We describe a patient who developed avascular necrosis of both humeral trochleae after combination chemotherapy for acute lymphoblastic leukaemia. This presented as progressive stiffness of both elbows with little pain. Radiography and MRI confirmed the presence of avascular necrosis at both sites. This region corresponds to a watershed between the medial and lateral vascular arcades which supply the distal humerus and may explain the susceptibility of this bony region to avascular necrosis. Treatment involved capsulectomy of the elbow and removal of osteophytes giving a good functional outcome on both sides.

Since the first case of avascular necrosis after intermittent combination chemotherapy was reported by Ihde and De Vita, this particular complication has become well recognised. We describe the occurrence of avascular necrosis of the humeral trochlea of both elbows in a patient who had received combination chemotherapy for acute lymphoblastic leukaemia.

Case report

A 22-year-old Caucasian man was diagnosed with acute lymphoblastic leukaemia in May 1994. He completed the Hoelzer protocol of combination chemotherapy which included high doses of corticosteroids over a period of six months with no radiotherapy.

He began to notice progressive stiffness of his right elbow 24 months after completion of the chemotherapy. Similar symptoms developed in his left elbow six months later. There was no pain, but he found the activities of daily living increasingly difficult. Throughout this period, there had been no pyrexia or involvement of other joints. Radiographs of both elbows were interpreted as normal. A bone-seeking isotope scan showed intense uptake of radionuclide in both elbows (Fig. 1). MRI showed extensive avascular necrosis in both joints, with associated effusions and areas of collapse (Fig. 2).

Clinically, each elbow showed an arc of flexion from 60° to 110°. There was minimal limitation of supination and pronation and crepitus was present in both joints. Repeat radiographs of both elbows revealed new bone formation and marginal osteophytes (Fig. 3). Arthroscopy was fol-
lowed by arthrotomy of the left elbow. At operation, there was extensive formation of new bone around both the coronoid and olecranon processes, which impinged on marginal osteophytes at the edges of the coronoid and olecranon fossae. A large osteochondral fragment of the capitellum was present. Both anterior and posterior capsulectomy was carried out with removal of the impinging osteophytes through a posterior longitudinal incision. A similar procedure was performed on the right elbow six months later. Histological examination of the joint capsule and cartilage showed non-specific changes with no evidence of malignancy. After operation, the patient received continuous passive movement, and later used night splints.

At the latest follow-up 60 months after chemotherapy and 18 to 24 months after surgery, the arc of flexion on the left was 10° to 130° and on the right 20° to 140°. Supination and pronation remained unchanged and there was no pain. The power of flexion and extension was normal. He remained independent in his activities of daily living and continued to work as an accountant.

Discussion

Avascular necrosis of bone after combination chemotherapy for lymphoma or leukaemia is well recognised.\textsuperscript{1,3-7} The frequency of the complication ranges between 1.3% and 3.3%.\textsuperscript{6} Avascular necrosis of the trochlea of the humerus after such treatment, however, has not been previously described. There are only two reports in the English literature of avascular necrosis involving the trochlea. Beyer et al\textsuperscript{8} and Osebold, El-Khoury and Ponseti\textsuperscript{9} described one case each, but neither of their patients had been treated with high-dose steroids. Bayer et al\textsuperscript{8} summarised the published reports of aseptic osteonecrosis of the trochlea and reported that the condition appeared to affect preadolescent and adolescent boys. The main symptoms were either swelling of the elbow or a restricted range of movement; pain was rarely present. The presentation of our patient was similar.

The potential for the trochlea of the humerus to undergo avascular necrosis may be explained by a recent study of

Fig. 2a
Coronal (a) and sagittal (b) T1-weighted MRI of the right elbow showing patchy areas of avascular necrosis involving the distal humerus, particularly the trochlea. The left elbow had similar features.

Fig. 2b

Fig. 3
Lateral radiograph of the left elbow before operation. There are marginal osteophytes and loss of joint space. The right elbow had similar features.
the arterial anatomy of the adult human elbow by Yamaguchi et al., who showed that the medial and lateral aspects of the trochlea are supplied by separate vascular arcades and that there is a watershed in the central part. Fat emboli, as postulated by Wang et al., may occlude the terminal branches of these arcades, jeopardising the blood supply to the central trochlea.

No benefits in any form have been received or will be received from a commercial party related directly or indirectly to the subject of this article.

References


