taken 1 month later, showing complete clinical recovery (arrow)

Discussion

SELSTOC is a strange condition characterized by aseptic inflammation behaving as a cold abscess whose clinical symptoms are: Rapid growth, age below two years, no other clinical signs, unremarkable past history, typical sternal ultrasound (double lobed image dumbbell-shaped, hypoechoic and poorly vascularized) as well as complete clinical resolution within 1-3 months. First described by te Winkel et al. (1) in 2010 who collected 14 cases, where 6 of them required biopsy, and pathological studies showing unspecific inflammation despite being treated with antibiotics. Echography was carried out in 13 cases and a computed tomography (CT) was performed on 4 patients.

In recent years, there have been many reports on this issue (see Table I). For instance, Alonso Sánchez et al. (2) published 5 cases in 2020 with their classical characteristics being either clinical or radiological, with 3 children receiving antibiotics and one of them demonstrating 1 *Staphylococcal* infection after incision and drainage of the lesion, although the more likely reason could be an incidental situation on primary SELSTOC on the basis of typical ultrasound.

Table I. Patient characteristics diagnostic and therapeutic information

References	No. cases	Definition	Age median (range)	Biopsy/Joint puncture	Radiology data	Antibiotics (No.)	Resolution Median (range)
te Winkel et al. (1)	14	SELSTOC	16 mo (7-50)	5 Bi/6 incision	13 US. 4 CT	6/14	6 mo (1-6)
Alonso Sánchez et al. (2)	5	SELSTOC	9 mo (3-18)	1 Bi/1 incision	5 US. 1 MRI	3/5	6 mo (1-12)
Nikolarakou et al (3)	3	Chondroesternal arthritis	8 mo (8-12)	0 Bi/2 incision	3 US. 1 CT	3/3	2 mo (2-2)
Ilivitzki et al. (4)	3	Sternal pseudotumor	7 mo (7-16)	1 Bi/1 incision	3 US. 1 MRI	3/3	6 mo (4-18)
Adri and Kreindel (5)	2	SELSTOC	17 mo (12-22)	0/0	2 US	0	1 mo (1-1)
Fuente-Lucas et al. (6)	1	SELSTOC	7 mo	1/1	US. MRI	0	3 mo
Moreira and Marchiori (7)	1	SELSTOC	9 mo	0	US. MRI	0	2 wk
Arnés Parra et al. (8)	1	SELSTOC	9 mo	0	US. MRI	0	3 mo
Sanz-Santaeufemia (present case)	1	SELSTOC	8 mo	0	US	0	3 wk

No.: Number, mo: Months, wk: Weeks, Bi: Biopsy, US: Ultrasonography, CT: Computed tomography, MRI: Magnetic resonance image, SELSTOC: Self-limiting sternal tumors of childhood

Other papers found in the literature over the previous ten years include Nikolarakou et al. (3) in 2014 who described 3 affected children treated with antibiotics with 2 cases undergoing drainage and a CT for one patient due to multiple doubts about the nature of the mass; finally diagnosing this illness as chondrosternal arthritis but recognizing the great similarity with SELSTOC. Ilivitzki et al. (4) treated 3 patients with antibiotics, performing magnetic resonance image (MRI) and needle aspiration in one of them. They named this condition sternal pseudotumour. Adri and Kreindel (5) in 2018 presented 2 cases with the same definition, radiological studies and therapy as ours. Likewise, isolated cases with similar symptoms and evolution have been reported over this decade, such as Fuente-Lucas et al. (6) in 2021 reporting on the involvement of costochondral cartilages requiring biopsy and MRI to rule out malignancy. Moreira and Marchiori (7) in 2020 wrote a case report very similar to Fuente-Lucas et al. (6), except that pathological studies were not performed and Arnés Parra et al. (8) in 2022 published one case with age, clinical symptoms and conservative therapy nearly identical to our case, only differentiated by MRI which was performed in order to confirm the diagnosis. In all publications, the clinical data, ultrasound appearance along with the spontaneous regression during their clinical course are extremely similar. In general, it is not mandatory to conduct invasive tests such as biopsy or special radiologic studies such as MRI or CT, although they occasionally help in differential diagnosis (9). The complete resolution of the tumor within 1 to 3 months is the usual evolution, without the need for pharmacological or surgical therapies. Treatment can be based on careful observation with or without anti-inflammatory drugs, repeated ultrasound studies and a patient attitude while avoiding absolutely unjustified diagnostic procedures or therapeutic decisions (7), so demonstrating an application of quaternary prevention.

Conclusion

Sternal tumors in infants below 2 years of age, even in toddlers younger than 12 months, with no alarm signs or fever are highly suggestive of SELSTOC. Once this possibility is established, there is no need to carry out ionizing radiological examinations or invasive procedures in order to confirm or discard the clinical suspicion as the tumor is self-involuting and it originates from an exacerbated immune response to an aseptic inflammatory process. Despite swelling or local signs consistent with infection, a "do not touch" approach must be taken and a "wait-and-see" follow-up will prove it was the correct option.

Ethics

Informed Consent: There are parental permissions for the use of images.

Footnotes

Authorship Contributions

Surgical and Medical Practices: F.J.S., B.G.M., A.R.O., Concept: F.J.S., A.R.O., Design: F.J.S., A.R.O., Data Collection or Processing: F.J.S., B.G.M., M.E.G.T., A.R.O., Analysis or Interpretation: F.J.S., I.R.G., M.L.C.G., Literature Search: F.J.S., I.R.G., A.R.O., Writing: F.J.S., M.E.G.T., A.R.O.

Conflict of Interest: The authors declare that they have no conflict of interest in this paper as well.

Financial Disclosure: The authors declared that this study received no financial support.

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