ABSTRACT

Purpose. To report on 14 patients with osteoid osteomas treated by computed tomography–guided radiofrequency ablation.

Methods. Nine males and 5 females aged 13 to 45 (mean, 25) years with osteoid osteomas were included. The proximal tibia was the commonest site involved. A bipolar 18-gauge radiofrequency probe with a 9-mm active tip was used. A 4.5-mm hollow drill was introduced into the nidus. Energy application was started at 2 W and increased to a maximum of 5 W. Heat was applied for 4 to 6 minutes at 90 degrees Celsius.

Results. 12 (86%) of the 14 patients had prompt pain relief; the remaining 2 underwent a repeat ablation. After a mean follow-up period of 19 (range, 9–25) months, no patient had pain recurrence.

Conclusion. Radiofrequency ablation is a minimally invasive and cost-effective treatment for osteoid osteomas.

Key words: bone neoplasms; catheter ablation; osteoma, osteoid

INTRODUCTION

Osteoid osteomas are benign circumscribed tumours of spongy bone, smaller than 1 cm in diameter. They consist of highly vascularised connective tissue surrounded by a ring of bony sclerosis, and mostly occur in young adults.1 Traditional treatment was curettage with excision of the nidus, but percutaneous computed tomography (CT)–guided radiofrequency ablation is now considered the treatment of choice.2–4 We present 14 patients with osteoid osteomas treated by CT-guided radiofrequency ablation, which is a minimally invasive and cost-effective procedure with a low complication rate.
MATERIALS AND METHODS

Between May 2004 and January 2007, 9 males and 5 females aged 13 to 45 (mean, 25) years with osteoid osteomas were included in this prospective observational study. The diagnosis was based on radiography and CT, and was supplemented with 3-phase bone scanning. Histopathological diagnosis was not obtained before surgery. The proximal tibia was the commonest site involved (Table). Three patients had undergone curettage and (incomplete) excision of the nidus elsewhere with poor or no relief in pain.

The nidus was first located by thin-cut CT sections. A 4.5-mm hollow drill or a Jamshedi needle was introduced into the nidus (Figs. 1 and 2). A bipolar 18-gauge radiofrequency probe with a 9-mm active tip was inserted through an introducer sheath and connected to the radiofrequency generator. Energy application was started at 2 W and increased to a maximum of 5 W. The procedure was terminated if a resistance of 900 ohms was reached. Heat was applied for 4 to 6 minutes at 90°C. In most patients, the entry point was closed using ≤2 stitches.

The mean hospital stay was 2 (range, 1–3) days. Mobilisation was started depending on the site involved. Full weight bearing and walking was initiated within a mean of 2 weeks in patients with lower limb lesions. Patients were followed up at week 1, month 1, and every 3 months thereafter. Results were evaluated in terms of reduction and absence of pain.

RESULTS

The technical success rate was 100%; the thermal probe was placed within the nidus of all lesions. 12 (86%) of the 14 patients had prompt pain relief and were able to return to normal activities. The remaining 2 had no pain relief and underwent repeat radiofrequency ablation within 3 months; one of them with a proximal tibial lesion achieved good pain relief (after having undergone failed surgery elsewhere), another with a proximal femoral lesion had no pain relief and underwent curettage and excision of the nidus. One patient with a tibial shaft lesion developed cellulitis, which responded well to a short course of antibiotic therapy. Radiological healing was evident in only 4 patients. There was no correlation between pain relief and absence of radiological healing. After a mean follow-up period of 19 (range, 9–25) months, no patient had pain recurrence.

DISCUSSION

Despite being benign, osteoid osteomas can result
in extreme disability secondary to unrelenting pain. Percutaneous radiofrequency ablation achieved a success rate of 89% in 263 patients over 11 years, comparable to 93% in our study. The procedure is minimally invasive and cost effective. Access to critical areas including the cervical spine and hip can be easily attained through a probe, with minimal risk of injuring adjacent vital soft tissue structures. Technical success depends on the nidus size, the site involved, the surgeon’s skill, the probe temperature, whether the procedure is primary or secondary, and whether a monopolar or bipolar ablation device is used. High-energy delivery techniques provide better pain relief than manual energy control devices.

The commonest complication is skin burn with thermal necrosis. Recurrence rates are between 5 and 25%, and can be minimised with more precise probes. Poor skin quality, unrelenting diabetes, and local sepsis are contra-indications to the procedure. Caution is required when the procedure is used in patients with cardiac pacemakers.

REFERENCES