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On-line Case Report

Spontaneous bilateral olecranon fractures in a rheumatoid patient

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ABSTRACT

A case is described of a patient sustaining bilateral spontaneous olecranon fractures while undergoing rehabilitation following surgery for a hip fracture. The patient's underlying rheumatoid arthritis disease process most likely caused erosions and subchondral cysts formation in the mid-trochlear notch region. This area, in turn, acts as a pivot point in elbow extension/flexion movements. During rehabilitation, the patient became dependent on her upper limbs for mobilisation. This led to significant forces being put through this already weakened region, causing spontaneous bilateral olecranon fractures. Rheumatoid patients after lower limb surgery should be careful during rehabilitation, and avoid undue strains through their upper limbs.

Keywords: Olecranon fractures – Rheumatoid arthritis – Rehabilitation

Olecranon process fractures are common, be it due to either direct or indirect injuries.[1] However, spontaneous olecranon fractures are a rarity. We report a case of spontaneous bilateral transverse fractures of the olecranon in a rheumatoid patient. To our knowledge, this has never been described before.

Case report

A 75-year-old, non-demented, woman with rheumatoid arthritis underwent a dynamic hip screw fixation for neck of femur fracture. On admission, there was no clinical evidence of an elbow injury.

Following the operation, the patient underwent rehabilitation. During times of exertion when she assisted herself into and out of her chair, she began complaining of pain in her elbows. However, this was not initially investigated, and thought to be an exacerbation of her rheumatoid arthritis, which typically did affect her elbows.

Once discharged, she presented to her general practitioner with persistent pain in both her elbows. Radiographs of her elbows revealed bilateral displaced transverse fractures of the olecranon. (Figs 1 and 2) Two months had elapsed from her elbow symptoms to a diagnosis of the fractures.

On examination, both elbows were slightly bruised with a palpable gap over the olecranon processes. She had a functional arc of movement of 120° (range, 20–140°) in the left elbow and 110° (range, 10–110°) in her right elbow. The lack of full extension in both her elbows was thought to be due to previous fixed flexion deformity.

Due to her age, the osteopoenic nature of her bones, the fact that these injuries were not acute, and that she had a good range of movement, it was decided to treat conservatively. The patient continued using her arms effectively for activities of daily living.

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Figure 1 Left elbow anteroposterior and lateral radiographs.

Figure 2 Right elbow anteroposterior and lateral radiographs.

Discussion

The biomechanical stability of an elbow joint is not only dependent on passive stabilisers such as the congruency of the articular surface and the medial and lateral collateral ligamentous complex, but also on muscle groups whose line of pull across the joint provide dynamic stability.[2] In particular, the forces across the ulnohumeral component can be three times the body weight during strenuous lifting, with the largest forces acting axially at the distal humerus near full extension.[2,3] The force that is transmitted through the ulnohumeral joint, as apposed to the radiohumeral joint, varies according to the degree of flexion/extension and the degree of supination/pronation.[4] Finally, during flexion and extension, the olecranon process acts as a lever, with the fulcrum being the distal end of the humerus, and the pivot point being the mid-point of the trochlear notch.[5]

Avulsion fractures of the olecranon are extremely rare in adults, as it is more common for the triceps tendonous insertion to fail. However, when avulsion stress fractures have been reported, they typically occur in gymnasts and throwing-sports athletes.[6] In these cases, the fracture usually involves flakes of bone avulsed off the olecranon, and they are often managed conservatively.[6]

In terms of the rheumatoid disease, spontaneous fractures of metatarsals, lower tibia and fibula, the femoral neck and pelvic bones have been recorded.[5] Often, osteoporosis secondary to steroid therapy is cited as the cause.

When considering the rheumatoid disease and the avulsion stress fracture mechanism together, a slightly different pattern of fracture occurs. In chronic rheumatoid disease, where the elbows are affected, there are localised areas of weakness in the olecranon process due to deep erosions or subchondral cysts. The mid-portion of the trochlear notch, the pivot point, is often thinned by erosion or cyst formation.[5] Excess strain via the action of the triceps, may produce a fracture at the weakest point, the mid-trochlear region.[5] This appears to produces a transverse fracture through the mid-point, the olecranon, displayed by our case, as apposed to the flake fractures previously described.

Traditionally for displaced olecranon fractures, operative intervention has been advocated. However, in recent years, there has been an argument for conservative management in the elderly, largely due to quite high complication rates for operative intervention in this patient cohort. Morgan *et al*.[7] showed an overall complication rate for olecranon operative fixation, mainly tension band wiring, of 37%. The main complications included infection and prominence of metal work. Even if patients are operated on, depending on the type of fracture, fixation often leaves a residual loss of extension of approximately 10–15°, and a loss of flexion of less than 10°.[8] A case series by Veras Del Monte *et al*.[9] specifically looked at the functional results of displaced olecranon fractures that were treated conservatively in the elderly: none were limited in their daily activities. Our patient displayed a near full range of movement, with a loss of extension ranging between 10–20° bilaterally. Furthermore, given her age of 75 years and the osteopoenic nature of her bones, it was felt that a conservative approach was best suited for this patient.

Finally, elbows that have been significantly damaged by the rheumatoid disease process may require a 'total elbow replacement'. A previous olecranon fracture is not an absolute contra-indication for a total elbow replacement. However, one can intuitively say that the lack of any sizeable proportion of the olecranon may increase the difficulty in preparing the ulna, and may even affect the

stability of some of the currently used prosthesis, as often the articulating ulna component rests in the trochlear notch.

Conclusions

This case highlights the need for gentle rehabilitation regimens for elderly rheumatoid patients after lower limb surgery. They often put a significant load through the trochlear notch of the olecranon process when they mobilise from a sitting to a standing position, using their upper limbs to push themselves up. The trochlear notch is an area often damaged by chronic rheumatoid arthritis, and, hence, has a higher chance of sustaining an avulsion stress fracture.

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