DOUBLE JEOPARDY: PATHOLOGICAL FRACTURE AND NON-UNION OF PROXIMAL HUMERUS DUE TO CHONDROCALCINOSIS

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Abstract:
Fractures of the humerus constitute 5% to 8% of fractures and most have an uneventful healing, but occasionally non-unions of the fracture with joint stiffness of shoulder and/or elbow and prolonged debilitating pain may be encountered. Predisposing conditions usually are osteoporosis, obesity, alcoholism and smoking. Comminuted or segmental fractures, soft tissue interposition at the fracture site, improper fixation and infection may also result in non-union.

A fracture of neck of the right humerus (dominant limb) in a young lady failed to unite following internal fixation and lead to atrophic non-union with implant loosening, which initially was suspected to be due to poor fixation and/or infection, but histopathological evaluation on two separate occasions of the fracture site revealed a picture of Chondrocalcinosis (CC). CC is a condition wherein deposition of calcium pyrophosphate dihydrate (CPPD) crystals occurs within articular cartilage and synovial tissue and is associated with joint pain leading to arthritis. The presence of these CPPD crystal has not been mentioned in the bone or at fracture sites in the literature. The histopathological evidence of CPPD at the fracture site in this case of humerus non-union did not establish whether the fracture was due to the pathology or the CPPD got deposited at the fracture site and was a cause of non-union.

Keywords: Chondrocalcinosis, Calcium pyrophosphate dehydrate(CPPD) ANKH gene, PHILOS, Non-union.
use of synthetic bone graft substitutes during primary procedure, which was denied by him, as in this case. She was immobilized in an arm pouch for 6 months. At 6 months the X ray revealed non-union at the fracture site with calcific speckling in the soft tissues adjoining the non-union site (Fig: 5) and routine blood investigations were normal. She was operated upon the non-union site was freshened, the tissue was sent for histopathological examination, with autologous corticocancellous bone grafting and internal fixation with PHILOS plate(Fig:6). The histopathology was reported as chondrocalcinosis. She was on regular follow up, at six months there was delayed progression in fracture healing, and at ten months from the second surgery the range of motion of shoulder improved and as per Constant Murley score it had improved from score of seven at time of first visit to 33 with no pain or instability, the radiographs shows the implant is in good position, the fracture healing has progressed but not complete and calcific speckling has resolved partially (Fig: 7).

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Discussion:
Chondrocalcinosis is a disorder of calcium pyrophosphate crystal deposition (CPPD) in the articular cartilage, synovial tissues lining the joint and the tendon sheaths adjacent to the joints. Its occurrence has not been in reported osseous structures. Chondrocalcinosis can occur in a Sporadic form or as in secondary chondrocalcinosis. Sporadic is a common occurrence in the elderly and often associated with osteoarthritis and also with hereditary haemochromatosis, hyperparathyroidism and hypomagnesemia are metabolic disorders that predispose to secondary chondrocalcinosis. This usually is attributed to a genetic predisposition to such condition which is a mutation in the ANKH gene that is involved in the transport of inorganic pyrophosphate. Fang HQ and colleagues reported an intra-articular chondrocalcinosis in the knees of 20 patients. Agrawal and colleagues reported a case of extra-articular chondrocalcinosis in a 53 year old man in the right scapular area which was initially considered to be a sarcoma.

References: