



Surgical Treatment and Short-term Outcome for a Refractory Case of Medial Clavicle Osteitis Condensans: A Case Report

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ABSTRACT

Medial clavicle osteitis condensans presents as pain and swelling in the sternal end of the clavicle with increased bone density in the radiograph. In this case report, we present a 39-year-old woman with right medial clavicle osteitis condensans who underwent several diagnostic procedures with inconclusive findings. Despite various interventions, including IV antibiotics, steroid injections, and IV pain medications, relief was only temporary. Abnormal bone marrow signals involving the sternal end of the right clavicle on further imaging, together with non-response to treatment, prompted surgical intervention. Medial clavicle and first rib resection were performed resulting in significant improvement in pain and function on short-term follow-up.

Keywords. condensing osteitis, medial clavicle osteitis condensans, bone sclerosis

INTRODUCTION

Condensing osteitis is a rare benign disorder found in multiple bony locations such as the clavicle and the iliac bone. It is characterized as a localized, inflammatory thickening of the affected bone. Although first reported in 1974, medial clavicle osteitis condensans remain a rare entity with few documented cases in the literature. This idiopathic disorder presents as an increase in bone density at the medial clavicle and usually affects women of childbearing age. Clinical manifestations include pain on the abduction of the arm, fullness, and sclerosis over the medial end of the clavicle with sparing of the sternoclavicular joint. The exact etiology of condensing osteitis remains elusive. Patients usually recall no traumatic episode, although possible mechanical stresses related to activity are sometimes implicated. The diagnosis can be difficult because of the non-specific symptoms and imaging that frequently resemble bone malignancies. Treatment modalities range from conservative symptomatic management to surgical excision. In this case report, we present a patient with long-standing medial clavicle osteitis condensans, highlight the clinical and radiological features, describe the treatment, and report the progress of this rare condition.

CASE

This is a case of a 39-year-old woman who presented with pain and swelling localized to the right medial clavicle, with a history of shoulder pain and limitation of motion over the past 16 months. She was initially treated for rotator cuff syndrome and took pain medications which provided minimal to no relief. Subsequent ultrasound revealed

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inflammatory processes at the right sternoclavicular region, while a chest CT scan with contrast showed an unremarkable bony thorax, including ribs, vertebrae, and sternum. Physical therapy also failed to alleviate symptoms. Four months before the admission, the pain persisted, accompanied by a palpable enlargement in the medial clavicle and numbness and pins and needles sensation in the right arm. A plain MRI of the right clavicle revealed no focal mass lesion or abnormal fluid collection in the area of interest. EMG-NCV results were normal with no focal entrapment neuropathy and no evidence of brachial plexopathy. Despite treatment with IV antibiotics along with steroid injections and IV pain medication, relief was only temporary. A thoracic outlet syndrome study revealed a possible symptomatic vascular thoracic outlet syndrome on the right arm. The patient underwent intraarticular acromioclavicular, glenohumeral, and sternoclavicular steroid injections which afforded no relief. Further imaging with upper thorax MRI/MRA revealed abnormal bone marrow signals involving the sternal end of the right clavicle and adjoining clavicular notch exhibiting a mass effect. Figures 1, 2 and 3 show the axial and coronal cuts of the patient's MRI/MRA. Based on the MRI findings, the lesion was thought to have no overlying soft tissue mass. A core needle biopsy was initially contemplated. However, using a Jamshidi needle biopsy in the medial clavicle could place the subclavian vessels at risk. Given the two options of core needle biopsy and open excision biopsy, the patient opted for the latter, since this offers both diagnostic and therapeutic benefits. She was then admitted for surgical management.

A focused examination of the patient's right shoulder showed swelling and a 3 x 3 cm circumscribed, hard, tender, non-movable mass at the right medial clavicle (Figure 4). The range of motion of the shoulder was limited due to pain. The active and passive range of motion of shoulder abduction and forward flexion were 0–100 degrees. The patient had a 30% neurosensory deficit on the radial, median, and ulnar nerve distribution of the right upper extremity. The Roos and Adson test for thoracic outlet syndrome was positive. The patient's Fil-DASH score was 95 points indicating severe disability. The X-ray of the clavicle in AP and Serendipity view (Figure 5) revealed a cortical irregularity and bone thickening at the right medial clavicle.

The surgical plan for the patient at this point was Medial Clavicle Resection, Right with Possible Stabilization and Application of Iliac Bone graft. The patient was placed in a supine position under general anesthesia. After marking the skin, the incision was made starting from the medial one-third of the clavicle, following the surface of the clavicle medially, extending toward the midline of the sternum (Figure 6). The incision was then deepened to reveal the sternoclavicular joint, anterior surface of the sternum, and medial third of the clavicle. Exophytic changes on the inferior aspect of the medial clavicle and the first rib were removed using rongeur (Figure 7). A length of 0.9 cm of medial clavicle and 0.9 cm of first rib were resected using an oscillating saw and rongeur (Figure 8). The medial clavicle was noted to be stable after

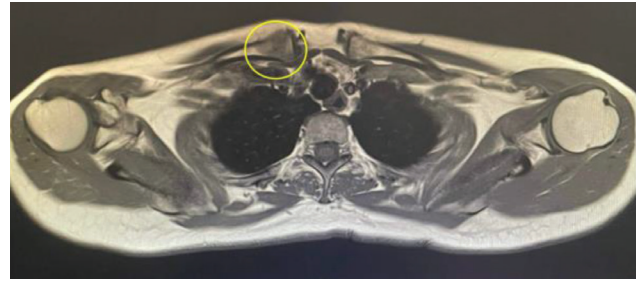


Figure 1. T1 weighted axial cut of the upper thorax MRA showing the lesion.

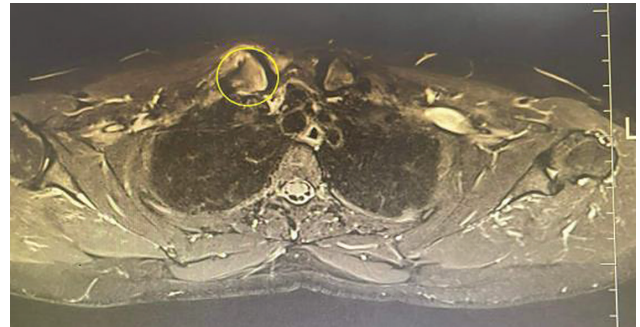


Figure 2. T2 weighted axial cut of the upper thorax MRA showing the lesion.



Figure 3. T2 weighted coronal cut of the upper thorax MRA.

doing a passive range of motion of the shoulder; it was decided that there was no need for stabilization using a plate. The operative site was washed out with a saline solution and then closed with the insertion of a Jackson-Pratt drain. The final procedure done was a medial clavicle resection, right; first rib resection, right, under general anesthesia.

Post-operative x-ray (Figure 8) confirms the approximately 1 cm shortening from the resection of the clavicle. Bone gram stain and culture studies revealed a light growth of *Serratia marcescens*. Thus, the patient was also treated with Levofloxacin 500 mg IV once a day for four weeks given on an outpatient basis, until normalization of ESR and CRP.

On the third postoperative day, there was less pain (NRS 6/10), a well-coaptated wound, no discharge, no dehiscence, and an improvement in the neurosensory deficit from 30% to 10% at the radial, median, and ulnar distribution. The JP drain was removed. There were no new subjective complaints,

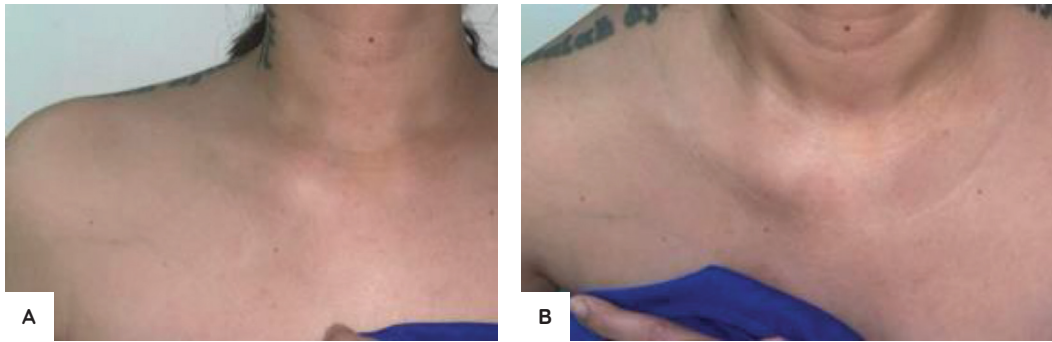


Figure 4. A gross picture of the patient's right clavicle showing frontal (A) and superior (B) view.

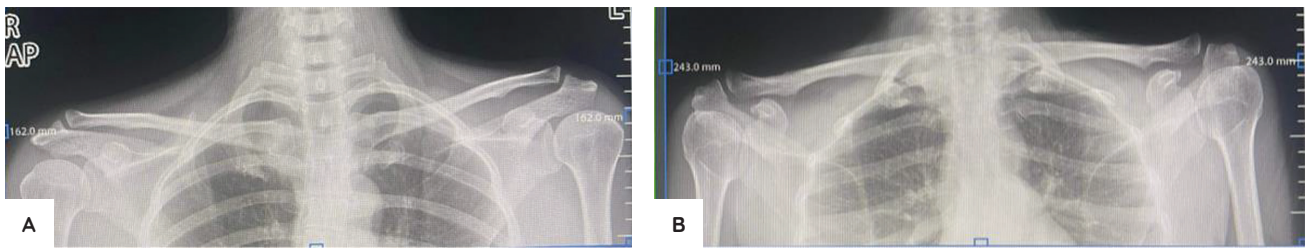


Figure 5. Pre-operative x-ray of the clavicle in AP (A) and serendipity (B) view.

hence the patient was discharged. Fil-DASH score at two weeks post-op was 59 points.

At two months post-op, there was a significant decrease in pain (NRS 0-1/10). The patient had a full range of motion of the shoulder (Figure 9) with no noted neurosensory deficit. She was able to do activities of daily living with minimal to no difficulty. Fil-DASH score was 17.5 points indicating significant improvement of the patient's condition. She reported satisfaction with the outcome at five months. Fil-DASH score was 15 points she was able to do activities of daily living with minimal to no difficulty.

Histopathological examination revealed mature woven bone with normocellular marrow, with islands of hyaline cartilage and some areas of fibrosis. There was no evidence of

malignancy. These findings, alongside the patient's symptoms and radiographic results, are consistent with other case reports, thus favoring the diagnosis of medial clavicle osteitis condensans.

DISCUSSION

Medial clavicle osteitis condensans is a rare and often overlooked condition characterized by persistent discomfort and bony irregularities at the medial end of the clavicle. It can resemble other more common conditions such as osteo-arthritis or osteomyelitis, thus knowledge about this condition is essential for appropriate diagnosis and management.¹

The typical presentation of medial clavicle osteitis condensans is persistent, localized pain and tenderness at the sternoclavicular area, which worsens with movement. Patients may also experience limited range of motion and stiffness in the affected shoulder. The pain may radiate to the neck, shoulder, and arm and is frequently described as dull or aching, as experienced by our patient. Without an appropriate diagnosis and course of treatment, symptoms are often chronic and can last for years.^{1,2}

Osteoarthritis, bone island, osteomyelitis, septic arthritis, and sternoclavicular joint dislocation are conditions similar to medial clavicle osteitis condensans. The more common conditions should first be ruled out through laboratory tests to ensure appropriate management. X-rays may show sclerotic changes and irregularities at the medial end of the clavicle, while computed tomography (CT) scans and magnetic resonance imaging (MRI) can provide more detailed information about bone morphology and soft tissue involvement.^{3,4}



Figure 6. Skin markings over the sternoclavicular area.

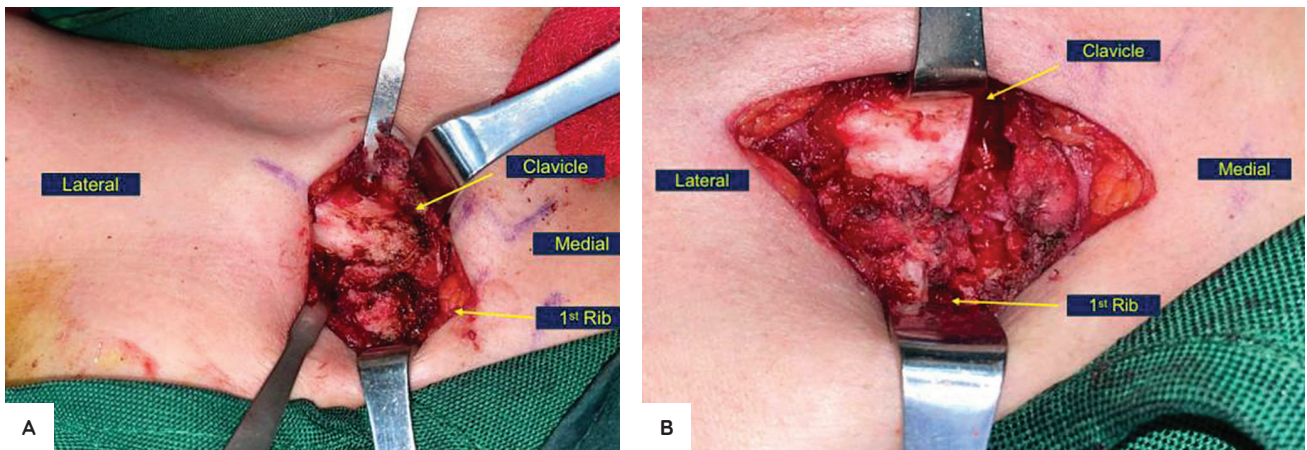


Figure 7. Intraoperative gross picture of the medial clavicle and first rib showing exophytic changes (A); post resection (B).

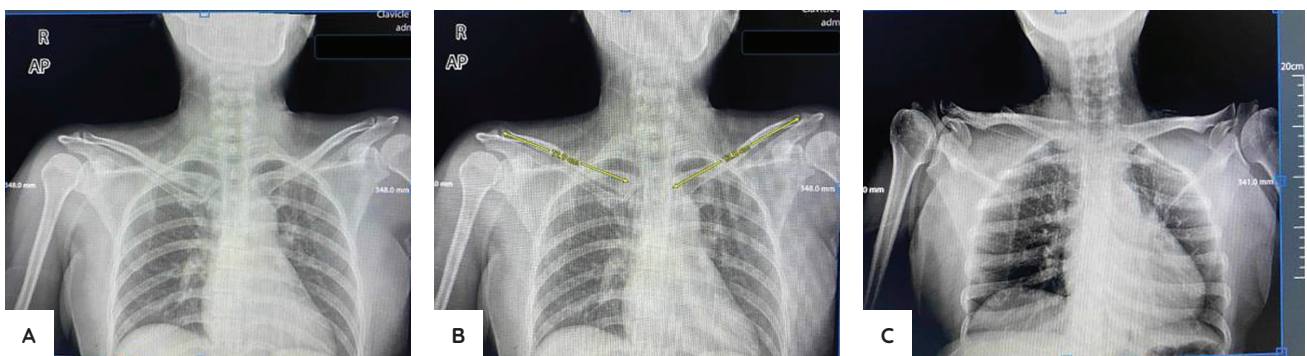


Figure 8. Post-operative x-ray of the clavicle in AP view (A); AP view with measurement confirming resection of 0.9 cm (yellow arrows) (B); serendipity view (C).

In this case, the patient also presented with shoulder pain, paresthesia, and neurosensory deficit on the right upper extremity. These symptoms could be caused by compression of the neurovascular bundle to the upper extremity resulting

in thoracic outlet syndrome or pectoralis minor syndrome. This compression could have been caused by the bony overgrowth in the costoclavicular space coming from the medial clavicle and the first rib.⁵



Figure 9. Range of motion at 2 months postop showing full shoulder abduction (A) and full shoulder flexion (B).

Treatment for medial clavicle osteitis condensans aims to ease discomfort and enhance functionality. Pain relief and function enhancement are typically pursued through nonsteroidal anti-inflammatory drugs (NSAIDs) and pain medications, coupled with physical therapy to improve range of motion. Occasionally, corticosteroid injections or intra-articular hyaluronic acid might offer supplementary relief. Existing literature has mostly reported improvement after conservative management.^{2,6,7} However, there were no case reports available detailing the surgical treatment for medial clavicle osteitis condensans. Surgical measures are seldom necessary but could be considered for refractory cases, notable structural impairment, or instability.^{1,4}

In this case report, the patient had a refractory case of medial clavicle osteitis condensans, hence surgical treatment was advised. Pre-operative planning is prepared to address instability that may occur to the remaining clavicle. According to Abbot and Lucas, a resection of the medial clavicle lateral to the costoclavicular ligament would lead to superior displacement of the medial clavicle, alongside pain

and dysfunction.⁸ On the other hand, a study done by Bisson et al., has reported that a resection of 1.0 cm in males or 0.9 cm in females would result in minimal or no disruption of the costoclavicular ligament, thus preserving the stability of the clavicle.⁹ Having this knowledge, the patient was advised that fixation with a Balser plate, as described by Feng et al., might be needed to restore the stability of the medial clavicle.¹⁰

Intraoperatively, there were exophytic changes on the inferior aspect of the medial clavicle extending to the first rib. Therefore, abnormal portions of both the clavicle and first rib were resected. A 0.9 cm section was resected, and upon checking the range of motion, the remaining clavicle was stable. Hence, there was no need to apply the Balser plate. Excision of the medial clavicle has provided the patient with significant improvement (even resolving the paresthesia and neurosensory deficit of the upper arm) with almost complete relief at five months post-operation.

CONCLUSION

Although medial clavicle osteitis condensans is rare, it warrants consideration when evaluating sclerotic lesions near the medial end of the clavicle, especially in young and middle-aged women. Identifying this condition can prevent unnecessary tests in pursuit of a diagnosis. Understanding the clinical characteristics, diagnostic approaches, and treatment strategies is crucial for delivering the best possible care for affected individuals. In this case, surgical resection of the medial clavicle resulted in significant relief of symptoms.

ETHICAL CONSIDERATION

Patient consent was obtained before submission of the manuscript.

STATEMENT OF AUTHORSHIP

All authors certified fulfillment of ICMJE authorship criteria.

AUTHOR DISCLOSURE

The authors declared no conflict of interest.

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