CASE REPORT

CT Guided Laser Ablation of Osteoid Osteoma

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Abstract:

To present our experience of Computed Tomography (CT) guided laser ablation of radiologically proven osteoid osteoma in the inter trochantric region of the femur. A 19 year old female presented with severe pain in left upper thigh region since 6-7 months, which was exaggerated during nights and was relived on taking oral Non Steroid Anti Inflammatory Drugs (NSAIDs). On CT scan hypodense lesion with surrounding dense sclerosis noted in intertrochanteric region in left femur. Magnetic Resonance Imaging (MRI) revealed small focal predominantly cortical, oval lytic lesion in the intertrochanteric region which appeared hypointense on T1 Weighted Image (T1WI) and hyperintense on T2 Weighted Image (T2WI) and Short Tau Inversion Recovery (STIR) image. Diffuse extensive sclerosis and hyperostosis of bone was noted surrounding the lesion appearing hypointense on T1W and T2W images. Under local anesthesia the laser fibre was inserted in the nidus under CT guidance through bone biopsy needle and 1800 joules energy delivered in the lesion continuous mode. Complete relief of pain noted after 24 hours after the treatment. CT guided LASER ablation is a safe, simple and effective method of treatment for osteoid osteoma.

Keywords: Osteoid Osteoma, Laser Photocoagulation

Introduction:

Osteoid Osteoma (OO) is a benign bone tumor [1] but painful bone lesion that primarily occurs in children and young adults. Male: Female ratio is 3:1 .The most common symptom is bone pain, which often worsens at night and is typically relieved by aspirin or other nonsteroidal anti-inflammatory drugs. On plain-film studies, OO is seen as dense reactive bone with a radiolucent nidus at the core, which may be difficult to visualize. Computed tomography (CT) is the imaging modality of choice. The treatment options available for osteoid osteoma are conservative medical treatment, surgical treatment and percutaneous intervention. Laser photocoagulation as a method for treating osteoid osteomas was first described by Gangi *et al* [2].

Case History:

We are presenting a case of 19 year old female complaining of severe pain in left upper thigh since 6-7 months, which was exaggerated during nights and was releived on taking oral Non Steroid Anti Inflammatory Drugs (NSAIDs).

On CT scan 4 x 6mm hypodense lesion with surrounding dense sclerosis noted in intertrochanteric region in left femur (Fig. 1).

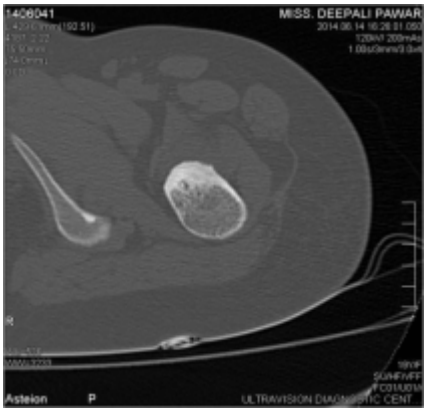

Fig.1: Plain CT Sclerotic Lesion with Hypodense Nidus in Intertrochanteric Region

MRI revealed small focal predominantly cortical oval lytic lesion in intertrochanteric region of left femur, which appeared hypointense on T1 Weighted Image (T1WI) and hyperintense on T2 Weighted Image (T2WI) and STIR. Diffuse extensive sclerosis and hyperostosis of bone noted surrounding the lesion appearing hypointense on T1WI and T2WI. Mild diffuse marrow oedema was seen in the left femoral neck and proximal metadiaphyseal region appearing hyperintense on STIR. Mild diffuse soft tissue oedema was noted in the surrounding muscles (Fig. 2a, 2b).

Before the procedure blood cell count and blood clotting analyses were performed. Procedure was performed on day care basis. Spinal anesthesia was given. On asterion super 4 CT scanner (Toshiba Medical systems, Tokyo, Japan) lesion was located in the intertrochanteric region of left femur by taking 2mm axial cuts. The maximum size of the nidus was 4 mm. Using the images, we adjusted the position of the patient's limb and marked the skin at the planned access point. The skin was prepared and draped. Osseous access was established with 13G bone biopsy needle [High Tech Surgical system] (Fig. 3). The LASER fiber was connected to Diode 810 laser machine [UK] and the fiber was inserted into the nidus after withdrawing the stellete of bone marrow needle (Fig. 4).

After conforming the fiber tip in the nidus 1800 joules energy was delivered in the lesion in

Fig. 2a: Coronal FLAIR

Fig. 2b Axial T2WI Nidus with Surrounding Sclerosis

Fig.3 Tip of bone biopsy needle in the nidus

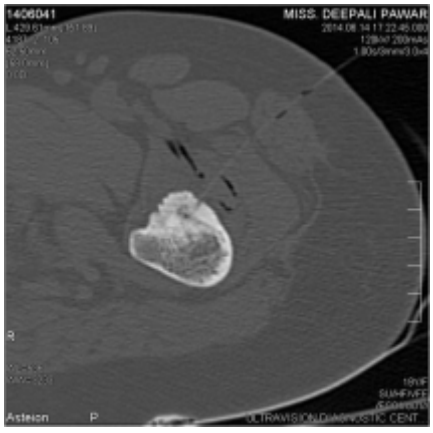

Fig.4 LASER fibre in the centre of nidus

continuous mode at 10W power [3]. Post-procedure CT was performed to confirm the lack of soft tissue swelling and hematoma. Patient tolerated the procedure well, no intraprocedure and postprocedure complications. Patient was discharged after 12 hours.

Patient was advised no weight baring activity of left leg for one month and follow–up after 1month.Complete relief of pain was noted after 24 hours [4]. Follow–up CT and MRI was done after one month which revealed mild sclerosis of the nidus (Fig.5a, 5b).

Fig. 5a: Follow-up CT after One Month

Fig.5b Follow-up MRI shown Air in the Nidus Show mild Sclerosis of the Nidus.

Discussion:

For treating patients, the nidus should be removed or destructed. As regards treatment, currently available options are conservative medical treatment, surgical treatment and percutaneous intervention [5]. Pain may disappear after several years of conservative treatment with an average time to pain resolution of 5-6 years however long-term medical therapy may be unacceptable due to refractory pain and complications with the chronic use of anti-inflammatory agents. Surgery has been considered as a curative treatment. Because intraoperative localization of the nidus is difficult, which is usually smaller than 10 mm in maximum diameter and surgical removal of the tumor often necessitates significant bone resection, there are very high chances of recurrenence. Laser photocoagulation as a method for treating osteoid osteomas was first described by Gangi *et al* [2] and recently reported a series of 114 osteoid osteomas. CT-guided radiofrequency ablation (RFA) has also been accepted as a demonstrably safe, minimally invasive, and cost-effective treatment for osteoid osteoma. There is no case series in the literature comparing radiofrequency ablation and laser photocoagulation in the treatment of osteoid osteoma [6].

Laser photocoagulation has some advantages over radiofrequency ablation. With laser therapy coagulation and tissue destruction starts from the probe which is acting as a point heat source and radiates from the center to the periphery. Size of necrosis is produced in proportion to the energy delivered and is therefore predictable. CT guided laser ablation is a safe, simple, and effective method of treatment for osteoid osteoma.

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