OSTEOİD OSTEOMA : PERCUTANEOUS TREATMENT WITH CT GUIDANCE

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SUMMARY

In three patients suspected osteoid osteoma was treated by CT guided percutaneous resection. Osteoid osteomas were located in the appendicular skeleton in all patients. All patients were successfully treated with complete relief of pain. There is no recurrence of symptoms during a follow-up period of 6 - 14 months. Histological confirmation was obtained in all cases.This technique can be used to treating osteoid osteoma successfully.CT guided percutaneous resection is a safe and simple technique as an alternative to the open surgical procedures.

Key words: *Osteoid osteoma, CT guided percutaneous treatment*

ÖZET

Osteid Osteoma düşünulen 3 hasta, bilgisayarlı tomografi kılavuzluğunda perkütan tedavi edildi. Osteid Osteomalı tüm hastalar apendüküler lokalizasyonlu idi. Tüm hastalar ağrının azalmasıyla başarı ile tedavi edildiler. 6-14 aylık takip sürecinde bulgularda rekürrens olmadı. Tüm olgularda histolojik uyum elde edildi. Bu yöntem osteid osteomalı olgularda başarı ile kullanılabilir. Bilgisayarlı tomografi eşliğinde perkütan rezeksiyon açık cerrahi işleme alternatif emniyetli ve basit bir tekniktir.

Anahtar sözcükler: Osteid osteoma, bilgisayarlı tomografi kılavuzluğu, perkütan rezeksiyon.

Osteoid osteoma, is a benign bone tumor characterized by the formation of a nidus of vascular osteoid tissue surrounded by a margin of dense sclerotic bone (6,8,11). It was first described by Jaffe in 1935 (3,9).

Treatment of osteoid osteoma remains controversial. Many authors report spontaneous resolution of pain and healing of the lesions, although histologic confirmation of the diagnosis has never been provided in these reports (13). Medical treatment of osteoid osteoma is also described by Kneisl et al (12). However, surgical excision is curative for osteoid osteoma and is the treatment of choice (11). Surgical excision includes; en bloc resection and intralesional resection or curettage (6).

Intralesional resection and curettage has the highest and en bloc resection has the lowest recurrence rate (11). Proper pre- and intraoperative localization of the tumor is critical to ensure an adequate resection and to minimize the chance of recurrence (8,19). Large en bloc resection may become necessary with the possible risk of fracture or bone distortion (5). CT can also be used to provide guidance for percutaneous treatment and it has been recently reported (2,4,5,7,14,15,16,17,18,20).

We report our experience with three histologically documented osteoid osteomas treated with CT-guided percutaneous resection.

MATERIAL and METHODS

Between January 1995 and September 1996 three patients who had osteoid osteoma were studied. There were two male and one female patients and ages ranged from 8 to 21 (Mean age 13.8 years).

For all patients, a thorough medical history was obtained and a physical examination, plain radiography and bone scintigraphy were

performed. Computed tomography was used if a nidus was not clearly apparent on plain radiographs (Figure 1). All patients whose cases were reviewed had a nidus that was apparent on radiography or computed tomography.

All lesions were located in appendecular skeleton . Two were in the lower extremity: one in the femur, one in the tibia, one lesion was in the upper extremity: in the humerus .

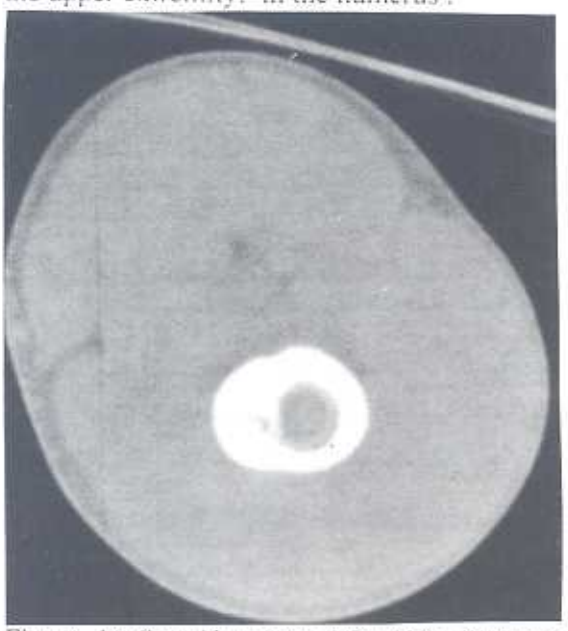

Figure 1: Osteoid osteoma 1/3 middle diaphysis of femur. CT section.

In three patients, percutaneous resection of osteoid osteoma was performed in the CT scanning room according to the precise rules of surgical ascpsis.Two patients were treated under regional anesthesia and one patient was treated by local anesthesia. In one patient, the lesion was located in the tibia, a pneumatic cuff was placed and inflated around the limb root in order to reduce bleeding during the procedure. After the patient and the involved extremity were immobilized, 1 mm thick contiguous CT sections were obtained to precisely locate the lesion. A small skin incision was made and a drill resection system was then used to resect the osteoid osteoma.

A guide wire is inserted into the nidus, with a course a short and direct possible, avoiding vascular and nervous structures. The correct position of the guide wire is checked by obtaining additional CT scans (Figure 2). When the guide wire is correctly positioned into the nidus, the 4.5 mm drill is introduced over the guide, up to the bone surface and drilling is performed (Figure 3).

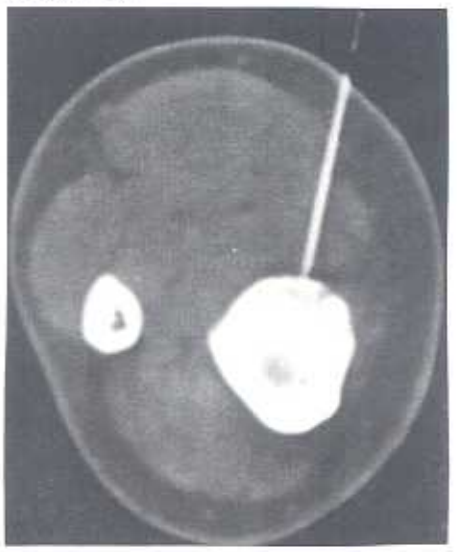

Figure 2 : A Kirschner's wire is positioned in to the lesion's center with a hand drill.

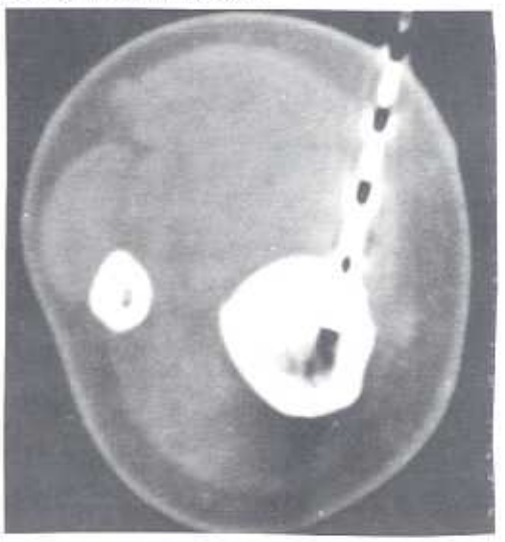

Figure 3: A 4.5 mm drill is inserted around the wire and resection was performed by the drilling.

This drilling process was repeated by 7 mm drill. After drilling, a bone curet is used to remove any residual fragments of the nidus. Postprocedural CT scans are obtained to confirm the total excision of the lesion, and specimens of the removed bone were sent for histologic study.

RESULTS

In all patient's, tissue was available for histological examination. The findings were typical of osteoid osteoma.

The histological features of trabecular thickness, reactive bone formation, proportion of fibrovascular stroma and ratio of osteoid and mineralized matrix were examined.

All patients had a follow- up for 6-14 months (mean 8.8 months).

All patients noted dramatic relief of their pain after the operation and during follow-up, and all the patients remained free of pain.

All patients achieved a full range of movement and all patients were allowed to bear weight two days after operation. They returned to their daily activities at mean 8 days (between 6 -10 days).

There were no severe vascular or neurological complications during the procedure and no profuse blood loss.There were no infectious complications despite the procedure being performed in the CT scan room .

Follow-up plain radiograms and CT examinations were performed in all patients at 3 - 6 months after the procedure, showed healing and no evidence of a nidus.

DISCUSSION

Osteoid osteoma is a benign skeletal lesion that may occur in virtually any bone. The clinical presentation and radiographic findings are characteristic (6,8,11). However, sometimes it is necessary to differentiate it from osteoblastoma, Brodie abscess, eosinophylic granuloma of bone (1). Scintigraphy and CT are useful in identification and precise localization of the nidus (3,10,13).

Pain in patients with osteoid osteoma is due to the presence of nerve fibers around vessels in the nidus. Lesions must be either totally removed or destroyed to achieve complete and permanent pain relief (2). However, identification of these lesions (usually < 1 cm) at operation is difficult. Sometimes the nidus is partly or completely left in place (5). Local resection or curettage of these lesions includes recurrence risk in some cases, and despite en bloc resection treatment, recurrence may occur (11,14).

Recently, CT guided percutaneous treatment of osteoid osteoma was reported. Steinberg et al used CT to precisely position a 0.028 mm C wire to within 1 mm of the nidus (18).

Voto et al, reported 9 cases in which the lesion was treated percutaneously under CT guidance with a biopsy needle (20).

Mosheiff et al also used a biopsy needle to remove osteoid osteoma of the scapula (15). Doyle and King reported two cases with Craig bone biopsy needle (7). Mazoyer et al used CT guidance for a combination of drilling and core biopsy to successfully treat seven patients (14).

Rosenthal et al used percutaneously placed radiofrequency electrodes to generate heat to destroy the nidus in four patients (17).

Assoun et al used percutaneous resection with CT guidance in 23 skeletal lesions and 1 lumbar spine lesion (2).

Baunin et al used CT-guided percutaneous resection of osteoid osteoma in eight children (4). Berg et al also treated 18 patients with osteoid osteoma by using percutaneous thermocoagulation of nidus under CT guidance (5).

We successfully treated three osteoid osteoma by CT guidance percutaneous method. Our results are generally similar to those published by Voto et al and Doyle et al. We prefer the use of local anesthesia during the CT- guided percutaneous procedure because it provides comfort to both the patient and the surgeon and therefore ensures better control of the resection. This technique is minimally invasive, which allows for complete, acurrate excision and early return to activity. This procedure presents potential advantages that traditional open surgery techniques do not have. A subsequent injection of absolute alcohol into the resection site may be used to completely destroy any residual nidus. Histological evaluation with this technique, however, is less definitive (5).

Treatment of osteoid osteoma can be made by many different ways. Most of surgeons prefer en bloc resection for treatment. However this technique is not enough to prevent the recurrence alone. CT-guided percutaneous resection may become the treatment of choice for osteoid osteoma. Our experience allows us to conclude that this technique has two important advantages. Firstly, effectiveness: the symptoms relieve in all patients, and histological confirmation is obtained. Secondly, safety: there was no severe complication. Since bone resection is focal no bone repair is needed. The hospital stay is short, and early weight bearing may be permitted.

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