

# Condensing Osteitis of the Clavicle: Case Report and Review of the Literature

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Osteitis condensans of the clavicle is a benign, often painful disorder of unknown etiology manifested by bony sclerosis of the clavicular head with an uninvolved sternoclavicular joint. The case presented demonstrates the characteristic scintigraphic findings of osteitis condensans of the clavicle. A review of the published pathologically proven cases reveals this disorder to have distinctive clinical and radiological features that allow differentiation from infection, neoplasia, and arthritides in most instances. The frequent observation, as in this case, of devitalized bone and marrow fibrosis with remodeling of cancellous bone suggests that osteonecrosis may play an important role in the pathogenesis of this disorder.

**J Nucl Med 29:1122-1125, 1988**

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**R**adiologically apparent sclerosis of the medial clavicle with corresponding focally intense uptake of a bone scanning agent may be associated with a number of bone disorders and arthritides affecting the clavicle and sternum. This report describes a case of osteitis condensans of the medial clavicle, a benign disorder which is typically symptomatic for years before diagnosis. Our review of the literature indicates that osteitis condensans has characteristic clinical, radiographic, and scintigraphic features that, when correlated, distinguish it from other disorders with which it may be confused.

## CASE REPORT

A 36-yr-old woman complained of painless swelling of her left clavicle of unknown duration. She denied trauma, a change in physical activities, or systemic symptoms. Seven years previously she had received a short course of steroids for lymphocytic thyroiditis. A computed tomographic (CT) scan of the chest at that time showed no sternoclavicular abnormality.

On examination a firm, nontender swelling of the medial left clavicle was palpated. Erythrocyte sedimentation rate, white blood cell count, and alkaline phosphatase were normal. In retrospect, sclerosis of the inferior medial clavicle was visible on a chest film obtained 6 mo previously (Fig. 1), and plain films of the clavicle showed that the lesion was unchanged. Intense focal isotope uptake occurred at this site on

technetium-99m ( $^{99m}\text{Tc}$ ) oxidronate (HDP) bone scintigraphy (Fig. 2). A CT scan (Fig. 3) demonstrated sclerosis of the cancellous bone in the medial clavicle with adjacent mild soft-tissue swelling. Periosteal reaction and osteophytes were absent.

The swelling failed to respond to nonsteroidal anti-inflammatory agents. A Craig needle biopsy was performed 5 wk after the initial evaluation. Histologic examination revealed marrow fibrosis, appositional woven and lamellar new bone formation, and fragments of bone with empty lacunae indicative of osteonecrosis. Culture was sterile.

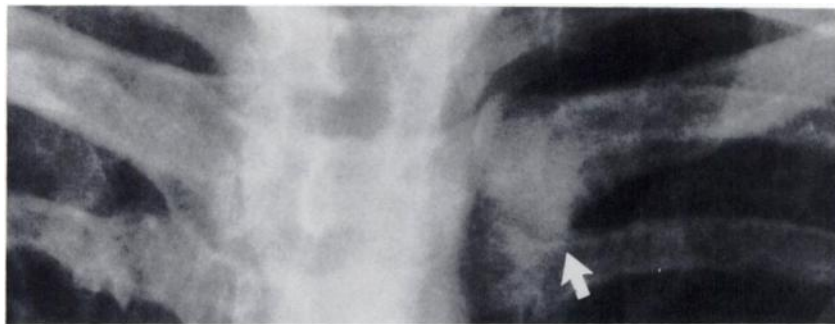
## DISCUSSION

Brower et al. (1) first used the perhaps unfortunate term osteitis condensans to describe isolated bony sclerosis of the medial clavicle, without inflammation, which they found in two young adult females. Twelve cases with pathologic confirmation have subsequently been reported in the English literature (1-6, Table 1), as well as several unproven cases (7,8). All biopsied cases have occurred in females, usually in their fourth decade. Symptoms of pain with arm movement, local swelling, or tenderness are almost always present for several years prior to diagnosis. The swelling may be painless, as in this case. Patients usually recall no traumatic episode, although possible mechanical stresses related to activity are sometimes implicated. Erythrocyte sedimentation rates and white blood cell counts are occasionally mildly elevated (5). No reports have indicated an association with systemic disease or medications.

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Received Nov. 9, 1987; revision accepted Feb. 25, 1988.

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**FIGURE 1**

Posteroanterior chest film taken 6 mo prior to the patient's first complaint of clavicular swelling shows ill-defined sclerosis of the medial left clavicular head (arrow). The right clavicle is normal.



**FIGURE 2**

Anterior chest image from the bone scan demonstrates intense focal uptake limited to the medial left clavicle.

Scintigraphic and radiographic findings are distinctive. Restricted to the medial few centimeters of clavicle is dense homogeneous sclerosis bordering the subchondral surface and inferior clavicular head. Small inferior osteophytes have been described. There is no joint space abnormality, periosteal reaction, evidence of bone destruction, or extraclavicular lesions. Bone scintigraphy invariably shows intense radionuclide accumulation limited to the site of sclerosis, without sternal involvement (3-6). Gallium and labeled white blood cell scans are normal (5).

Osteitis condensans can be readily distinguished from most disorders affecting the medial clavicle and sternoclavicular joint by clinical and radiographic criteria. Advanced osteoarthritis in the sternoclavicular joint with subchondral sclerosis and osteophytosis is unusual before the fifth decade (9). Osteoarthritis causes a narrowed joint space, sternal involvement, and sclerosis restricted to the subchondral bone (7,10). Bilateral sternoclavicular involvement and involvement at other joints is typical. Other arthritides affecting the sterno-

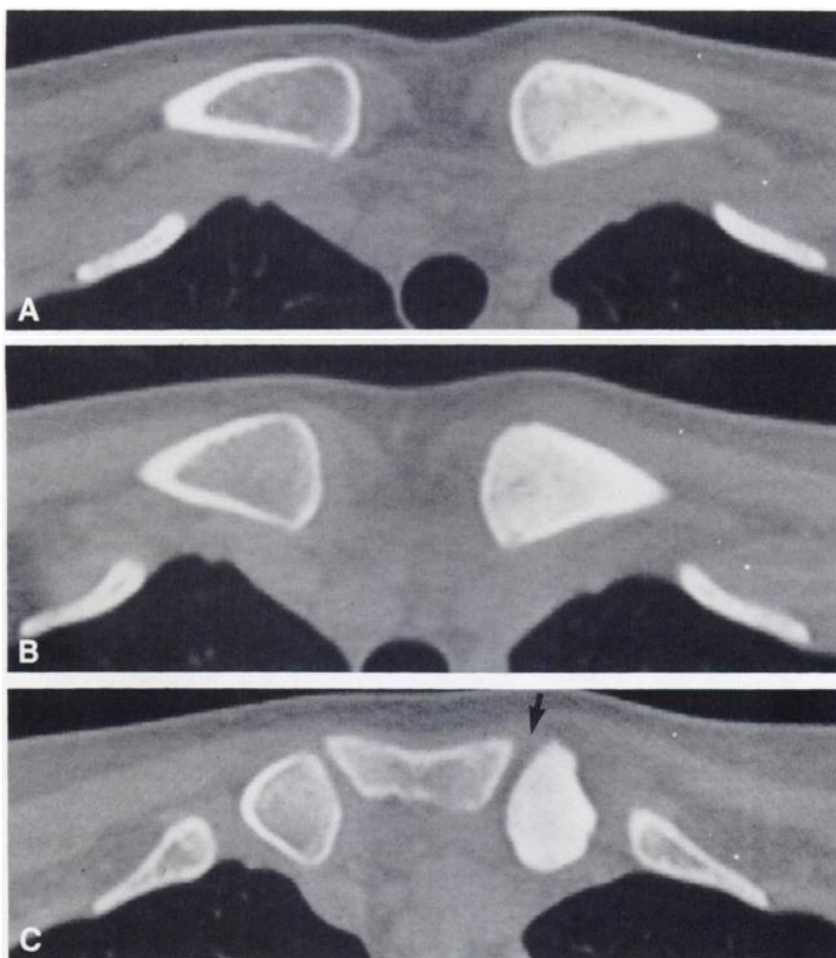
clavicular joint cause subchondral destruction or osteoporosis rather than sclerosis (11).

Infection of the sternoclavicular joint or medial clavicle may uncommonly cause a similar scintigraphic appearance but will appear in a different clinical setting with a more acute presentation. Plain films or CT will demonstrate evidence of bone destruction or synovial abnormality (12). Chronic sclerosing osteomyelitis of the clavicle is rare, but may appear as dense sclerosis similar to osteitis condensans. Periosteal reaction or foci of bone destruction are usually radiographically evident (13). A variant of chronic osteomyelitis, described as osteitis condensans in childhood by Appell et al. (14), is distinct from osteitis condensans in adults. The former is characterized by marked periosteal reaction, osseous destruction, bony expansion of most of the clavicle, extraclavicular lesions, and histologic demonstration of inflammation.

The possibility of primary or secondary osteoblastic neoplasm may pose a more difficult diagnostic problem. The age of the patient, long duration of symptoms, atypical epiphyseal location, absence of periosteal reaction and bony destruction, and absence of progression on serial studies should render malignancy unlikely. Metastases appearing as a solitary bone scan abnormality in the clavicular epiphysis must be very unusual, none having been reported in a large series (15).

Sternoclavicular hyperostosis is a rheumatologic syndrome characterized by inflammatory ossification of the sternocostoclavicular ligaments in association with systemic and specific dermatologic manifestations (16). Radionuclide uptake appears in the sternum, superior ribs, and more extensively in both clavicles at the sites of ligamentous ossification seen on plain films. Spinal ligamentous ossification and sacroiliac abnormality are present as well.

Freidrich's disease, or avascular necrosis of the medial clavicle, is a seldom reported entity described in children and adults (17,18). Signs and symptoms are similar to osteitis condensans with a duration of weeks to years, but a shorter duration of symptoms with a clearer relationship to trauma is described in children and adolescents with avascular necrosis. The scintigraphic findings of Freidrich's have not been reported, but an appearance similar to that seen in osteitis con-



**FIGURE 3**

(A-C). Computed tomographic images just superior to (A, B) and through (C) the sternoclavicular joint show dense sclerosis of the left clavicular head with mild soft tissue swelling. The joint space (arrow) is normal and there is no evidence of bone destruction or periosteal reaction.

**TABLE 1**  
Clinical and Scintigraphic Findings in Pathologically-Proven Cases of Osteitis Condensans of the Clavicle

Case no.	Age/sex	History of trauma	Duration of symptoms	Bone scan	Reference
1	51/F	No	Asymptomatic	ND*	(1)
2	52/F	No	N.S.†	ND	(1)
3	26/F	No	3 yr	ND	(2)
4	31/F	No‡	2 yr	ND	(2)
5	34/F	No‡	3 yr	+	(3)
6	32/F	No	5 yr	+	(4)
7	36/F	No	5 mo	+	(5)
8	32/F	No	1.5 yr	+	(5)
9	47/F	No	7 mo	+	(5)
10	63/F	No	3 yr	+	(6)
11	32/F	No	3 yr	+	(6)

\* Not done.

† Not stated.

‡ Occupational or athletic stresses implied.

densans would be expected in the reparative phase of avascular necrosis. The radiographic appearance is similar, and in many cases identical, but subchondral irregularity and focal lucencies are sometimes described in Freidrich's (18).

The pathogenesis of osteitis condensans and Freidrich's disease is speculative. Osteonecrosis on biopsy is considered the distinguishing feature of Freidrich's but marrow fibrosis or osteonecrosis have been described in several cases of osteitis condensans (1,5,6), including the present case. Mechanical stresses have been postulated as the most likely cause of osteitis condensans (4-6), in spite of the lack of suggestive clinical history in the majority of cases. Expected features in stress-induced bone reaction such as typical periosteal reaction, evolution of findings on scintigraphy or plain films, and resolution of the lesion with conservative management are not reported. Low grade osteonecrosis with remodeling may better explain the clinical, radiographic, and pathologic features. We postulate that because these reported features are often indistinguishable, Freidrich's disease and osteitis condensans possibly represent the same or pathologically related entity.

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