Early Arthroscopic Management of Heterotopic Ossification of the Elbow

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Introduction

The formation of heterotopic ossification (HO) about the elbow commonly follows elbow trauma, closed head injuries, or major burns. Although it can form anywhere in the body, the most commonly involved joints are the hip and elbow. Although the exact etiology is unknown, possible predisposing factors include increased prostaglandin activity, tissue hypoxia, alterations in the sympathetic nervous system, and immobilization. This lack of full understanding of the etiology limits preventative measures. Many different preventive and treatment measures have been proposed, including early motion, cryocompression, indomethacin, disphosphonates, and radiation therapy. However, none other than radiation therapy has provided consistent success in preventing the formation of HO about the elbow. Once formation begins, traditional management has been to allow the process to mature before excision because it has been reported that early open excision has a high rate of recurrence. Recently, some surgeons have questioned the need for delay, with reports of early open excision of HO with satisfactory results. Wert et al reported on the first all-arthroscopic excision with release of early HO with similar excellent results. This chapter presents the arthroscopic technique for excision of HO about the elbow.

Indications

- Discovery of heterotopic bone about the elbow with a progressive loss of motion. The best time for surgical intervention is within the first 6 weeks.

Contraindication

- The primary contraindication is a lack of advanced skills in elbow arthroscopy.
Pertinent Physical Findings

Patients with early HO formation present with the following:
▶ Decreasing elbow range of motion
▶ Inspection may reveal some localized swelling
▶ Although there is often no specific area of tenderness to palpation, a generalized, swollen, boggy feel is often noted when palpating the capsule.
▶ Examination shows decreasing motion, initially with soft and then hard endpoints.

Pertinent Imaging

▶ X-rays
  ▶ Early x-rays may be completely normal.
  ▶ Once the motion loss occurs, repeat imaging may show wispy bone forming in the soft tissues.
  ▶ Subsequent imaging will reveal more bone formation becoming visible as the HO activity increases (Figure 25-1).
▶ Magnetic resonance imaging (MRI)
  ▶ Scanning will show the extent of the HO formation because the bone areas visible on early imaging will show only a part of the pathology (Figure 25-2).

Equipment

▶ Video arthroscopy equipment
▶ Interchangeable cannula system
Positioning and Portals

The patient may be positioned in the prone, supine, or lateral decubitus position. The advantages and disadvantages of each are been discussed in Chapter 1. The authors’ preferred position is prone with a small bump placed on a regular arm board under the upper arm to keep it parallel to the floor.¹
Step-by-Step Description of the Procedure

1. Review preoperative imaging to ascertain the exact locations of the HO and its proximity to the neurovascular structures.
2. Place the patient in the prone position with free movement of the elbow.
3. Insufflate the joint via the posterior or soft spot portal.
4. After carefully locating the ulnar nerve, establish a proximal anteromedial portal to visualize the anterior joint capsule.
5. Establish a proximal anterolateral portal via an outside-in technique.
6. The HO anteriorly is usually located anterior to the capsule and posterior to the brachialis, so it may not be readily visualized. The first step is to define the proximal extent by releasing the capsule off the humerus with an electrocautery and then resect the capsule until the HO comes into view. It is soft, woven-type bone adjacent to the humerus.
7. Continue visualizing from the proximal anteromedial portal and establish a straight lateral portal with a switching stick so that it can be used to retract the brachialis away from the HO and protect the neurovascular bundle.
8. Using the shaver in the proximal anterolateral portal and visualizing from the proximal anteromedial portal, resect the HO from top to bottom, always staying posterior to the switching stick and brachialis.
9. Switch the arthroscope to the proximal anterolateral portal and the shaver to the proximal anteromedial portal, and remove any remaining HO.
10. Using fluoroscopy confirms complete excision of anterior HO; check for restoration of motion.
11. Posterior excision follows a similar pattern:
   ▶ Establish posterior central and lateral portals.
   ▶ Elevate the triceps off the HO using a switching stick.
   ▶ A superior posterior lateral portal can be established to place a switching stick or retractor to hold the triceps away from the HO and to protect the ulnar nerve medially.
   ▶ The HO posteriorly is usually resected from distal to proximal with the shaver in the posterior central portal and the arthroscope in the posterior lateral portal.

Figure 25-3. Arthroscopic views of the woven type soft bone noted in early HO cases.
Postoperative Protocol

A Hemovac drain is placed in the anterior and posterior compartments overnight. Continuous passive motion and cryocompression are also used for the first week. Each patient receives radiation therapy within a 24-hour window before or after surgery; the exact amount is determined by the radiation oncologist but is usually around 700 rads. Physical therapy is started within 48 hours of surgery with an emphasis on motion and compression.

Potential Complications

The most fearsome complication is neurovascular injury. It is essential to mark out each of the nerves and know their locations throughout the procedure. This should be considered advanced arthroscopy due to the distortion of normal anatomy by the injury and the subsequent HO formation. Portal drainage due to failure to close the lateral portals occurs in about 10% of cases. Recurrence of the HO is also a potential complication.

Top Technical Pearls for the Procedure

1. Define the extent of the HO on preoperative imaging and evaluate the proximity to associated neurovascular structures.
2. Mark out all the neurovascular structures prior to beginning the procedure.
3. Use retractors to keep the soft tissues off the HO during resection.
4. Excise the HO in a set pattern. Anteriorly, the authors favor proximal to distal and lateral to medial, whereas posteriorly, they favor distal to proximal.
5. Evaluate the excision under fluoroscopy before completing the procedure.

References


