Osteoid Osteoma: Resection with CT Guidance

Kalman Katz MD, Liora Kornreich MD, Rami David MD, Gad Horev MD and Michael Soudry MD

1Orthopedic Surgery Unit and 2Department of Imaging, Schneider Children’s Medical Center of Israel, Petah Tiqva, and Sackler Faculty of Medicine, Tel Aviv University, Israel

Key words: osteoid osteoma, resection, CT guide

Abstract

Background: Osteoid osteoma is a benign bone lesion characterized by nocturnal pain mostly, which may be relieved by non-steroidal prostaglandin inhibitors. Treatment by complete resection of the nidus immediately relieves the pain. Intraoperative location of the nidus may be difficult, and extensive bone resection may be necessary to ensure complete excision. Few studies have described resection of osteoid osteoma under CT guidance, and little attention has been given to lesions near the neurovascular bundle.

Objective: To report our results of osteoid osteoma resection under CT guidance, with specific attention to lesions lying near the neural structure.

Methods: Nine patients with suspected osteoid osteoma underwent resection with a 6.8 mm core drill under CT guidance.

Results: Histologic confirmation was obtained in seven patients, while in two there was no evidence of the nidus in the excised bone material. All nine reported complete pain relief immediately after the surgery. Postoperative CT scan showed complete removal of the osteoid osteoma.

Conclusions: Removal of osteoid osteoma under CT guidance is simple, safe and allows complete removal of the nidus with low morbidity.

Osteoid osteoma is a benign bone lesion characterized by the formation of a small nidus of variably calcified osteoid tissue in the stroma of loose vascular connective tissue, surrounded by a margin of dense sclerotic bone. The lesion causes considerable pain, more marked at night, which may be relieved by non-steroidal prostaglandin inhibitors [1].

Treatment consists of complete resection of the nidus, which immediately relieves the pain. Intraoperative location of the nidus may be difficult, and extensive bone resection may be necessary to ensure complete excision, with possible risk of fracture and an extended period of healing.
To avoid nerve injury, a small incision was made over the skin mark in the remaining three patients, in whom the lesion was located near the ulnar nerve in the posterior medial cortex of the condyle of the humerus and in the posterior cortex of the femoral neck [Figures 1 and 2]. With the patients in the prone position, the bone surface was exposed by blunt dissection, and with direct vision under CT guidance the guide wire and the core drill were inserted into the nidus. All patients received prophylactic antibiotic treatment before surgery.

**Results**

Complete and immediate relief of pain was achieved in all cases. Postoperative plain radiograph and CT scan confirmed complete removal of the nidus [Figure 2B]. In seven patients a nidus was found on histological study; in one there was no evidence of a nidus in the excised bone material and in one the heat caused by the power drill burnt the excised material. The procedures required from 2 to 4 hours to complete.

Although the operation was performed in the CT room, no infection occurred. The bone defect healed within 3 months in all patients, and they returned to full activity. No recurrence was observed at follow-up 6–36 months after surgery.

**Discussion**

Successful treatment of osteoid osteoma can be achieved only with complete excision of the nidus. Localization of the nidus during open surgery is not always possible, and extensive resection is sometimes necessary to ensure complete removal. Excision of excessive bone results in weakening of the bone, prolonged healing time, and high risk of fracture. The results of the present study, as well as others [2–5], demonstrate that CT guidance enables...
complete excision of the nidus and the removal of only small amounts of bone.

This method has some disadvantages: the main problem has been that a reliable diagnostic sample cannot always be retrieved for histological analysis [2,3]. This was true for two of our patients as well.

CT guidance is excellent for localizing the lesion and placing the guide. However, because the CT scans are obtained intermittently there is a danger of the guide and the drill being placed deeper than necessary. To minimize the amount of bone removed, the drill should be inserted through the shorter route from the skin to the lesion. To avoid neurovascular damage we recommend inserting the guide and drill under direct visualization when the lesion is adjacent to a neurovascular structure.

Removal of osteoid osteoma under CT guidance is simple, safe, and allows complete removal of the nidus with low morbidity.

**References**


**Correspondence:** Dr. K. Katz, Orthopedic Surgery Unit, Schneider Children’s Medical Center of Israel, Petah Tiqva 49202, Israel. Tel: (972-3) 925 3759; Fax: (972-3) 925 3988; email: catz@isdn.net.il.

---

**Capsule**

**Beta carotene and risk of diabetes**

Recent data suggest a protective role of carotenoids in the development of type 2 diabetes mellitus (DM), possibly via an antioxidant effect, but no randomized trial has directly assessed the efficacy of beta carotene to prevent DM. Liu et al. tried to determine whether long-term beta-carotene supplementation reduces the risk of developing type 2 DM.

A total of 22,071 healthy U.S. male physicians aged 40 to 84 years were tested in a randomized double-blind placebo-controlled trial, from 1982 to 1995. More than 99% of the participants had complete follow-up (median duration 12 years). Subjects were randomly assigned to receive beta carotene (50 mg on alternate days) or placebo. The results showed that among 10,756 subjects assigned to beta carotene and 10,712 to placebo, the incidence of type 2 DM did not differ between groups: 396 men in the beta-carotene group and 402 men in the placebo group developed type 2 DM. The lack of association between beta-carotene supplementation and incidence of type 2 DM persisted despite multivariate adjustment. There was no evidence of benefit when the period of risk was subdivided into years of follow-up or increasing duration of treatment.

*JAMA* 1999;282;1073

---

*It is amazing how complete is the delusion that beauty is goodness.*

*Leo Tolstoy*