CASE REPORTS

Condensing Osteitis of the Clavicle

GC Ooi FRCR(UK)
WCG Peh FRCR(UK)
Department of Diagnostic Radiology,
The University of Hong Kong, Queen Mary Hospital, Hong Kong

Abstract
Condensing osteitis of the clavicle is a rare benign condition of unknown aetiology which afflicts women of child-bearing age. It is characterised radiographically by sclerosis of the infero-medial aspect of the clavicle, without involvement of the sternoclavicular joint. This term is actually a misnomer, as inflammation is not recognised as a component of this disorder. Jurick (1994) in a recent comprehensive review of the literature, found 62 reported cases of what she termed "non-inflammatory sclerosis of the clavicle", in addition to 14 of her own cases. Besides "condensing osteitis", other descriptive terms used include "Friedrich's disease", "post-traumatic reactive and resorptive lesions of the medial end of the clavicle", "non-inflammatory sclerosis" and simply, "sclerotic changes" of the sternal end of the clavicle. This paper aims to review the clinical and imaging features of patients with condensing osteitis of the clavicle and other similar entities.

Introduction
Condensing osteitis of the clavicle is a rare benign but painful disorder of unknown aetiology. It is characterised radiographically by sclerosis of the medial end of the clavicle, without involvement of the sternoclavicular joint. This term is actually a misnomer, as inflammation is not recognised as a component of this disorder. Jurick (1994) in a recent comprehensive review of the literature, found 62 reported cases of what she termed "non-inflammatory sclerosis of the clavicle", in addition to 14 of her own cases. Besides "condensing osteitis", other descriptive terms used include "Friedrich's disease", "post-traumatic reactive and resorptive lesions of the medial end of the clavicle", "non-inflammatory sclerosis" and simply, "sclerotic changes" of the sternal end of the clavicle. This paper aims to review the clinical and imaging features of patients with condensing osteitis of the clavicle and other similar entities.

Condensing osteitis was first identified as a distinct entity by Brower et al (1974). Their original description of the clinical, radiographic and histological features of this lesion, with symptomatic relief following surgical excision in two young women, has subsequently been recognised by several other workers. To date, about 30 cases of condensing osteitis, mainly in the form of case reports, have been documented in English literature. Nearly all affected patients were adult women (96%) aged between 26 to 69 years (mean age of 45 years). The majority complained of pain and/or swelling of the medial end of the clavicle. In some cases, the pain radiated to the suprACLavicular fossa and ipsilateral shoulder, aggravated by abduction or forward movement of the shoulder. The pain was usually mild but could be severe, with duration of symptoms varying from 4 weeks to 5 years. In about half of the reported cases, there was an association with minor stress or repetitive physical activity, such as lifting of heavy weights or sports-related activity.

Van Holsbeeck (1992) postulated that the clavicular sclerosis may be secondary to chronic abrasion of a spontaneously subluxing sternoclavicular joint. The radiographic features are characteristic, comprising dense sclerosis at the inferior aspect of the medial clavicle, often associated with mild bony expansion. A hook-like osteophyte arising from the infero-medial aspect of the clavicle has also been recognised as a feature of this condition (Figure 1). The sternoclavicular joint space is not narrowed, at least in the early stages of the disease, with preservation of the articular surfaces. Periosteal reaction and bony destruction are absent. Jurick (1994) in a follow-up study of 11 patients with condensing osteitis, demonstrated...
Condensing Osteitis of the Clavicle

regression of bony sclerosis and development of adjacent osteoarthritis with time. Computed tomography (CT) depicts accurately the extent and nature of bone involvement. It demonstrates the preservation of the sternoclavicular joint, the sclerotic involvement of the sternal end of the clavicle and excludes a-destructive or aggressive process. The bone marrow cavity is typically obliterated, with soft tissue swelling occasionally reported (Figures 2 and 3). These lesions also produce markedly increased focal tracer uptake on isotope bone scans, corresponding to the site of bony sclerosis (Figure 4). Magnetic resonance imaging is useful in confirming the benign nature of the clavicular sclerosis, demonstrating areas of hypointense signal intensities on both spin-echo T1 and T2 weighted images, which represent the regions of sclerotic bone. The histological features of condensing osteitis are an increased amount of normal bone with marrow obliteration, thickened cancellous bone and trabecular reinforcement. Some authors have also reported marrow fibrosis and osteonecrosis, suggesting a low-grade ischaemic process.

The true cause of condensing osteitis is unknown, although it is generally accepted as representing a response to mechanical stress which particularly affects women of child-bearing age.

Symptomatic patients should be managed with nonsteroidal anti-inflammatory drugs and limitation of physical activities. If the diagnosis is in doubt or if the patient is refractory to conservative treatment, excision of the medial end of the clavicle is recommended.

Friedrich's disease

Friedrich's disease is ischaemic necrosis of the medial clavicular epiphysis. It is a rare disorder, with only 28 cases having been reported to date. Clinically, the presenting signs and symptoms are similar to that of condensing osteitis. There is painful swelling over the sternoclavicular joint, which may be aggravated by movement. Unlike condensing osteitis, however, Friedrich's disease is not confined to the adult population, and in fact typically affects children and adolescents. The radiological appearances may resemble those of condensing osteitis but careful examination of plain radiographs will demonstrate that the entire medial end of the clavicle is sclerotic, with fragmentation and a notch-like defect at the articular surface. These lesions appear hot on isotope bone scans, hence are scintigraphically indistinguishable from condensing osteitis. The disease is often self limiting with eventual normalisation of radiographic appearance after conservative treatment. Necrosis, with fibrosis of the marrow cavity and empty lacunae, is the main histological feature of Friedrich's disease. Trauma or an embolic event at the medial clavicular epiphysis is believed to cause the ischaemic necrosis that is the hallmark of this condition.
Chronic recurrent osteomyelitis is an unusual condition usually affecting children. With clavicular involvement, development of hyperostosis and bony enlargement may mimic condensing osteitis. Appel et al (1983) used the term condensing osteitis to describe marked sclerotic enlargement of the medial two-thirds of the clavicle associated with periosteal reaction in seven girls (aged 7 to 15), three of whom had multifocal bone involvement. All cases had raised erythrocyte sedimentation rates, two had high white cell count while four responded to antibiotics. Jones et al (1990) described radiographic findings of marked expansion and sclerosis of the medial two-thirds of the clavicle, with thick dense periosteal reaction, in 3 children. Bone biopsies confirmed chronic osteomyelitis in one patient and non-specific inflammatory changes in the other two. The patients responded to antibiotics leading to the authors to suggest that condensing osteitis could be a form of low grade osteomyelitis. The consensus in subsequent reviews was that these authors reported cases of chronic recurrent multifocal osteomyelitis, which differed clinically and radiologically from condensing osteitis. Apter et al (1992) described post-traumatic reactive and resorptive lesions of the medial end of the clavicle in 3 young soldiers, biopsy of which showed new bone formation and chronic inflammation. These changes were thought to be stress-related. Sternocostoclavicular hyperostosis is another condition which typically affects the medial end of the clavicle, as well as other juxtaarternal structures. Unlike condensing osteitis, it affects older male patients who present with bilateral painful anterior chest wall swellings and pustular lesions of the palms and soles. About 200 cases have been reported to date. Other differential diagnoses of medial clavicular lesions which may be considered include sternoclavicular joint pyoarthrosis, septic arthritis and osteoarthritis, and miscellaneous conditions like osteofibrous osteoma and fibrous dysplasia.

**Summary**

Despite some similarity in presenting signs and symptoms, with careful radiological assessment one should be able to differentiate condensing osteitis from Friedrich's disease and the other conditions that resemble this entity. The selective sclerotic involvement of the inferomedial aspect of the clavicle in women of child-bearing age, in the absence of constitutional symptoms, should lead one to the correct diagnosis. Recognition of this condition should spare the patient from further unnecessary and potentially invasive investigations.

**References**