Pseudoaneurysm After Arthroscopic Subacromial Decompression and Distal Clavicle Excision

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abstract

Arthroscopic shoulder surgery is considered a safe and effective method of treating a variety of shoulder pathologies and is associated with a low complication rate. The type and rate of complications can vary, depending on the procedure, positioning, surgical time, and anesthesia. Fortunately, neurovascular injuries occur infrequently. Numerous studies have described the proximity of neurovascular structures to portals placed in shoulder arthroscopy, in both the beach chair and the lateral decubitus positions. Accurate portal placement is important to avoid damage to adjacent neurovascular structures. Inaccurate placement of portals can lead to inadvertent damage to these structures and create more difficulty with visualization and angle of instrumentation, possibly compromising the success of the procedure. This article describes a 50-year-old man who underwent arthroscopic subacromial decompression and distal clavicle excision for persistent subacromial impingement and acromioclavicular arthritis. During postoperative follow-up, the patient had a small, bulging area located near the anterior portal site. Examination showed a well-healed anterior portal site with a small (approximately 2×2 cm), nontender, immobile mass located within the deep soft tissues just below the anterior portal incision. Ultrasound evaluation showed a pseudoaneurysm of a branch of the thoracoacromial artery (arrow). The patient underwent successful embolization of the pseudoaneurysm, with complete resolution of symptoms.
Arthroscopic shoulder surgery is considered a safe and effective method of treating a variety of shoulder pathologies. Reported complication rates are between 4.6% and 10.6%. The type and rate of complications can vary, depending on the procedure, positioning, surgical time, and anesthesia. Reported complications in shoulder arthroscopy include portal bleeding, chondrolysis, neurovascular injury, infection, frozen shoulder, severe postoperative pain, instrument breakage, airway obstruction, pleural injury, and significant fluid extravasation. Fortunately, neurovascular complication rates are reportedly low after arthroscopic shoulder surgery. Reported rates of nerve injury range from less than 0.2% to 3% in most cases to as high as 10% in some studies. Vascular injury during arthroscopic shoulder surgery remains rare, with the cephalic vein the most commonly injured structure.

CASE REPORT

A 50-year-old man presented with a history of worsening right shoulder pain. He was diagnosed with subacromial impingement and acromioclavicular arthritis and underwent 6 months of nonoperative management. Because of continued pain, the patient underwent elective arthroscopic subacromial decompression and distal clavicle excision.

Before undergoing surgery, the patient had an interscalene block. He underwent right shoulder arthroscopy in the beach chair position under general anesthesia using a standard posterior viewing portal located approximately 2 cm inferior and 2 cm medial to the posterolateral corner of the acromion. An anterior portal was created with an 18-gauge spinal needle using an outside-in technique, as described by Matthews et al. A midlateral portal was established with an outside-in technique by placing a spinal needle approximately 3 cm distal to the midpoint of the lateral acromion, in line with the posterior border of the clavicle. After diagnostic examination was performed, the patient underwent subacromial decompression and distal clavicle excision.

At the 6-week postoperative visit, the patient stated that his pain had completely resolved and his range of motion had improved significantly. However, he reported a small, bulging area near the anterior portal site that was painless and became more pronounced and pulsatile with activity. Examination showed a well-healed anterior portal site with a small (approximately 2×2 cm), non-tender, immobile mass located within the deep soft tissues just below the anterior portal incision. On palpation, it appeared to have a pulsatile nature. Given the examination findings and history, the differential diagnosis for the mass included abscess, hematoma, seroma, aneurysm, and pseudoaneurysm.

The patient was referred for arterial ultrasound examination, which showed a 3.7-cm pseudoaneurysm from a branch off the axillary artery. A vascular surgeon was consulted and recommended an arteriogram for further evaluation. The arteriogram showed a pseudoaneurysm involving a branch of the thoracoacromial artery (Figure 1). Coil embolization of the right thoracoacromial artery branch was performed, and postembolization arteriogram showed no filling of the pseudoaneurysm as well as occlusion of the artery distally (Figure 2).

At the patient’s 4-month follow-up, he continued to have painless right shoulder range of motion, with improvements in motion and strength. Physical examination showed no pulsatile mass near the anterior portal incision site. Distal radial and ulnar pulses were 2+, with capillary refill less than 2 seconds in the right hand. The patient had full range of motion and strength with negative provocative testing.

DISCUSSION

Shoulder arthroscopy is considered a safe and effective procedure with low complication rates, ranging from less than 1% to 10.6%. Curtis et al reported a complication rate of 4.8% for arthroscopic shoulder surgeries. These included adhesive capsulitis, neurologic complications, wound complications, complex regional pain syndrome, laceration of the cephalic vein, pulmonary embolism, and heterotopic bone formation. Berjano et al reported a higher complication rate of 10.6%, including excessive bleeding, hematoma formation, infection, postoperative edema, ulnar nerve neuropaxia, and respiratory distress.

Fortunately, neurovascular injuries from shoulder arthroscopy remain rare, with reported rates ranging from 0.2% to 10%. Most nerve injuries are tem-
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orthopaedic neuropraxias, resolving without further intervention. Reported vascular injuries are quite rare. Cameron described a case of a venous pseudoaneurysm that developed after a patient underwent arthroscopic irrigation of a septic shoulder joint and a branch of the cephalic vein was inadvertently lacerated during an attempt to place an anterior portal. The patient had a previously placed arteriovenous fistula in the ipsilateral forearm for dialysis, resulting in a dilated, high-flow cephalic vein that contributed to the complication. Curtis et al reported laceration of the cephalic vein in a series of 660 shoulder arthroscopies. However, there was no apparent long-term morbidity. Flowers and Myers reported a case in which a patient received an interscalene block before undergoing arthroscopic rotator cuff repair and had a pseudoaneurysm of the axillary artery postoperatively. The authors were unable to determine how the axillary artery could have been injured as a result of interscalene block.

In the authors’ case, the patient had a pseudoaneurysm involving a branch of the thoracoacromial artery after undergoing shoulder arthroscopy. The pseudoaneurysm was near the anterior portal site. The anterior portal was created with an outside-in technique, as described by Matthews et al (anterior-central portal), using the intra-articular triangle bounded by the humeral head, glenoid rim, and biceps tendon. In this study, anatomic dissection of 20 cadavers after shoulder arthroscopy in the lateral position showed multiple structures at risk with placement of the anterior portal as described. The cephalic vein was found to be the most superficial structure at risk. The axillary artery and vein and divisions of the brachial plexus were located inferior and medial to the coracoid. The axillary and musculocutaneous nerves and the subscapularis artery were located just inferior and lateral to the coracoid. The area lateral and adjacent or superior to the coracoid is considered a safe area for portal placement and contains the thoracoacromial vessels, supraspinatus tendon, and coracoacromial ligament. In an anatomic cadaver study of 12 shoulder arthroscopy portals that were placed in the beach chair position, Meyer et al concluded that anterior portals were the most at risk to injure neurovascular structures, including the cephalic vein, axillary artery, and axillary nerve. The anterior-central portal was located, on average, 17 mm from the cephalic vein, 33 mm from the axillary artery, and 31 mm from the axillary nerve. The cephalic vein was found injured in 1 specimen. Lo et al examined the neurovascular structures at risk during placement of shoulder arthroscopy portals using an outside-in technique. A standard anterior portal (above the lateral half of the subscapularis tendon medial to the biceps tendon) was created with an outside-in technique in the lateral decubitus position. The authors found a mean distance of 39.4 mm to the axillary nerve, 45.7 mm to the musculocutaneous nerve, 44.3 mm to the brachial plexus, 36.9 mm to the cephalic vein, and 37.8 mm to the axillary artery of 44.3, 36.9, 37.8, 18.8, and 46.3 mm, respectively. In 1 specimen, the cephalic vein had been directly penetrated.

Numerous studies have described the proximity of neurovascular structures to portals placed in shoulder arthroscopy, in both the beach chair and the lateral decubitus positions. Accurate portal placement is important not only to avoid damage to adjacent neurovascular structures but also to ensure the appropriate angle of approach to intra-articular structures. Malpositioned portals may lead to inadvertent damage to neurovascular structures and create more difficulty with visualization and angle of instrumentation, possibly compromising the success of the procedure. In the authors’ case, it is possible that, while establishing the anterior portal with an outside-in technique, the spinal needle was introduced slightly superior and lateral to the coracoid, inadvertently damaging the thoracoacromial branch. It is unlikely that the vascular injury occurred when placing the interscalene block because the needle is introduced between the scalene muscles above the clavicle.

To the authors’ knowledge, this is the first report of an injury to a branch of the thoracoacromial artery after shoulder arthroscopy. Permanent injury to neurovascular structures during shoulder arthroscopy is rare, with most injuries consisting of temporary neuropraxias, likely secondary to positioning and traction. This report should serve as a reminder, however, that accurate portal placement is critical to avoid damage to surrounding neurovascular structures. Postoperative examination findings consistent with possible neurovascular injury should be thoroughly evaluated to avoid long-term morbidity.

REFERENCES


