Chondroblastoma

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ABSTRACT

Purpose. To review all patients with chondroblastoma treated in our hospital between 1993 and 2004.

Methods. Six men and 4 women aged 13 to 33 (mean, 21) years with histologically proven chondroblastomas were retrospectively reviewed through our tumour registry, patient records, radiographic and histopathologic reports. All patients underwent intralesional curettage and bone grafting with or without bone cement. The mean follow-up period was 5.5 (range, 2–11.8) years. Functional outcome was measured according to the Enneking scoring system.

Results. The proximal tibia and femur were the most frequently involved sites. All patients presented with pain but only 2 with joint effusion. In 3 patients the lesions were aggressive, in 3 others it was active, and in 4 it was latent. In 2 patients the lesions recurred at 5 and 28 months; both resolved after repeat surgeries without further recurrence. Functional outcomes were either good or excellent, except for one patient with a compartment syndrome of the contralateral leg. No patients had metastasis to lungs or collapse of articular surfaces.

Conclusion. Chondroblastoma is a rare benign bone tumour commonly presenting with pain. Outcomes are usually good after curettage and reconstruction with bone grafting.

Key words: bone neoplasms; chondroblastoma

INTRODUCTION

Chondroblastoma is an uncommon benign bone tumour arising from a secondary ossification centre in epiphyseal plates and apophyses. It usually occurs in adolescents and young adults, and involves the tibia, femur, and humerus. Only a few case series have been reported, the largest consisting of 60 to 70 patients. The recurrence rate is about 10 to 35% after curettage and reconstruction with either bone graft or polymethylmethacrylate bone cement. We describe treatments and outcomes of 10 patients with chondroblastoma.

MATERIALS AND METHODS

Records of 10 patients with histologically proven chondroblastoma, who presented between January 1993 and December 2004, were retrospectively...
reviewed through our tumour registry, patient records, and radiographic and histopathologic reports from the departments of orthopaedics and pathology and laboratory. Patients previously treated elsewhere were also included.

Histologic criteria for a diagnosis of chondroblastoma were as described by the World Health Organization. The epidemiology, presentation, radiographic findings, treatment, and oncologic and functional outcomes were recorded.

Patients were followed up for a mean of 5.5 (range 2–11.8) years. Radiographs of the tumours were taken every 3 months for the first 2 years, every 4 months in the third year, and 6-monthly thereafter. Tumours were categorised as aggressive, active or latent according to the radiographic classification of Springfield et al. Three tumours were aggressive (with poorly

Chest radiographs were also reviewed (to monitor for systemic metastasis).

Patients were considered ‘healed’ when symptoms were absent and marked peripheral sclerosis was seen with central opacification or progressive centripetal ossification with obliteration of the curetted and bone grafted areas on radiographs. Recurrence was defined as a return of symptoms and an enlarging radiolucency at the operated site. Functional outcome was measured according to the Enneking scoring system of the Musculoskeletal Tumor Society.

RESULTS

Six men and 4 women aged 13 to 33 (mean, 21) years were diagnosed with chondroblastoma. Patients 1 and 8 were recurrent cases having been treated elsewhere. All patients presented with pain but only 2 had joint effusion. In 6 patients the symptoms lasted for at least one year; in patient 9 with a patellar chondroblastoma the symptoms lasted the longest (for 2 years).

Sites of involvement were: the proximal tibia (n=3), the femoral head (n=2), the greater trochanter (n=1), the patella (n=2), the proximal humerus (n=1), and the fourth distal phalanx (n=1) [Fig. 1]. The tumours were located in the epiphysis (n=5), apophysis (n=3), and an extension from the epiphysis to the metaphysis (n=2). Endosteal expansion was noted in those involving the femoral head, greater trochanter, or patella; whereas cortical destruction with some periosteal new bone or neocorticalisation was noted in tumours involving the proximal tibia, proximal humerus, and fourth distal phalanx.

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Figure 1  Distribution of the 10 chondroblastomas, with number of cases indicated.

Figure 2  Patient 1: radiographs of the ring finger showing an aggressive lesion with endosteal expansion and periosteal new bone formation/neocorticalisation (arrow).

Figure 3  Patient 10: radiographs showing an active, lytic, epimetaphyseal lesion in the proximal tibia with well-defined rims of surrounding bone and some neocorticalisation (arrow).
defined margins and minimal or no intra-osseous reaction and no surrounding periosteal bone in the extra-osseous component, Fig. 2). Three others were active (confined to the bone with incomplete reactive rims or within a rim of reactive periosteal bone, Fig. 3). Four others were latent (confined to the bone, with well-defined complete reactive rims surrounding the tumour and without cortical destruction).

Treatment involved curettage (n=9), burring (n=2), bone grafting (n=9), and bone cementing (n=3) [Table]. In patient 1, the tumour recurred at 5 months and later resolved after repeat surgery. In patient 2 it recurred at 28 months, possibly secondary to incomplete curettage because of difficulty accessing the femoral head (via a lateral approach and under image intensification). A repeat curettage and bone grafting was performed, but the patient developed an infection. She underwent a final bone grafting after the infection resolved (with debridement and antibiotic bead placement).

Complications developed in 3 patients. Patient 8 underwent resection arthrodesis and reconstruction with a vascularised fibular graft and intramedullary nail. Five years later, she developed a peri-implant infection, which resolved after nail removal and antibiotic bead placement. Patient 5 had patellofemoral pain for 12 months, which later resolved. Patient 7 developed compartment syndrome of the contralateral leg after an 8-hour surgery on the contralateral leg (except in the knee).

DISCUSSION

Chondroblastomas are uncommon, accounting for approximately 1 to 2% of all primary bone tumours. In our hospital, they accounted for 0.9% of all bone tumours, 1.4% of all primary bone tumours, and 3.6% of all primary benign bone tumours. There is a male predominance and the peak incidence is in the second decade of life.* Pain is the most common symptom, and is usually present for less than a year.† The incidence of joint effusion varies from 4 to 30%.‡,§,∥ Despite epiphyseal involvement being a common feature, only 2 of our patients had effusions. Joints adjacent to a chondroblastoma may develop effusions, which are rarely apparent on physical examination (except in the knee).¶ Synovial extension of tumour is rare and a synovectomy is seldom necessary.© Patient 8 had synovial nodules after a failed synovectomy elsewhere. She underwent a complete synovectomy and knee arthrodesis at our hospital and had no further recurrence after follow-up for 7 years.

Chondroblastomas are usually well-circumscribed lytic lesions involving the epiphyses or apophyses.¶ In larger lesions, there may be extension into the metaphysis, and endosteal expansion or cortical destruction with periosteal new bone formation known as neocorticalisation. The aggressiveness of the lesion varies among studies. In a study of 70 lesions, 33% were aggressive, 53% were active, and 14% were
latent. On the other hand, Suneja et al. reported that 13% were aggressive, 85% were active, and 3% were latent. Hsu et al. classified 30% of their cases as aggressive, 60% as active, and 10% as latent. In our study, 30% were aggressive, 30% were active, and 40% were latent. Aggressive lesions tend to have a higher recurrence rate.

Management of chondroblastoma consists of curettage with or without burring and filling up the defect with bone graft and/or bone cement. Despite better and more aggressive treatment methods, recurrence rates range from 8 to 30%, whereas systemic metastasis rates range from 0.8 to 6%. Factors contributing to recurrences include: young age, aneurysmal bone cyst components, aggressiveness, anatomic site, and inadequate surgery. The suspicion that an open growth plate negatively impacts local recurrence has not been proven.

Patients with lesions in less accessible locations (e.g., talus, proximal tibia, and proximal humerus), or those with aggressive tumours, recurrences, and repeat surgery, or those with restricted joint movement and degenerative changes, had poorer outcomes.

**REFERENCES**