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Chronic Osteomyelitis of Clavicle as a Primary Manifestation of CRMO in an Adolescent: A Case Report

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Abstract **Case Report**

***Background*:** Chronic recurrent multifocal osteomyelitis (CRMO) is an auto-inflammatory bone disorder characterized by aseptic, mono- to multi-focal inflammation of the bones, yet its etiology remains undetermined. Diagnosis of CRMO is often challenging due to its overlapping signs and symptoms with other bone disorders, leading to potential long-term deformities. Increasing awareness of the various presentations of CRMO is crucial for timely diagnosis and management. ***Case presentation*:** A 14-year-old girl presented to our center with recurrent left clavicle pain, persisting for more than 3 years before referral. She had received multiple courses of analgesics. Physical examination revealed a hard, fixed mass in the medial third of the left clavicle, painless to palpation, with no inflammatory signs. MRI showed diffuse multiple hypo-signal lesions of the medial third of the left clavicle, blowing the bone cortex with infiltration of the soft tissues. Differential diagnoses were ruled out through bone biopsy, and laboratory tests. The patient responded favorably to treatment with Methotrexate, and Indomethacin, with no relapse observed during one year of follow-up. ***Conclusions*:** Uncommon presentations of CRMO can pose challenges in diagnosis, potentially leading to prolonged diagnostic processes. Increasing awareness among specialists regarding these presentations can facilitate earlier diagnosis and more effective treatment of CRMO patients.

Keywords: Chronic Nonbacterial Osteomyelitis (CNO), Chronic Recurrent Multifocal Osteomyelitis (CRMO), Chronic Nonbacterial Osteitis, Auto-Inflammatory Bone Disease.

INTRODUCTION

Chronic recurrent multifocal osteomyelitis (CRMO) is one of the auto-inflammatory bone disorders with still debated etiology. It is the most severe subgroup of chronic non-bacterial osteomyelitis (CNO), which is aseptic, mono- to multi-focal inflammation of the bones [1].

CRMO was first described in 1978 by Probst *et al.*, [2], and is a rare chronic inflammatory musculoskeletal process observed in children and adolescents. And the most common age of onset has been reported to be 7-12 years (3). While previously believed to be rare, recent studies suggest that the incidence of CNO/CRMO may be comparable to bacterial osteomyelitis [4].

The clinical course of CRMO is characterized by recurrent episodes of bone inflammation, leading to symptoms ranging from mild to severe bone pain, mild fever, malaise, and in some cases, fractures. The disease most commonly affects the metaphyses of long bones (Tibia and Femur) [3-5]. The second localization by order of frequency is the clavicle [6]. Other frequent sites of involvement include the pelvis, vertebral bodies, and the shoulder girdle [3-5]. The prognosis of the patients with CNO/CRMO is generally good according to previous studies, and a minority of cases will show severe disease in long-term follow-ups [7].

Here we discuss a 14-year-old girl presenting with recurrent left clavicle pain, persisting for more than 3 years before referral. This is an uncommon presentation of this disease, and only a few cases with such severe symptoms as their first presentation have been reported before.

CASE PRESENTATION

A 14-year-old girl with an intellectual deficit was referred to our center for recurrent mild pain and

swelling at the medial left clavicular extremity from 3 years before referral. Treated by multiple courses of analgesics. She had a fever but no traumatic or infectious history was reported. She was affected with pustulosis lesions on the lower limbs (**Figure 1**)

Physical examination revealed a hard, fixed mass located about the medial third of the left clavicle, painless to palpation. The overlying skin was unremarkable (**Figure 2**). Biological parameters (blood count, CRP) were within normal limits. The Radiographs showed hypertrophy of the medial end of the clavicle with periosteal appositions (**Figure 3)**. A computer Tomography scan of the chest and clavicle revealed sclerosis, hypertrophy of the medial third of the clavicle with a normal sternoclavicular joint, and thickening soft-tissue planes. Magnetic resonance imaging (MRI) showed diffuse multiple hypo-signal lesions hypertrophy of the medial third of the left clavicle, blowing the bone cortex with infiltration of the soft tissues (**Figure 4)**.

A surgical biopsy was performed. Direct examination with Gram coloration revealed the presence of cocci Gram+. The aerobic and anaerobic cultures did not grow. A 15-day antibiotic treatment with amoxyclavulanate was given. The histological examination revealed sclerotic bone with non-specific inflammation cells. The diagnosis of chronic clavicular osteomyelitis was given.

The patient received oral analgesic, non-steroid anti-inflammatory drugs (Ibuprofen), and her condition improved. After six months of follow-up, the patient still complained about moderate pain and was not in full remission. Therefore, 7.5 mg of Methotrexate once a week was added to his medications. She is still under follow-up with no problems occurring to date.

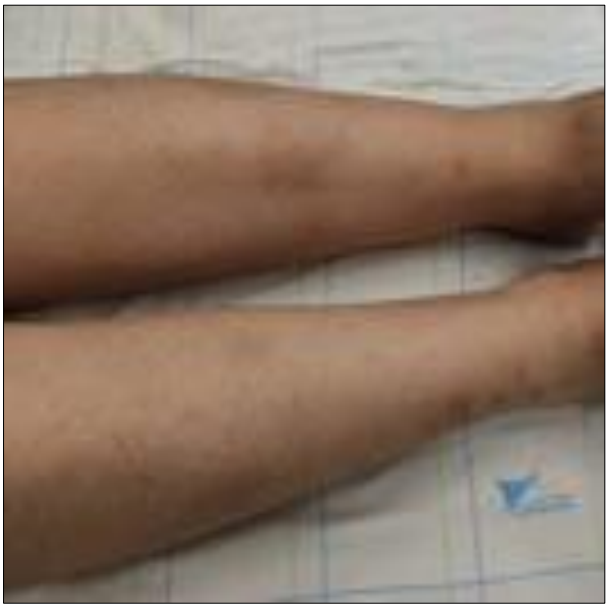

Figure 1: Clinical photo showing pustulosis lesions on the lower limbs

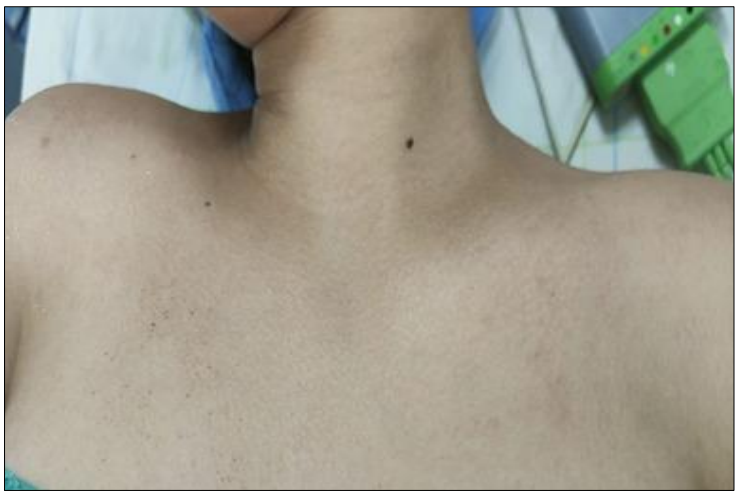

Figure 2: Clinical photo of the mass located in the medial third of the left clavicle

Figure 3: Radiographs showed hypertrophy of the medial end of the clavicle with periosteal appositions

Figure 4: Magnetic resonance imaging showed diffuse multiple hypo-signal lesions hypertrophy of the medial third of the left clavicle

DISCUSSION

Chronic recurrent multifocal osteomyelitis (CRMO) is an auto-inflammatory disease primarily affecting children and adolescents [1], with girls being affected 2-3 times more frequently than boys [8]. It typically presents with inflammation in multiple sites, commonly affecting the metaphyses of long bones, especially within the lower extremities near the knees and ankles [1]. Symmetrical lesions can be seen in 22% of cases, which was considered a criterion by Jansson *et al*., [9]. The vertebrae, mandible, clavicle, and pelvis are considered classic sites in chronic non-bacterial osteomyelitis (CNO) [1].

Chronic osteomyelitis of the clavicle classically occurs in adolescence and always begins in the medial side of the clavicle [10]. Typically, the disease is characterized by insidious onset of local swelling and pain [10]. The laboratory findings can be normal. Overall, biopsy results and radiographic features are the most critical components necessary for the correct diagnosis of this condition. Treatment consists of anti-inflammatory drugs but no place is given to antibiotics as they have never shown their efficiency.

Various therapeutic options are available including non-steroid anti-inflammatory drugs NSAIDs, oral or intravenous glucocorticoids, colchicine, methotrexate, sulphasalazine, infliximab, and pamidronate [11–12]. Pamidronate seems to be a very effective mode of therapy for patients with the CRMO, by promoting remission in all components of the disorder, such as bone, joint, and skin involvement [11–12]. The possibility of using anti-TNF has been advocated [13]. The natural history of this disease appears to be typical. The disease never heals and its course is characterized by periodic exacerbation and remission [10].

The long-term prognosis for CRMO patients is generally favorable, with a high rate of remission [1]. However, diagnosing CRMO can be challenging, as it requires ruling out other critical diseases, such as infectious osteomyelitis and malignancies [3]. This challenge, combined with the disease's varied presentations, can lead to delays in diagnosis [14]. Delayed diagnosis can result in prolonged and unnecessary treatments and psychological impacts on affected children.

Although CRMO is considered a rare disease, with an estimated incidence of 4 per million children [1], it may be underestimated due to underdiagnosis. Increasing awareness among healthcare providers is crucial for the timely diagnosis and management of CRMO. Interdisciplinary collaboration among specialists, including orthopedic and general surgeons, radiologists, rheumatologists, and primary care physicians, can facilitate knowledge sharing and improve awareness of the varied presentations of CRMO.

CONCLUSION

We described a 14-year-old girl with CRMO whose disease presented with recurrent clavicle pain, and the diagnosis was made 3 years after his initial symptoms, following a surgical biopsy. Increasing awareness among different specialists about such cases can potentially lead to earlier diagnosis and timelier and more effective treatment of CRMO patients.

Conflict of Interest: All the authors declare that they do not have any conflict of interest.

Consent of Publication: Consent from parents has been taken.

Author's Contribution: All the authors have contributed to the redaction of this manuscript.

REFERENCES

1. Zhao, D. Y., McCann, L., Hahn, G., & Hedrich, C. M. (2021). Chronic nonbacterial osteomyelitis (CNO) and chronic recurrent multifocal osteomyelitis (CRMO). *Journal of translational autoimmunity*, *4*, 100095.
2. Probst, F. P., Bjorksten, B., & Gustavson, K. H. (1978). Radiological aspect of chronic recurrent multifocal osteomyelitis. *Ann Radiol (Paris)*, *21*, 115–25.
3. Hofmann, S. R., Kapplusch, F., Girschick, H. J., Morbach, H., Pablik, J., Ferguson, P. J., & Hedrich, C. M. (2017). Chronic recurrent multifocal osteomyelitis (CRMO): presentation, pathogenesis, and treatment. *Current osteoporosis reports*, *15*, 542-554.
4. Schnabel, A., Range, U., Hahn, G., Siepmann, T., Berner, R., & Hedrich, C. M. (2016). Unexpectedly high incidences of chronic non-bacterial as compared to bacterial osteomyelitis in children. *Rheumatology international*, *36*(12), 1737-1745.
5. Falip, C., Alison, M., Boutry, N., Job-Deslandre, C., Cotten, A., Azoulay, R., & Adamsbaum, C. (2013). Chronic recurrent multifocal osteomyelitis (CRMO): a longitudinal case series review. *Pediatric radiology*, *43*, 355-375.
6. Beretta-Piccoli, B. C., Sauvain, M. J., Gal, I., Schibler, A., Saurenmann, T., Kressebuch, H., & Bianchetti, M. G. (2000). Synovitis, acne, pustulosis, hyperostosis, osteitis (SAPHO) syndrome in childhood: a report of ten cases and review of the literature. *European journal of pediatrics*, *159*, 594-601.
7. Catalano-Pons, C., Comte, A., Wipff, J., Quartier, P., Faye, A., Gendrel, D., ... & Job-Deslandre, C. (2008). Clinical outcome in children with chronic recurrent multifocal osteomyelitis. *Rheumatology*, *47*(9), 1397-1399.
8. Bhat, C. S., Anderson, C., Harbinson, A., McCann, L. J., Roderick, M., Finn, A., ... & Ramanan, A. V. (2018). Chronic non bacterial osteitis-a multicentre study. *Pediatric Rheumatology*, *16*, 1-7.
9. Jansson, A., Renner, E. D., Ramser, J., Mayer, A., Haban, M., Meindl, A., ... & Belohradsky, B. H. (2007). Classification of non-bacterial osteitis: retrospective study of clinical, immunological and genetic aspects in 89 patients. *Rheumatology*, *46*(1), 154-160.
10. Docquier, P. L., Malghem, J., Mousny, M., & Rombouts, J. J. (2006). Chronic osteomyelitis of clavicle as primary manifestation of SAPHO syndrome in adolescents: report of four cases and long-term evolution. *Joint Bone Spine*, *73*(6), 756-759.
11. Amital, H., Applbaum, Y. H., Aamar, S., Daniel, N., & Rubinow, A. (2004). SAPHO syndrome treated with pamidronate: an open-label study of 10 patients. *Rheumatology*, *43*(5), 658-661.
12. Kerrison, C., Davidson, J. E., Cleary, A. G., & Beresford, M. W. (2004). Pamidronate in the treatment of childhood SAPHO syndrome. *Rheumatology*, *43*(10), 1246-1251.
13. Deutschmann, A., Mache, C. J., Bodo, K., Zebedin, D., & Ring, E. (2005). Successful treatment of chronic recurrent multifocal osteomyelitis with tumor necrosis factor-a blockage. *Pediatrics-English Edition*, *116*(5), 1231-1233.
14. Roderick, M. R., Shah, R., Rogers, V., Finn, A., & Ramanan, A. V. (2016). Chronic recurrent multifocal osteomyelitis (CRMO)–advancing the diagnosis. *Pediatric Rheumatology*, *14*, 1-5.