



Surgical management of an intratendinous ganglion cyst of the long head of the biceps brachii: a case report



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Intratendinous ganglion cysts are an incredibly rare phenomenon. A PubMed search yielded thirty-three unique results for “intratendinous ganglion cyst” and two results for “intratendinous ganglion cyst biceps brachii.” Neither of the biceps brachii cases referred to the specific surgical management of the cyst and the quantitative and qualitative measures of patient outcome. As the cases are so rare, the typical presentation and progression of the condition cannot be determined. The patient was informed that data concerning the case would be submitted for publication, and she provided consent.

Case report

A 38-year-old right-handed female with a past medical history of congenital cervical fusion presented with right shoulder pain. She was previously evaluated for right shoulder pain in 2013 at another institution. The mechanism of injury described by the patient was a “twisting and jerking motion” while performing daily activities of living. Due to clinical suspicion, studies were obtained, but the magnetic resonance arthrogram (MRA) revealed no pathology. Conservative management was initiated at this time, and the patient failed to achieve adequate pain relief. Four years later, she presented to our institution due to increasing shoulder pain related to lifting and carrying her three small children daily with constant 7/10 pain. She localized the pain to the anterolateral shoulder.

Upon physical examination, there was tenderness to palpation along the long head of the biceps. Shoulder range of motion was normal and equal bilaterally. Shoulder examination revealed no abnormalities. X-rays were obtained showing no abnormality and normal joint space alignment. Conservative management with physical therapy and anti-inflammatories was initiated with some relief of the pain.

At follow-up six weeks later, an MRA was discussed due to continued pain and stiffness. The patient was not willing to obtain this due to pain with the previous arthrogram. Instead, a diagnostic ultrasound performed by a musculoskeletal fellowship-trained radiologist was conducted which revealed findings consistent with a proximal long head biceps tendon rupture and partial tearing of the cranial/superior subscapularis tendon fibers at their insertion onto the lesser tuberosity (Figs. 1 and 2). A corticosteroid injection biceps tendon sheath under ultrasound guidance was performed with significant pain relief, and she was transitioned to a home exercise program.

Six months later, the patient felt a “pop” in her right shoulder, but the pain improved, so continuing the home exercise regimen was advised. A year after initial presentation, the patient continued to have pain in the right shoulder. At this point, the patient agreed to MRA, which revealed an intratendinous ganglion cyst within the extra-articular portion of the long head presumably related to prior injury, supraspinatus tendinopathy, and mild AC joint osteoarthritis (Figs. 3 and 4). The cyst measured approximately 0.6 cm in diameter and 3.3 cm in length. No rotator cuff or labral tear was identified.

On physical examination after the MRA, significant positive findings were Speed's and Yergason's tests with tenderness to palpation on the long head of the biceps. An ultrasound guided

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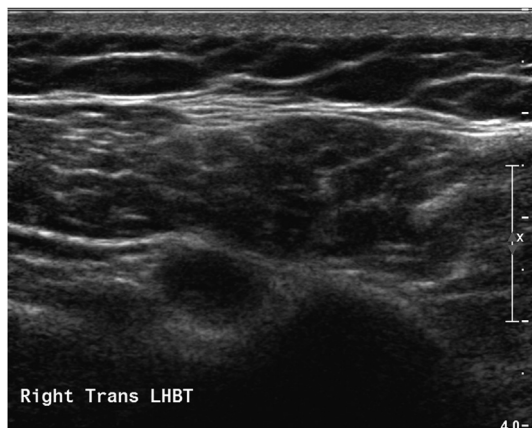


Figure 1 Transverse view of the long head of the biceps tendon suggesting a biceps tendon rupture due to the extra-articular portion of the long head of the biceps not visible within the bicipital groove and fluid distention within the tendon sheath.

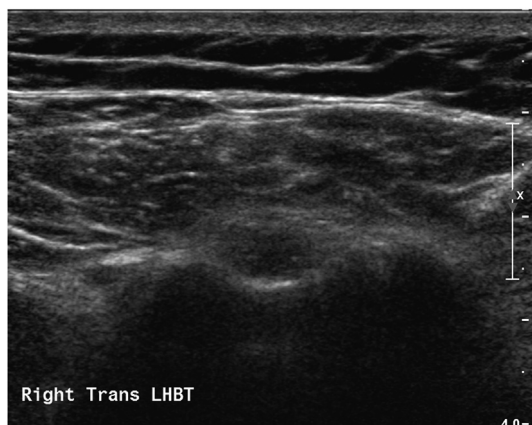


Figure 2 Alternative window of the transverse view of the long head of the biceps tendon.

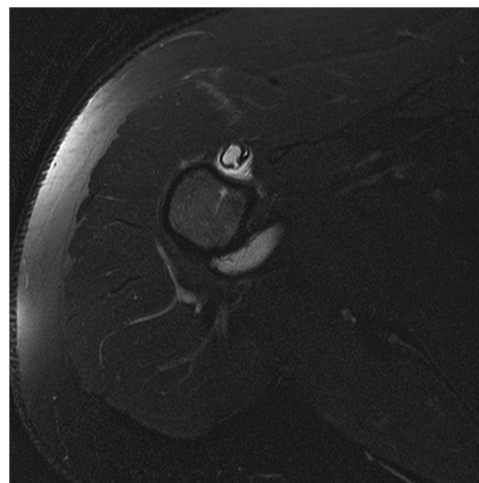


Figure 3 Axial T2-weighted view of the cyst.

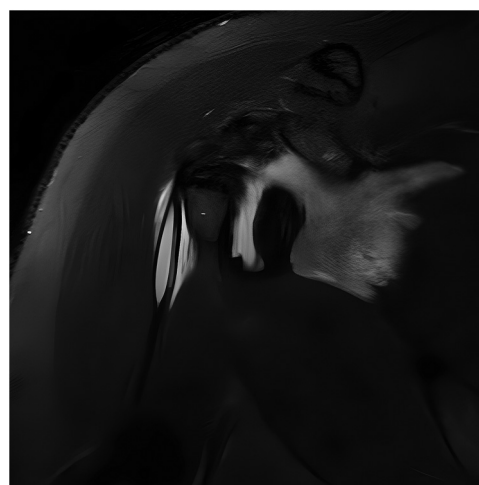


Figure 4 Coronal T2-weighted view.

aspiration of the cyst was attempted in office and failed. Another corticosteroid injection was performed at this time. The patient followed up six weeks later and stated the injection did not provide any relief with persistent 5/10 pain. Surgical intervention with subpectoralis biceps tenodesis was discussed and agreed upon.

Arthroscopy of the shoulder was initially performed to evaluate for intra-articular pathology. The patient was placed in the beach chair position with the use of an arm holder. A posterior portal was established, and the arthroscope was placed in the glenohumeral joint. The glenohumeral joint cartilage was grossly normal. The anterior and posterior labrum, subscapularis tendon, infraspinatus, and teres minor tendons were grossly intact. The supraspinatus demonstrated a small partial articular-sided tear that was minimal in appearance and no intervention was needed. The long head of the biceps tendon demonstrated normal attachment to the biceps anchor and no signs of a ganglion cyst intra-articularly. An anterior portal was established and a biceps tenotomy was then performed near the biceps anchor using arthroscopic scissors.

Once this was completed, attention was then brought to the subpectoral biceps tenodesis. Near the axilla, a 3-cm vertical incision is made along the medial arm starting 1 cm superior to the inferior pectoralis edge and subcutaneous dissection was taken down to the long head of the biceps tendon just below the pectoralis major. This was taken out of the wound and evaluation of the

long head of the biceps tendon demonstrated a large intratendinous ganglion cyst (Figs. 5 and 6).

The tendon was incised to confirm gelatinous fluid from the intratendinous portion. Once this was done, a FiberLoop (Arthrex, Naples, FL, USA) suture was used to perform a running locking stitch in the tendon. Two strands of the suture were then placed through an endobutton (Arthrex Pec Button). The anterior cortex of the humerus was then débrided of soft tissue and decorticated using a combination of Bovie cautery and a key elevator. A 3.2 mm drill bit was then used to drill a unicortical bone tunnel into the intramedullary canal just below the inferior border of the pectoralis major tendon. The endobutton was placed into the intramedullary canal and the suture strands were tensioned, reducing the long head of the biceps tendon down to the anterior humeral cortex. Once this was fixated to the anterior humeral cortex, the two FiberLoop suture strands were then tied on top of the tendon to complete the tenodesis (Fig. 7). The remaining proximal tendon was then amputated. The wound was then copiously irrigated, and a standard skin closure was then performed.

The patient's postoperative period proceeded without issue. She followed the standard physical therapy protocol for subpectoral biceps tenodesis with stretching and strengthening to tolerance after her one week follow-up appointment. At six weeks



Figure 5 Biceps brachii tendon preganglion cyst incision.



Figure 7 Final fixation of the bicep tenodesis.

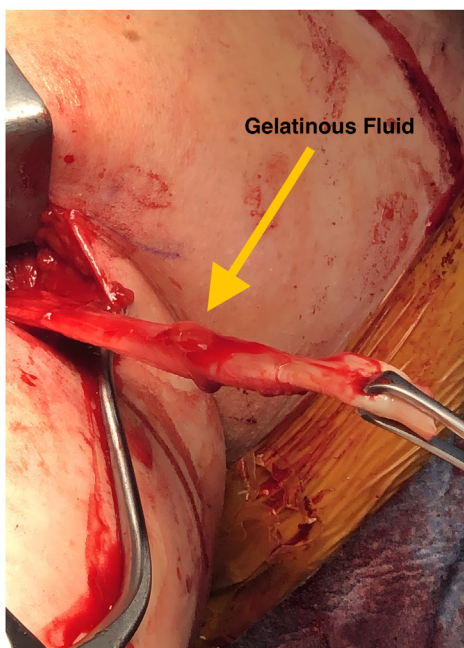


Figure 6 Intratendinous cyst with gelatinous fluid present after incising the tendon.

postoperative, the patient denied any pain in the right shoulder with no tenderness to palpation at the tenodesis site. Her visual analog scale score was 0/10 and single assessment numeric evaluation score was 100%. She had full range of motion, strength was 5/5 in all ranges of motion, and negative Speed's and Yergason's tests. Incision sites are well-healed with no signs of infection. She was discharged from formal rehab by 6 weeks postoperative and already undergoing activities she was unable to do previously.

The patient remained pain free at the three month follow-up visit. At 1 year postoperative, the patient had a visual analog scale score of 0/10 and a single assessment numeric evaluation score of 100%. At this time, she was discharged from the clinic.

Discussion

Ganglion cysts are benign soft tissue tumors most commonly found in the wrist, foot, and knee. The etiology of ganglion cysts is largely unknown, but some hypothesize trauma, tenosynovitis, or a congenital anomaly is responsible. It is thought trauma leads to an infiltration of hyaluronic acid into the tendon. This causes fusiform dilatation and dissects the fibers of the tendon or ligament.¹ In this case, previous repeated trauma to the tendon could have predisposed this patient to a ganglion cyst.

After the initial inciting event or anomaly, the mechanism by which the cyst forms is also unknown. Theories postulate that extra-articular mucin droplets join to form the body of the tumor. The wall of the cyst and the pedicle which attaches the cyst to a nearby structure subsequently form following the development of the tumor body.³ The wall is composed of layered sheets of collagen with interspersed fibroblasts and mesenchymal cells.³ The cystic fluid is composed of hyaluronic acid, glucosamine, globulins, and albumin.

Cysts are classified by their origin: tendon sheath, joint, bone (periosteal or intraosseous), or soft tissue.² Intratendinous ganglion cysts are quite rare and have been reported most commonly in the extensor tendons of the wrist.⁴ Few cases have been reported of an intratendinous ganglion cyst of the long head of the biceps tendon. Kishimoto described the first case in 2008, and Rutten described the second case in 2010, each of which are radiological studies.^{5,6}

Magnetic resonance arthrogram and ultrasound are highly sensitive and specific tests for suspected shoulder pathology. Due to the large width and length of the ganglion cyst, the initial ultrasound gave the appearance of fluid in the bicipital groove, thus accounting for the incorrect diagnosis of tendon rupture on the diagnostic shoulder ultrasound in this patient.

Subpectoral tenodesis was the approach chosen for this patient due to the more distal location of the ganglion cyst. In contrast to a proximal fixation with a suprapectoral approach, the subpectoral approach allows for removal of the distal pathology. There is also evidence to suggest that a subpectoral approach with distal fixation eliminates the potential for pain due to tendonitis within the

bicipital groove, which further strengthened the use of this approach for this patient.⁷

In this case, surgical intervention for an intratendinous ganglion cyst of the long head of the biceps allowed the patient to be pain free at 6 weeks postoperatively. MRA has higher resolution than diagnostic ultrasound, which allowed for definitive diagnosis of the ganglion cyst. Ultimately, conservative management failed and surgical management with a subpectoral biceps tenodesis was the best course of management for the very rare location of the ganglion cyst.

Conclusion

An intratendinous ganglion cyst of the long head of the biceps is a rare finding that can cause pain. It is best observed with MRA. Surgical intervention with open subpectoralis biceps tenodesis to address distal extra-articular tendon pathology allowed this patient pain relief and return to full activity.

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