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INTRAVENOUS ZOLEDRONIC ACID FOR PAIN RELIEF IN BONE BRUISING OF THE KNEE: A CASE REPORT

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ABSTRACT: Bone bruising describes the post traumatic bone marrow changes demonstrated on magnetic resonance imaging (MRI). Isolated bone bruises account for clinical symptoms and may also lead to posttraumatic arthritis. We report a patient with isolated, NSAID resistant, post-traumatic bone bruising who improved with intravenous zoledronic acid.

KEYWORDS: IV Bisphosphonate, Zoledronic acid, bone bruise.

INTRODUCTION: Bone bruising describes the post traumatic bone marrow changes demonstrated on magnetic resonance imaging (MRI).¹ After trauma to the knee, although bone bruising can occur in isolation,² it is more often seen along with concomitant meniscal,³ and ligamentous injuries.^{4,5} Isolated bone bruises were initially thought of as benign.⁶ However, there are recent reports that these patients have persistent pain and delayed recovery.⁷ Bisphosphonates, which are potent inhibitors of bone resorption, also have anti-inflammatory action.⁸ Zoledronic acid is a third generation parenteral bisphosphonate with a high efficacy and favorable toxicity profile.⁹ We report a patient with isolated, NSAID resistant, post-traumatic bone bruising who improved with intravenous zoledronate.

CASE REPORT: A 36 years old man presented with a week's history of pain in the right knee following an injury sustained while playing football. The patient had visual analog scale (VAS: 0-10) pain score of eight. Physical examination revealed antalgic gait, tenderness over the medial femoral and tibial condyles and minimal effusion. Active and passive knee ranges of movement were 0-90 and 0-120 respectively but, pain worsened at end flexion. Anterior and posterior Drawer, Lachman, McMurray and varus/valgus instability tests were negative. Plain radiographs did not reveal any bony abnormalities. He was treated with non-steroidal anti-inflammatory drugs (NSAIDs), physiotherapy and rest.

At three weeks follow-up, pain and effusion persisted. Pain score on VAS was seven. MRI showed discrete foci of low signal intensity on T1-weighted images and high signal intensity on T2-weighted images in the medial femoral condyle. (Fig. 1) Menisci, cruciate and collateral ligaments were normal. A diagnosis of post-traumatic bone bruising was made. Since the pain was NSAID resistant, after full explanation to the patient of the treatment, intravenous zoledronic acid, 4 mg diluted in 100ml normal saline was infused over 30 minutes. Daily oral calcium supplement of 500mg and vitamin D of 400 IU were continued. Restricted weight bearing was advised but NSAIDs were discontinued.

He was followed up at six and twelve week intervals. The VAS pain score decreased from three at sixth week to zero at twelfth week, indicating complete pain relief. Knee range of movement also returned to normal. MRI repeated at 12th week showed a significant reduction in the size of bone bruise. (Fig. 2).

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DISCUSSION: In the past, bone bruising was considered as a benign entity without any sequelae and hence the treatment was conservative. However there are reports in the literature documenting the fact that patients with bone bruising have protracted clinical recovery, with more effusions and pain and slower return of motion, than those without evidence of bone bruising.⁷ Further there is also a concern that if these bone bruises are subarticular, they may predispose the overlying cartilage to earlier wear and tear.¹⁰

Bone marrow edema seen in those with bone bruises is also seen in those with avascular necrosis (AVN),¹¹ osteoarthritis (OA).¹² and non-traumatic bone marrow edema syndromes.¹³ There is evidence in the literature that this bone marrow edema especially in those with AVN hips and OA does produce pain and along with the reduction of pain the bone marrow edema also reduces.¹⁴

Bisphosphonates are the back bone of treatment of osteoporosis. Apart from inhibition of osteoclastic resorption, they have also been shown to suppress proinflammatory cytokines such as IL-1, TNF-alpha and IL-6.¹⁵ We have used oral alendronate, in patients with avascular necrosis and shown that it reduces pain and the need for NSAIDS and helped in the early mobilization of these patients. On follow-up, apart from pain reduction, there was also less bone marrow edema.¹⁶ Reduction of bone pain with IV bisphosphonates has been observed in patients with metastatic bone disease, corticosteroid induced osteoporosis and bone marrow edema syndrome.¹³

Intravenous pamidronate has been used in patients with a variety of painful conditions including vertebral fractures,¹⁷ and metastasis.¹⁸ Intravenous zoledronate is more potent and similar in toxicity profile when compared to parenteral pamidronate.¹⁹ Further unlike pamidronate the infusion can be given quickly and on an outpatient basis.

Our patient had recalcitrant pain in the knees in spite of treatment with optimal doses of NSAIDS for 3 weeks. A single infusion of IV zoledronate led to quick symptomatic recovery and early mobilization. Further there was a significant reduction in the size of the bone bruising on repeat MRI.

CONCLUSION: In conclusion IV zoledronate can be considered in those with bone bruising and recalcitrant pain. There is a need to perform well designed large studies with proper controls on this subject.

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Fig. 1: MRI showing discrete foci of high signal intensity on T2-weighted images in the medial femoral condyle.

Fig. 1

Fig. 2: MRI repeated at 12th week showing a significant reduction in the size of bone bruise.

Fig. 2

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