Calcifying Tendinitis,  
an Active Cell-Mediated Calcification

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Summary. Biopsy specimen from 18 patients suffering from calcifying tendinitis were stained with different histologic and histochemical techniques. The results of these examinations seem to indicate that we are not dealing with a dystrophic calcification, but with a cell-mediated calcification of a living tissue. The process resembles an incomplete endochondral ossification.

Key words: Calcinosi s — Para-Articular Tendons — Peri-Arthritis — Tendinitis — Shoulder.


Since Codman’s classic studies on the shoulder published in 1934 and 1938, it seems generally accepted that, in calcifying tendinitis, degeneration of tendon fibers precedes calcification, a process also called dystrophic calcification.

Codman believed the lesion to be traumatic in origin with degeneration occurring secondarily. Meyer on the other hand, stated that degeneration is a primary and spontaneous change. Steinbrocker, in the most recent edition of Hollander’s textbook of arthritis, still adheres to these classic views. He describes the different states of calcifying tendinitis as follows: wear and tear or injury results in degeneration of tendon fibers; continuing wear leads to loss of vascularity and subsequently to tissue necrosis; this necrotic tissue, in turn is replaced by a fibrinoid mass which is surrounded by leukocytes and histiocytes; finally, this mass calcifies. McLaughlin described the necrotic tissue as resembling rice-like bodies. He thought that motion would grind them into finely pulverized material which could remain as such or calcify.

All aforementioned authors believed that the initial steps of calcifying tendinitis and of ruptures of the rotator cuff were identical. Only the last stage was thought to be different: in one case the necrotic tissue calcifies and in the other rupture occurs through the degenerated tendon. Given this apparent similarity in pathogenesis it is not surprising to find that calcifying tendinitis and ruptures of the rotator cuff are grouped together under the heading of periarthritis humeroscapularis (Schaer, Glatthaar) or of degenerative diseases of periarticular...
tissues (Salter). Why in one case calcification takes place contrary to rupture in another is not explained in the pertinent literature. Indeed Steinbrocker states that "the exact method by which calcium is deposited remains obscure".

Both entities, calcifying tendinitis and rupture of the rotator cuff, also differ clinically. Patients with calcifying tendinitis are in a younger age group (30 to 45 years) and are engaged in a more sedentary work (Steinbrocker). Calcification starts 1 to 1.5 cm medial to the tendon insertion into bone ("Umbiegungsstelle" of Schaer). Radiographs do not show signs of osteoarthritis of the shoulder joint. The beginning of symptoms is acute without any known injury. The excruciating pain is responsible for the marked limitation of movements. Following disappearance or removal of the calcific deposit the patients usually remain free of symptoms.

On the other hand, patients suffering from ruptures of the rotator cuff belong to an older age group (50 to 60 years) and are laborers or factory workers (Steinbrocker). Rupture occurs at the tendon insertion into bone. Calcifications and ossifications seen at this level histologically should not be confused with calcifying tendinitis. Radiographs show signs of osteoarthritis, such as cysts, irregularities of the cortex, bony sclerosis, and/or narrowing of the acromio-humeral interval (Cotton and Rideout). A period of chronic pain precedes the rupture which occurs during an effort. Conservative or operative treatment never result in a restitutio ad integrum.

It is generally agreed that radiologically visible calcium deposits and ruptures of the rotator cuff do not appear together (DeSèze and Welfling, Friedman, McLaughlin, 1963; Neer, Ollson, Pedersen and Key). The observation of Wolfgang of eleven instances of calcification among 74 cases with tears should be carefully evaluated since this author did not differentiate between complete and incomplete tears. Firstly, tears can be incomplete, secondly, rupture of the calcium deposit into the bursa is necessarily accompanied by an incomplete tear and thirdly, no proof exists that incomplete tears will always become complete. Moreover, Wolfgang did not prove that patients showing calcification had a complete tear, which in our study is called "rupture". Respecting this distinction between incomplete and complete tears, Ollson proved through a statistic analysis that no association exists between calcifying tendinitis and cuff ruptures. McLaughlin and Asherman are of the same opinion. They state that the presence of calcification constitutes a strong evidence against a rupture.

In view of so many differences between calcifying tendinitis and cuff ruptures, a study was undertaken to determine whether the pathogenesis of both entities is indeed identical.

**Material and Method**

Biopsy material from the supraspinatus tendon was obtained from eighteen patients during removal of their calcium deposit and from four patients during repair of the tendinous cuff. Care was taken to remove a portion of the normal tendon adjacent to the lesion. Two patients with calcifying tendinitis received tetracycline pre-operatively permitting fluorescence studies. In additional four cases the supraspinatus tendon was removed in toto during autopsy. In these cases, varying from 64 to 79 years of age, no history of shoulder pain was recorded.