Case Report
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Chronic osteomyelitis of the clavicle in a child: diagnostic challenges and successful surgical management - a case report

Abstract

Background: Osteomyelitis of the clavicle is an uncommon condition in children when compared with infections involving the metaphysis of long bones. Due to its rarity and variable clinical presentation, clavicular osteomyelitis can pose a diagnostic challenge and may mimic other pathological conditions affecting the clavicle.

Case presentation: A nine-year-old boy presented swelling and pain over the left clavicular region that persisted for six months. There was no history of trauma or associated systemic symptoms such as fever. Physical examination revealed a tender swelling measuring approximately 2 × 3 cm over the clavicle. Laboratory investigations showed elevated inflammatory markers, while imaging demonstrated an osteolytic lesion of the clavicle. The patient was managed with surgical debridement followed by antibiotic therapy, resulting in clinical improvement.

Clinical Significance: Accurate diagnosis of clavicular osteomyelitis requires careful correlation of clinical findings with laboratory investigations and imaging studies. Both conservative treatment and surgical intervention may be considered depending on disease severity.

Conclusion: Chronic osteomyelitis should be considered in the differential diagnosis of persistent non-traumatic clavicular lesions in children. Early recognition and appropriate treatment are essential to prevent complications and ensure favorable outcomes.

Keywords: clavicle osteomyelitis, pediatric bone infection, hematogenous osteomyelitis, clavicular swelling, bone infection in children

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Introduction

Osteomyelitis refers to infection of bone and bone marrow resulting in inflammatory destruction of bone tissue and formation of necrotic bone fragments. In children, the condition most frequently affects the metaphyseal region of long bones such as the femur and tibia due to their rich vascular supply. Involvement of the clavicle is rare and represents only a small proportion of pediatric osteomyelitis cases. Clavicular infection may occur through hematogenous spread of microorganisms or by direct inoculation following trauma, surgical procedures, or invasive vascular access.

Because traumatic injuries of the clavicle are relatively common, non-traumatic pathological lesions affecting the clavicle may initially be overlooked or misdiagnosed. A wide spectrum of differential diagnoses must therefore be considered, including infectious conditions, congenital anomalies, and neoplastic lesions.

Establishing the diagnosis often requires a combination of clinical evaluation, laboratory investigations, imaging studies, and microbiological or histopathological analysis. In this report, we describe a rare case of chronic osteomyelitis of the clavicle in a nine-year-old child and discuss the diagnostic challenges associated with this condition.

Case presentation

A nine-year-old boy presented to our orthopedic outpatient department with complaints of swelling over the left clavicular region for approximately six months. The swelling was gradually progressive and associated with intermittent moderate pain. There was no history of trauma, fever, or swelling in other parts of the body. The child did not report weight loss, night sweats, or other constitutional symptoms.

Prior to visiting our hospital, the patient had received treatment at a nearby health center where he had been prescribed oral medications for approximately one month. However, the swelling persisted despite the treatment. The patient had no known chronic medical illnesses, no prior surgical history, and no history of immunocompromised conditions.

Clinical Examination

General physical examination revealed stable vital signs and no systemic abnormalities. Local examination of the clavicle demonstrated a swelling measuring approximately 2 × 3 cm over the mid-portion of the left clavicle. The swelling was tender on palpation, and the overlying skin showed mild erythema with a small superficial wound. No discharge was observed. The shoulder joint demonstrated a full range of motion without restriction. Examination of other musculoskeletal and systemic structures was unremarkable (Figure 1).

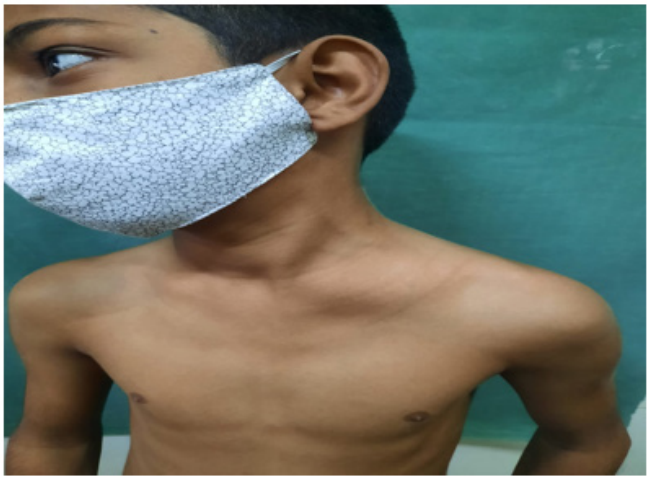


Figure 1 Clinical photograph showing swelling over the left clavicular region at the time of presentation.

At the outpatient orthopedic clinic, an extensive investigation was carried out including a complete blood count, ESR, RFT, LFT, chest x-ray, and abdominal ultrasound. The results showed an elevated ESR (50 mm/h), while all other blood workups were within the normal range. Remarkably, the chest x-ray (Fig. 2) appears to be normal with osteolytic lesion in the left clavicle. However, the lung parenchyma appeared to be normal. The abdominal ultrasound, on the other hand, yielded unremarkable findings.

Laboratory investigations

The following investigations were performed:

* Complete blood count

* Erythrocyte sedimentation rate (ESR)

* Renal function tests

* Liver function tests

Among these parameters, ESR was elevated to 50 mm/hour, while the remaining laboratory findings were within normal limits.

Radiological evaluation

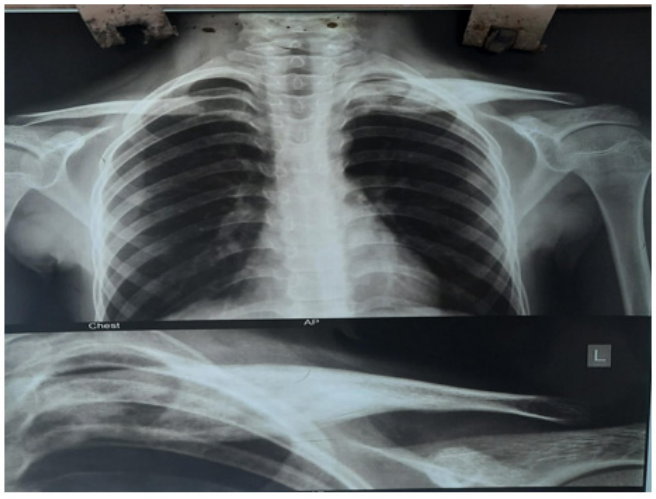
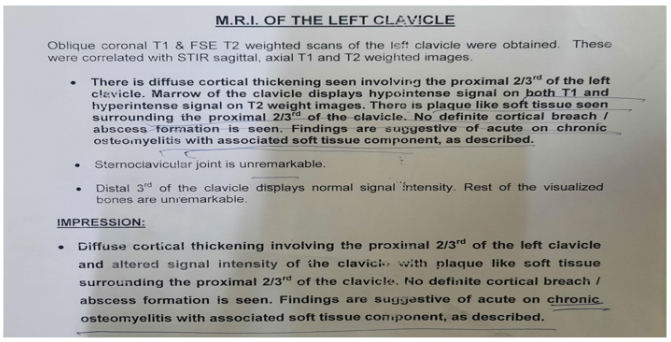


Figure 2 Plain radiograph demonstrating an osteolytic lesion involving the left clavicle.

A chest radiograph demonstrated an osteolytic lesion involving the left clavicle, while the lung fields appeared normal.

Ultrasonography of the abdomen was performed to evaluate possible underlying malignancy or metastatic disease and revealed no abnormalities.



M.R.I. OF THE LEFT CLAVICLE

Oblique coronal T1 & FSE T2 weighted scans of the left clavicle were obtained. These were correlated with STIR sagittal, axial T1 and T2 weighted images.

- There is diffuse cortical thickening seen involving the proximal 2/3rd of the left clavicle. Marrow of the clavicle displays hypointense signal on both T1 and hyperintense signal on T2 weight images. There is plaque like soft tissue seen surrounding the proximal 2/3rd of the clavicle. No definite cortical breach / abscess formation is seen. Findings are suggestive of acute on chronic osteomyelitis with associated soft tissue component, as described.
- Sternoclavicular joint is unremarkable.
- Distal 3rd of the clavicle displays normal signal intensity. Rest of the visualized bones are unremarkable.

IMPRESSION:

- Diffuse cortical thickening involving the proximal 2/3rd of the left clavicle and altered signal intensity of the clavicle with plaque like soft tissue surrounding the proximal 2/3rd of the clavicle. No definite cortical breach / abscess formation is seen. Findings are suggestive of acute on chronic osteomyelitis with associated soft tissue component, as described.

Figure 3 MRI report of the swelling on the left clavicle.

Magnetic resonance imaging (MRI) of the clavicle showed diffuse cortical thickening involving the proximal two-thirds of the clavicle with altered marrow signal intensity. Plaque-like soft tissue changes were present adjacent to the bone; however, there was no evidence of cortical breach or abscess formation.

Management

Considering the chronic nature of the lesion and imaging findings, the patient underwent surgical debridement with sequestrectomy at the time of biopsy. Following surgery, the patient was treated with oral cloxacillin, which resulted in gradual resolution of symptoms and reduction in swelling.

Discussion

Osteomyelitis in children most frequently involves the metaphyseal region of long bones because of the unique vascular anatomy of these areas. In contrast, infection involving the clavicle is rare and represents a very small proportion of pediatric osteomyelitis cases reported in the literature. The rarity of clavicular osteomyelitis often contributes to diagnostic delay because clinicians commonly attribute clavicular symptoms to traumatic injury or benign musculoskeletal conditions.

Clavicular osteomyelitis may develop through hematogenous dissemination of microorganisms or through direct inoculation following trauma, surgical procedures, or vascular access. Hematogenous spread remains the most common mechanism in pediatric patients. Several predisposing factors have been described, including skin infections, puncture wounds, sickle cell disease, and immunocompromised states. Additionally, procedures involving the subclavian vein or surgical interventions in the head and neck region have also been implicated as potential risk factors. In the present case, no identifiable predisposing factor was identified, suggesting a spontaneous hematogenous infection. The clinical presentation of clavicular osteomyelitis is often nonspecific. The most frequently reported symptoms include localized pain, swelling, and tenderness over the clavicle. Fever and systemic features may be present but are not consistently observed. Because these findings overlap with other clavicular pathologies, accurate diagnosis requires a high degree of clinical suspicion.

Radiographic evaluation is an important component of the diagnostic workup. Early radiographs may appear normal, while

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more advanced disease can demonstrate osteolytic changes, sclerosis, or mixed patterns of bone destruction. Magnetic resonance imaging is particularly useful for evaluating marrow involvement, soft tissue extension, and early inflammatory changes that may not be apparent on plain radiographs. The differential diagnosis of non-traumatic clavicular lesions is broad and includes congenital anomalies such as clavicular pseudoarthrosis, benign tumors, malignant neoplasms, vascular malformations, and metastatic disease. Among malignant conditions, Ewing sarcoma represents an important consideration in pediatric patients presenting with clavicular swelling and pain. Radiographic features such as aggressive periosteal reactions and systemic symptoms may help differentiate malignancy from infection; however, histopathological confirmation may occasionally be required.

Microbiological analysis plays an essential role in identifying the causative organism and guiding antibiotic therapy. Staphylococcus aureus is the most commonly reported pathogen in osteomyelitis. Other organisms that have been reported in clavicular osteomyelitis include streptococci, Pseudomonas species, Mycobacterium tuberculosis, and fungal pathogens. In some cases, prior antibiotic therapy may result in negative or inconclusive cultures.

In the present case, cultures demonstrated coagulase-negative Staphylococcus, although the patient had received oral antibiotics before presentation, which may have influenced the microbiological findings. Management of clavicular osteomyelitis depends on the extent and chronicity of infection. Early disease may respond to antibiotic therapy alone; however, chronic infections associated with sequestrum formation or persistent symptoms often require surgical intervention. Surgical options include curettage, sequestrectomy, and in severe cases partial resection of the clavicle.

In our patient, surgical debridement with sequestrectomy was performed, followed by antibiotic therapy. This combined approach resulted in satisfactory clinical recovery with resolution of symptoms. This case highlights several important clinical considerations. First, persistent clavicular swelling without a history of trauma should raise suspicion for underlying infection or neoplastic pathology. Second, advanced imaging modalities such as MRI are valuable for early detection and assessment of disease extent. Finally, timely surgical intervention combined with appropriate antibiotic therapy can lead to favorable outcomes in chronic cases.

Conclusion

Chronic osteomyelitis of the clavicle is an uncommon condition in children and may present with subtle clinical findings that mimic other clavicular pathologies. A high degree of clinical suspicion is therefore necessary when evaluating persistent non-traumatic swelling of the clavicular region. Early diagnosis through careful clinical assessment and appropriate imaging is essential. Microbiological and histopathological evaluation helps confirm the diagnosis and guide treatment. Prompt management with antibiotics and surgical intervention when indicated can result in favorable outcomes.

Ethical approval

The study was conducted in accordance with institutional ethical standards and the principles of the Declaration of Helsinki.

Consent

Written informed consent for publication of this case report and accompanying images was obtained from the patient's parents.

Author contributions

Dr. Jashandeep Singh Chahal – Conceptualization and supervision.

Dr. Yashwant Singh Rajawat – Patient management and data collection.

Dr. Shivansh Gupta – Literature review and manuscript preparation.

Data availability

All relevant data supporting the findings of this report are included in the manuscript.

Guarantor

Dr. Jashandeep Singh Chahal is the guarantor of the study.

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None.

Conflicts of interest

The authors declare that they have no conflicts of interest.

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