CASE REPORT

Arthroscopic excision of an intra-articular osteoid osteoma in the elbow joint

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SUMMARY

An osteoid osteoma is a rare, small, benign and painful tumour occurring in the extra-articular portion of long bones seen most commonly in the lower extremities. This is a case report of a 23-year-old female patient who underwent arthroscopic resection of an intra-articular osteoid osteoma. The nidus was completely removed by arthroscopic excision. The diagnosis was confirmed by postoperative histopathological analysis. In the case presented we have shown that intra-articular arthroscopy can be successful in the surgical management of benign bony lesions involving the elbow joint. We also present a review of the literature which reports on similar cases or intra-articular disease, preferred methods of surgical management and limitations in histopathological specimen acquisition for diagnosis.

BACKGROUND

An osteoid osteoma is a benign osteoblastic bone tumour with well-defined clinical, radiological and pathological characteristics. The tumour has a central vascularised and an osteoid-rich nidus, surrounded by distinctive reactive bony formation.¹ Ten per cent of all benign bone tumours are osteoid osteomas, and they are usually <1.5–2 cm in size.² They are seen two times more in male patients and occur most frequently in the second decade of life (typical peak incidence is in early 20s).³ The most frequent symptom is significant nocturnal pain which is alleviated by the use of non-steroidal anti-inflammatory drugs (NSAIDs) or aspirin. The tumours are usually embedded within the bony cortex of the long bones of the lower limbs (metaphysis or diaphysis).⁴

The rarer incidences of an intra-articular osteoid osteoma brings with it non-specific clinical manifestations which cause both diagnostic and therapeutic challenges.⁵

Clinical presentations commonly seen are pain, synovitis, limited range of motion, joint effusion and flexion contractures of the elbow joint.⁶ Notably, with intra-articular disease, there is delay in diagnosis.⁷

Open surgery and total excision of the nidus is one of the options of treatment for osteoid osteoma.⁸ Minimally invasive elbow arthroscopy may be a superior decision in surgical management. This case report of a 23-year-old female patient with an osteoid osteoma of the elbow joint is aimed to emphasise the role of arthroscopy while also providing a scaffolding for reviewing

and discussing current approaches in arthroscopic management.

CASE PRESENTATION

A 23-year-old, right-hand-dominant woman presented with a 6-month history of localised and persistent pain in the right elbow joint. There was no history of trauma. On physical examination of the elbow, there were no obvious abnormalities or swelling. The joint was tender with direct pressure but no erythema, heat or swelling noted. The range of motion of the elbow was unrestricted but pain was reported at the extreme flexion. The neurovascular examination was normal. Her laboratory tests and plain radiography were normal. Working diagnosis after the initial assessment was tenosynovitis involving the right elbow. NSAIDs were prescribed for 6 weeks with moderate improvement of symptoms but there was an element of nocturnal pain reported. CT scans performed subsequent to normal plain radiography were able to demonstrate a focal nidus at the anterior distal part of the humeral epiphysis (figure 1A,B). The findings were consistent with an intra-articular osteoid osteoma.

TREATMENT

Surgery was done under general anaesthesia. The patient was placed in a lateral decubitus position for arthroscopy. An elbow support positioned under the arm was attached to the operating table which allowed for the elbow to be moved in a 90° arc from flexion to full extension. A pneumatic tourniquet was applied. The elbow joint was inflated with 20 mL of saline to facilitate entrance of the 4.0 mm arthroscope into the intra-articular space. The anterior compartment was visualised and full clearance directly visualised for the insertion of instrumentation through the superomedial and anterolateral portal.

The lesion appeared as an elevated hyperemic bony protuberance with adjacent synovitis (figure 2). The nidus of the osteoid osteoma and circumferential sclerotic bone was curetted (figure 3). The excision material was sent for pathological examination. Reactive hyperemic bony columns were completely cleared using a motorised burr. Histopathology confirmed the diagnosis of an osteoid osteoma.

OUTCOME AND FOLLOW-UP

There were no postoperative complications. The patient reported pain reduction first week

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Figure 1 Sagittal (figure 1A) and axial (figure 1B) spiral CT showed a lesion with a central nidus and perinidal sclerosis in the anterior part of the distal epiphysis of the humerus.

postoperation. Normal activities of daily living were resumed on the 2 week follow-up. There was no recurrence of elbow pain at 3 years after treatment.

DISCUSSION

Osteoid osteoma is a common benign bone tumour. The classical radiographical image of the osteoid osteoma is typically the presence of a relatively radiolucent nidus almost always surrounded by the reactive bony sclerosis. It commonly involves the diaphysis of long bones⁹ and rarely epiphysal and intra-articular locations.¹⁰

Osteoid osteoma of the elbow joint, however, is extremely rare. The literature reports varying locations including reports describing lesions in the head,¹¹ proximal ulna,¹² coronoid process of the ulna,^{13–15} in the capitellum and¹⁶ distal humerus.^{17 18}

Patients with long-lasting intra-articular lesions are prone to develop synovitis, synovial proliferation, cartilage degeneration and articular rigidity. Lafforgue *et al* reported a case of osteoid osteoma with elbow synovitis and hypertrophic synovium.¹⁹ The intra-articular lesion can be misdiagnosed as tenosynovitis, synovitis or arthritis. Oftentimes, the diagnosis of osteoid osteoma in the elbow can be delayed. Osteoid osteoma may mimic synovitis, tendonitis, epicondylitis, inflammatory and infectious monarthritis, chondral lesions, osteomyelitis, stress fracture and other benign bone tumours.⁶ An initial working diagnosis of tenosynovitis in the case we present is consistent with what is expected to be encountered high up in the list of differential diagnoses.

Figure 2 Arthroscopic operative view showing the bony protuberance.

Figure 3 Arthroscopic operative view showing use of the curette for *en bloc* resection.

Diagnosis is usually straightforward in the setting of typical clinical and radiological findings. It is important to mention too that intra-articular osteoid osteoma has little to no reactive sclerosis around the nidus. Therefore, the radiolucent nidus is often overlooked on conventionally radiographs.²⁰ Thin-section CT and multiplanar reconstruction may improve diagnostic accuracy to assist in better defining and localising the lesion.⁸ In this case, we delayed the diagnosis because of atypical localisation and not taking suitable radiological imaging in the first evaluation.

MRI demonstrated the existence of bony oedema and reactionary changes in the soft tissue around the sclerotic lesion. However, there is controversy in the effectiveness of the MRI in the assessment of the osteoid osteoma as it may simulate more aggressive pathology or one of a different type.²¹

Radionuclide bone scans have a high sensitivity in the diagnosis of osteoid osteoma. The double-ring sign on scintigraphy is a characteristic of osteoid osteoma. Many times this characterised sign is absent in cases of intra-articular pathology because of coexisting synovial proliferation and hyperemia.²²

Excellent response to aspirin or NSAIDs is a common characteristic of osteoid osteoma that is nearly diagnostic criteria.⁹ This is due to the high level E2 prostaglandin synthesised by the tumour which is suppressed by anti-inflammatory agents. In the intra-articular localisation, the response to usage of NSAIDs for pain relief seems to be less effective than in the extra-articular localisation.⁶ Indeed, the patient did not respond as expected to pain relief with NSAIDs and aspirin.

Pain control can be achieved with NSAIDs conservatively. Conventionally, treatment of osteoid osteoma in the elbow has consisted of surgical excision with either curettage of the nidus or *en bloc* excision.⁸ Currently, minimal invasive surgical techniques are gaining popularity. Radiofrequency ablation or CT-guided excision is preferred methods in lesions that are surgically difficult to reach.³ Use of elbow arthroscopy has been progressively increasing. Arthroscopic treatment can be applied in loose body removal, debridement for septic elbow arthritis, debridement for osteoarthritis, synovectomy for inflammatory arthritis, capsular releases for stiffness, treatment of osteochondral defects, lateral epicondylitis and selected fractures with instability.⁷ Advantages of arthroscopic surgery are: a favourable reduction in the risk of infection, reduced trauma to the connective tissue, less scarring and less postoperative pain. There is also enhanced healing postoperatively with

faster return to work and performing daily activities shortly after surgery.

A few cases in the literature report arthroscopic excision of juxta-articular and intra-articular osteoid osteomas in the elbow.^{11 16 23 24} We chose to use excision via the arthroscopic approach. Elbow arthroscopy provided an excellent view of the anterior and posterior joint space which facilitated exact localisation of the nidus.

Nourissat *et al* state that complete excision of the larger lesions may be more challenging. They demonstrated that it is possible only to incompletely remove larger lesions via the arthroscopic technique.¹⁶ Kamrani *et al* treated osteoid osteoma of the elbow through arthroscopic ablation in 10 patients. They reported that most of their patients were unable to be diagnosed histologically due to insufficient sampling of the arthroscopic method.²⁴ Zupanc *et al* reported arthroscopic excision of a 42-year-old male patient with symptomatic juxta-articular osteoid osteoma of the capitellum. The removal of the nidus was performed with a motorised shaver which fragmented the lesion and made it unsuitable for histopathological diagnosis.²³ In our case, we did not encounter such limitation in our 23-year-old patient. We excised the nidus with curettage. We recommend the use of curettage to avoid tissue fragmentation to curtail risks which hamper histopathological assessment.

Researchers report that following removal of the nidus, flexion contractures, if present, resolve spontaneously requiring no further action for capsular release. However, patients who develop severe limitations in their range of motion, capsular release may be required.^{16 24} In the case we presented there was full range of elbow joint motion, therefore capsular release was neither considered nor indicated.

Learning points

- ▶ Young patients with persistent elbow pain that is not relieved by conventional management should prompt suspicion of another underlying pathology.
- ▶ Intra-articular osteoid osteoma can imitate several other articular pathologies.
- ▶ Patient complaining pain that increases during the night should bring to mind the osteoid osteoma.
- ▶ Diagnosis of the intra-articular osteoid osteoma is difficult unless there is a clue of the disease and suitable imaging is undertaken. CT has been found to be very helpful in the diagnosis.
- ▶ Arthroscopic surgery is safe and effective in the treatment of osteoid osteoma of the elbow joint.

Contributors SA: surgical treatment. EC: case presentation.

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