

Heterotopic Ossification Following Distal Biceps Tendon Repair: A Case Report

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Citation

W Blakeney. *Heterotopic Ossification Following Distal Biceps Tendon Repair: A Case Report*. The Internet Journal of Orthopedic Surgery. 2009 Volume 16 Number 1.

Abstract

A fit and healthy 54 year old surf lifesaver presented to the Emergency Department with an injury to his right upper limb. Whilst trying to hold on to a wayward boat by its rope, he felt a ripping sensation and severe pain over his distal biceps tendon. The clinical picture of complete rupture of distal biceps tendon was confirmed by Ultrasound Scan.

CASE REPORT

A fit and healthy 54 year old surf lifesaver presented to the Emergency Department with an injury to his right upper limb. Whilst trying to hold on to a wayward boat by its rope, he felt a ripping sensation and severe pain over his distal biceps tendon. The clinical picture of complete rupture of distal biceps tendon was confirmed by Ultrasound Scan.

The patient underwent surgery for repair of his distal biceps tendon 9 days later. The distal tendon was reattached using suture anchors through a single incision approach.¹³ Patient was immobilized in a splint for 6 weeks following the surgery. Range of motion exercises were started at the 6 week mark and patient made initial improvements. At 8 weeks patient complained of increasing pain at the distal radius with elbow flexion and forearm pronation/supination. On examination, a firm mass was palpable over the distal biceps tendon. Flexion range was limited from 25-105° with only 20° of supination and 35° of pronation. X-Ray Radiograph revealed heterotopic ossification (HO) of the distal biceps tendon (see figure 1). The extent of the HO was further defined by Computed Tomography (CT) Scan (see figure 2).

Figure 1

Figure 1

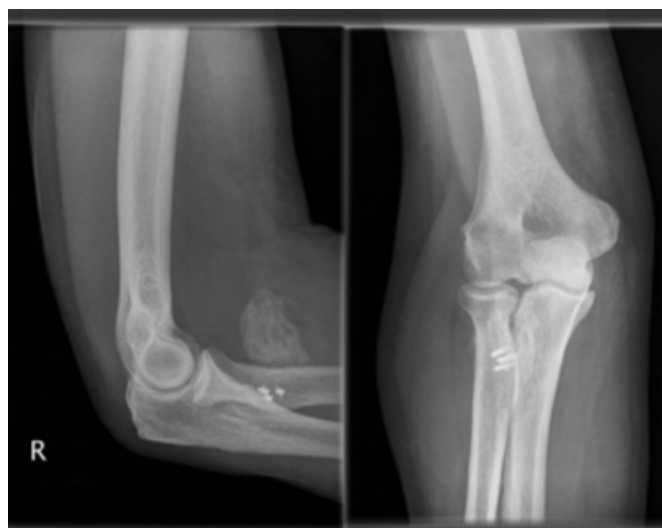


Figure 2

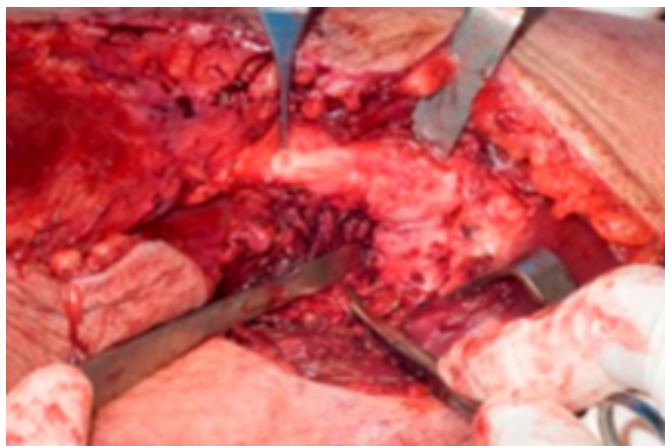
Figure 2



The patient was returned to theatre for excision of the HO 5 months after the initial surgery. At the time of operation, the heterotopic bone was noted to surround the distal tendon attachment (see figure 3).

Figure 3

Figure 3



Following the excision of the heterotopic bone from around the tendon, the biceps tendon was deficient. It was repaired using autologous hamstring graft and an Endobutton- a

previously described technique (see figure 4).⁷

Figure 4

Figure 4



The patient was also given a single dose of 8 Gy of radiotherapy following surgery and was started on 75mg Indomethacin daily to try to prevent further growth of heterotopic bone. Active range of motion exercises were started from Day 1 post-operatively. At 3 months post-surgery, patient had much improved range of motion with no evidence of recurrence of HO on X-Ray radiograph.

DISCUSSION

Heterotopic ossification is the pathologic formation of mature lamellar bone in non-osseous tissues. It results from an alteration in the normal regulation of skeletogenesis.¹² Its formation about the elbow can result from a number of causes. Direct trauma to the elbow is the most common cause, but it may also result from surgical intervention, neurological insults, burns and genetic disorders.²⁰

Surgical excision of heterotopic bone is indicated if the patient has any functional impairment or pain.⁵ Controversy about the timing of the surgical intervention has largely been resolved by evidence that early intervention gives good results.^{1,14,20} Surgical removal of HO is generally followed by prophylactic measures given its tendency to recur.

Physiotherapy, including range of motion exercises, should be started post-operatively. It is believed to work by inhibiting fibroblast activation and, thereby, preventing muscle contractures.⁵ The earlier physiotherapy is started, the less likely HO is to recur.

Inflammatory prostaglandins promote the osteogenic activity of bone morphogenetic proteins (BMPs), inducing formation

of heterotopic bone.¹⁶ Nonsteroidal anti-inflammatory drugs (NSAIDs) are presumed to act by inhibiting these inflammatory prostaglandins, which in turn inhibits mesenchymal cell differentiation.^{4,11} There is evidence from a systematic review of several randomised trials that NSAIDs decrease the incidence of HO.¹⁵ The majority of these trials were in the setting of HO in the hip, but HO about the elbow has also been shown to be successfully treated with NSAIDs.^{1,5,20}

Radiation therapy is another useful adjunct which has long been established as prophylaxis for the prevention of development of HO.⁶ It is believed to work by inactivating mesenchymal stem cells and stopping their differentiation into skeletogenic cells.³ The use of single-fraction therapy has been shown to be as effective as fractionated therapy.⁸ Preoperative radiotherapy (<4 h before surgery) has similar efficacy to postoperative administration (>72 hours postoperatively).⁶ A number of studies have also shown radiation therapy to be effective in the prevention of recurrence of HO specifically about the elbow.^{9,10,14,18}

Other therapies are being developed. Administration of Noggin, a BMP antagonist, into HO-predisposed muscle stem cells in mice has been shown to reduce HO.⁸ Another novel treatment which has shown promising results in animal models is the use of a selective retinoic acid receptor a-agonist.¹⁹ It is a targeted therapy which blocks formation of HO by interference with changes in gene expression needed for chondrogenesis and osteogenesis. These may be an option in the future for treatment of HO.

This case demonstrates that heterotopic ossification about the elbow can be readily treated with early surgical excision, adjunctive radiotherapy, administration of NSAIDs and prompt initiation of range of motion exercises.

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