Avascular Necrosis Of Both Trochlea Following Chemotherapy For Acute Lymphoblastic Leukaemia

G Cox, B Ketzer

Citation

G Cox, B Ketzer. *Avascular Necrosis Of Both Trochlea Following Chemotherapy For Acute Lymphoblastic Leukaemia*. The Internet Journal of Orthopedic Surgery. 2008 Volume 13 Number 1.

Abstract

A 25-year old male patient presented with avascular necrosis (AVN) of the trochlea of both elbows following combination chemotherapy for Acute Lymphoblastic Leukaemia (ALL). He had developed restriction of movement in both elbows with little pain. Radiographs confirmed AVN and secondary osteoarthritis of the ulnar-humeral joint. The central part of the trochlea is an area with poor vascularity, due to a blood supply from separate medial and lateral arcades. Treatment was non-operative with a high functional level being maintained.

CASE REPORT

A 19 year-old, Caucasian man was diagnosed with acute lymphoblastic leukaemia (ALL) in April 2002. He as entered into the UKALL XII protocol, which involved combination chemotherapy, including high dose corticosteroids, followed by cranio-spinal irradiation.[7]

He was initially referred to our institution with right knee pain and restriction of movement in June 2003. Radiographs showed the appearances of avascular necrosis (AVN). Non-operative management was pursued until September 2004 when he underwent arthroscopy of the right knee. This showed extensive AVN of the medial femoral condyle. He was treated successfully with a total knee replacement in March 2005.

He was re-referred to our institution with a two-month history of bilateral elbow stiffness in September 2007. Restriction of movement in both elbows had started In June 2003, but this had not been as marked. Range of movement on examination was 30-110 degrees of flexion with a full range of pronation and supination bilaterally. Radiographs taken of both elbows showed bilateral AVN of the trochlea with secondary osteoarthritis of the ulnar-humeral joint (Figures 1 & 2). He was able to carry out all activities of daily living (ADLS) and work full-time. Given his functional level and lack of pain, he was managed non-operatively and was discharged with an open appointment.

Figure 1

Figure 1

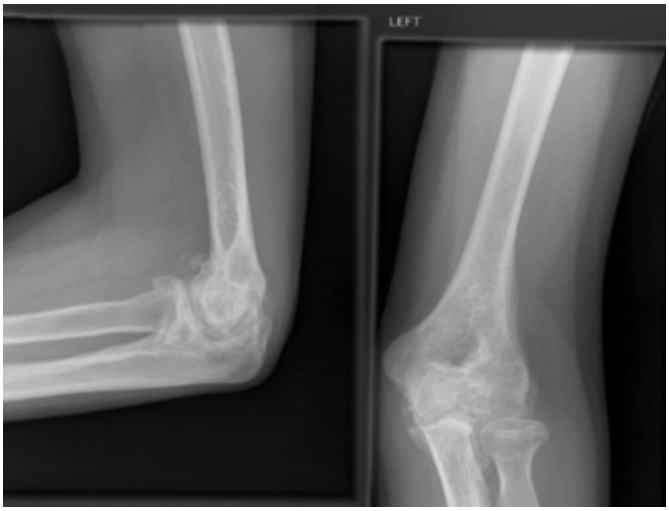
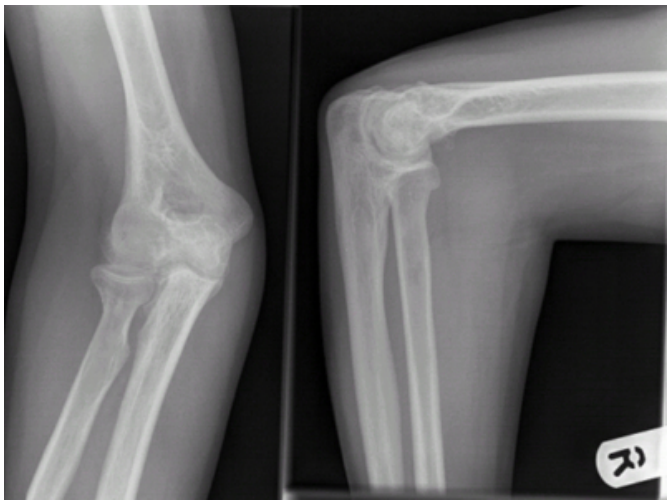


Figure 2

Figure 2



DISCUSSION

AVN following combination chemotherapy for leukaemia or lymphoma is a common complication.[4,5,6,9,10,11] AVN of the distal femur following this treatment is well recognised and has been reported several times.[2,8] However, AVN of both trochlea following combination chemotherapy has only been reported once before in English literature. This was by Chan & Bell who described this in a 22 year-old man living in Victoria, Australia.[3]

There are many similarities between our case and the previous reported case. Age, sex, race, diagnosis and treatment with combination chemotherapy are all similar. Presentation with restriction of movement rather than pain being the principle symptom is also alike. This appears to be a common factor in AVN of the trochlea, whatever the cause, and is one of the findings summarised by Beyer in his review of cases.[1]

Our case differs not only geographically but also in being complicated by AVN of the femoral condyle as well. Treatment of ALL, in our patient, also included cranio-spinal radiation. The case described by Chan & Bell was treated by anterior and posterior capsulectomy with excision of impinging osteophytes. Our patient was managed non-operatively. However, given the good functional outcome from Chan & Bell's case a similar operation could be indicated if his symptoms deteriorated.

We the authors agree with Chan & Bell's hypothesis for the pathogenesis of this disease. Namely, that the tenuous blood supply to the central part of the trochlea, by medial and lateral vascular arcades – described by Yamaguchi et al, is compromised by fat emboli as postulated by Wang et al.[12,13]

This case report serves to highlight this rare complication of the treatment of ALL with combination chemotherapy and demonstrates a non-operative management strategy.

References

1. Beyer WF, Heppt P, Glukert K, Willauschus W. Aseptic osteonecrosis of the humeral trochlea (Hagemann's disease). Arch Orthop Trauma Surg 1990;110:45-8
2. Bruder A, Ditmer H. Steroid-induced osteonecrosis of femoral condyles and bilateral Freyberg's disease, Ungallchirurg. 2002 Oct;105(10):939-42
3. Chan BK, Bell SN, Bilateral avascular necrosis of the humeral trochleae after chemotherapy. J Bone Joint Surg [Br], Jul 2000;82-B:670-672.
4. Engel IA, Straus DJ, Lacher M, Lane J, Smith J. Osteonecrosis in patients with malignant lymphoma: a review of twenty-five cases. Cancer 1981;48:1245-50
5. Harper PG, Trask C, Souhami RL. Avascular necrosis of bone caused by combination chemotherapy without corticosteroids. Br Med J 1984:288:267-8
6. Idhe DC, De Vita VT. Osteonecrosis of the femoral head in patients with lymphoma treated with intermittent combination chemotherapy (including corticosteroids). Cancer 1975;36:1585-8.
7. Medical Research Council Centre Acute Lymphoblastic Leukaemia Trial XII (UKALL XII). Protocol for Adult Patients with Philadelphia Positive ALL
8. Mont MA, Myers TH, Krackow KA, Hungerford DS. Total knee arthroplasty for corticosteroid associated avascular necrosis of the knee. Clin Orthop Relat Res. 1997 May;(338):124-30.
9. Murphy RG, Greenberg ML. Osteonecrosis in paediatric patients with acute lymphoblastic leukaemia. Cancer 1990;65:1717-21
10. Prosnitz LR, Lawson JP, Friedlaender GE, Farber LR, Pezzimenti JF. Avascular necrosis of the bone in Hodgkin's disease patients treated with combined modality therapy. Cancer 1981;47:2793-7.
11. Thorne JC, Evans WK, Alison RE, Fournasier V. Avascular necrosis of bone complicating treatment of malignant lymphoma. Am J Med 1981;71:751-8
12. Wang BG, Sweet DE, Roger SI, Thompson RC. Fat-cell changes as a mechanism of avascular necrosis of the femoral head in cortisone treated rabbits. J Bone Joint Surg [Am] 1977;59-A:729-35
13. Yamaguchi K, Sweet FA, Bindra R, Morrey BF, Gelberman RH. The extraosseous and intraosseous arterial anatomy of the adult elbow. J Bone Joint Surg [Am] 1997;79-A:1653-62

Author Information

G. Cox, MRCS, SHO Orthopaedics

B. Ketzer, FRCS, (Tr. & Ortho).
Consultant Orthopaedic Surgeon, Department of Trauma & Orthopaedic Surgery, Pinderfield General Hospital