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Median nerve injury after Latarjet open surgery: a case report

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The Bristow-Latarjet procedure is gaining popularity worldwide as the first-choice treatment for glenoid bone loss–associated recurrent shoulder instability, showing excellent results for, among others, contact sport athletes.[1,5,7,9] Nonetheless, overall complication rates remain considerably high after a Latarjet procedure, reaching 15% in the latest report.[6] Of these, neurologic complications affect one to two percent of patients. These neurologic lesions, such as axillary or musculocutaneous nerve injuries, are well described.[6] To our knowledge, there is no report of a median nerve injury following this procedure. The purpose of this article is to report the anatomic etiology of a median nerve injury leading to important functional impairment, as well as the means to avoid this complication.

Case report

A 42-year-old woman presented with recurrent anterior left shoulder instability five years after an arthroscopic Bankart repair. She was known for poorly controlled epilepsy, leading to seizure-triggered anterior shoulder dislocation and followed by antiepileptic adjustments by her neurologist. The radiographs and a computed tomography scan showed 22% anteroinferior glenoid bone loss and 34% Hill Sach's impaction. An open Latarjet procedure was indicated and performed.

Under general anesthesia and without a peripheral nerve block, the patient was placed in the beach chair position. No arthroscopic procedure was performed. A deltopectoral approach was used, and the coracoacromial ligament was incised 1 cm from its insertion on the coracoid. The pectoralis minor was released directly from the medial side of the coracoid, taking care not to continue the release past the tip of the coracoid, avoiding a disruption of the coracoid graft blood supply, as described by Young et al.[8] The coracoid graft was osteotomized and predrilled with two 3.5-mm drill holes, about 1 cm apart. The coracoid graft was positioned just medial to the articular surface of the glenoid through a subscapularis split and a 2-cm vertical capsulotomy. The graft was screwed in with two 4.0-mm partially threaded cancellous screws. Upon tightening of the superior screw, a fracture of the bone block occurred. The superior screw was removed, leaving only the inferior screw to hold the graft. The capsule was repaired to the glenoid rim with nonabsorbable suture (fiber wire) from two preloaded suture anchors (1.3-mm Y-Knot)

In the immediate postoperative period, the patient presented weakness, numbness, and allodynia in her left arm. The physical examination showed weakness of the flexor pollicis longus and of the flexor digitorum profundus to the index and middle fingers graded at 0/5 (Fig. 1). Also, it showed a decreased sensation and allodynia over the cutaneous innervation of the median, radial, musculocutaneous, and axillary nerve. In the remaining nerve territories, motor and sensory functions were tested and intact.

With these findings, a brachial plexopathy with predominantly median nerve palsy was clinically diagnosed. A computed tomography showed unraveling and displacement of the bone graft. We headed back to the operating room a week later with the hypothesis that this bone block displacement was compressing the brachial plexus.

Using the same position and incision, we confirmed that the graft was split longitudinally, no longer kept in place by the screw, and retracted by 1 cm distally, although still attached to the conjoined tendon. Through thorough inspection, we located the median and musculocutaneous nerve running distally deep in the surgical site. We noticed that when trying to put the graft back in

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Figure 1 Postoperative abnormal OK sign demonstrating median nerve motor dysfunction.

Figure 2 At 4 months postoperatively, the OK sign is back to normal, showing complete motor recovery of the injured median nerve.

place, fibers of the pectoralis minor still attached to the graft were causing compression on the brachial plexus, mainly the median and musculocutaneous nerves. No macroscopic nerve damage was noticed. The unraveling itself was not likely contributing to the brachial plexopathy. The culprits seemed to be these remaining pectoralis minor fibers, which were then released from the graft, resolving the compression. This compression-release phenomenon is clearly recorded on video for a better understanding (video). The conjoint tendon and coracoid bone fragments were whipstitched and reinserted to the glenoid rim using suture anchors (5.5-mm CrossFT, Conmed-Linvatec).

The patient showed no immediate postoperative neurological symptom improvement. Two weeks later, she presented with little sensory improvement on the radial and musculocutaneous nerves' territories but none on the median nerve's. No motor recovery was observed. An electromyography (EMG) was performed seven weeks after the index surgery in order to make a clear diagnosis about the anatomic site of the brachial plexus injury and to get an idea of the recovery prognosis. It showed lateral and posterior cords' injury without active denervation. The patient was referred to physiotherapy for the Latarjet standardized rehabilitation program. A finger-and-wrist extension orthosis was also prescribed.

At her two-month follow-up, the patient described allodynia improvement. At four months, complete clinical motor recovery was observed, with median nerve territory 5/5 strength (Fig. 2). Another EMG was performed one year later and demonstrated complete motor recovery but still partial sensory regeneration. The allodynia resolved by 19 months postoperatively, but the median nerve territory sensory loss was not fully recovered. The patient returned to her activities with mild functional limitation. No functional score was performed due to multiple comorbidities, including mild intellectual disability, which would have been a source of bias that would have invalidated the score.

Discussion

Neurological complications following the Bristow-Latarjet procedure have been described. However, after a thorough literature review, median nerve injuries following this procedure have not been reported. The goal of this case report is to emphasize the importance of a rigorous pectoralis minor release off the coracoid bone block.

Brachial plexus compression following a Latarjet procedure is well documented in the literature. In a case review by Gary M. Gartsman et al,[3] 400 patients undergoing this procedure by three shoulder fellowship-trained surgeons were analyzed. Thirteen patients suffered a clinically noted neurological complication supported by EMG. Seven of them involved the radial nerve, four involved the musculocutaneous nerve, and two involved the suprascapularis nerve. A complete recovery was observed on 11 out of 13 patients. Shah et al[8] describe 45 cases of immediate complications following a Bristow-Latarjet procedure, reporting five cases of sensory neurological complications during the postoperative period. Two of them involved the musculocutaneous nerve, one involved the radial nerve, and two involved the axillary nerve. A complete recovery was observed at two-month follow-up, except for the axillary territory. None of these studies reported injury to the medial nerve. A probable explanation of this latter affection is the close anatomic relationship of the brachial plexus to the coracoid process. The median and musculocutaneous branches are traveling more anteriorly than all the other nerves, especially in the space under the pectoralis minor.

During an open Bristow-Latarjet procedure, the coracoid graft and the adjacent tendon are lateralized and posteriorized. A meticulous release of the pectoralis minor fibers from the coracoid process is mandatory; otherwise, they could be brought posteriorly against the anteriormost branches of the brachial plexus as it occurred in this case. An article published in 2018 by LaPrade et al[6] describes precisely the relationship between the neurovascular bundle of the brachial plexus and bony anatomy (coracoid and glenoid) before and after a Latarjet procedure. This cadaveric study is certainly helpful when it comes to proceed with coracoid osteotomy, anterior glenoid preparation, graft fixation, and even revision surgery to better know which nerve is mostly at risk. Unfortunately, it was not aimed at assessing which structures would be compressed first by the remaining pectoralis minor fibers left attached to the coracoid.

In this case study, we initially thought that the unraveling of the graft and its displacement could have been the cause of the brachial plexopathy. Revision surgery showed that there was more compression on the median nerve when the graft and its pectoralis minor fibers were put against the glenoid than when they were retracted distally from the unraveling.

Moreover, the bone block fracture observed in the first procedure predisposed the graft to displacement or unraveling. This complication is well known in Latarjet procedure[2] with a reported graft fracture rate of 1.5%.[4] In a complication review from Gupta et al,[4] the graft fractures occurred when a minimum distance between the two screws was not respected, when the screw holes were not tapped before definitive screw insertion, or when excessive tightening of the screws occurred. In this case study, precautions to avoid all these scenarios had been taken. However, the bone block turned out to be particularly brittle. Decreased bone density is associated to the long-term use of anticonvulsant drugs. This phenomenon can explain the minimal effort required to cause the fracture while securing the graft in place on the first procedure. The partial release of the pectoralis minor was not believed to be responsible for the graft fracture, but it could have been involved in the traction force needed to displace the fragments. As the fracture was undisplaced and the second screw looked stable, the graft was left in place. The subsequent unraveling proved that the initial fracture was more significant than perceptible to the eye. In this case, we were unable to use screw fixation during the revision surgery and salvaged the procedure with a suspensory fixation using a bone anchor and whipstitching of the bone fragments and conjoined tendon. As infection is another important cause of fixation failure, intraoperative cultures were taken and ended being negative.

Conclusion

This case study is of great value since, to our knowledge, median nerve compression following a Bristow-Latarjet procedure has never been described in the literature. This brachial plexus branch neuropraxia was caused by pectoralis minor unreleased fibers, still attached to the graft and pulled posteriorly during the coracoid transfer. The median nerve was mainly involved due to its anterior position in the plexus at this level. Given the negative impact of this complication on the patient's function, we hope this report will help surgeons avoid this pitfall. It is easily preventable by completely releasing the pectoralis minor fibers from the coracoid process. Prompt recognition and treatment are positive factors for improving the outcome and patient care.

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Supplementary data

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