

Cadaveric Dissection to Demonstrate the Segment of the Axillary Nerve at Risk during the Latarjet Procedure

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INTRODUCTION

The axillary nerve lies posterior to the axillary artery and anterior to the subscapularis muscle at its origin. It then descends and runs along the lower border of subscapularis muscle before exiting posteriorly via the quadrangular space. This initial segment of the axillary nerve, which is about 12 mm apart from the inferior glenoid tubercle, is at risk of injury during open Latarjet procedure [1]. According to Burge P et al., the short course of axillary nerve predisposes it to a high risk of traction injury [2]. Though the musculocutaneous nerve is the most commonly injured nerve during the Latarjet procedure, axillary nerve injury which can occur in up to four percent of the patients, most often leads to long term disability and may require a repeat neurolysis procedure [3]. The purpose of this article is to demonstrate the relation of the axillary nerve with the surgical field of Latarjet procedure by a cadaveric dissection [Video-1].

Cadaveric Dissection

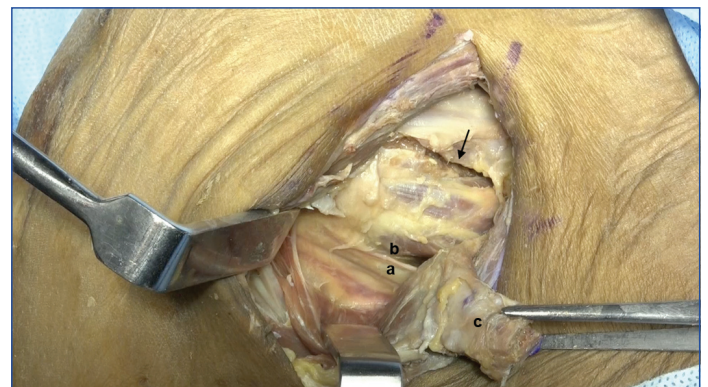
Surgical exposure: The cadaver was positioned in a beach chair position, and a small towel was placed under the shoulder to stabilise the scapula. The limb was draped free to allow for abduction and external rotation of the shoulder. A limited deltopectoral approach was used. A 5 cm incision was given from the tip of coracoid towards the anterior axillary fold, then the deltopectoral interval was identified, and the cephalic vein was retracted medially. A sharp tip-Homman retractor was placed superior to the coracoid process, and the structures attached to the latter were identified.

Coracoid graft harvest: The pectoralis minor muscle was released from the medial surface of the coracoid process. After placing the arm in abduction and external rotation, the coracoacromial ligament was incised from the coracoid process. A portion of the ligament was left intact on the coracoid process. An osteotomy was done at the knee of the coracoid, distal to the attachment of the coracoclavicular ligament. Any soft tissue attached over the deeper surface of the coracoid is released. The musculoskeletal nerve penetrates the conjoint tendon on its medial aspect, about 3-4 cm distal to the coracoid tip [4], and can be injured during the procedure. Hence the conjoint tendon should be freed from the soft tissue cautiously particularly from its medial aspect, and the surgeon should stay lateral to the tendon.

Glenoid preparation and graft fixation: The subscapularis muscle was split at the junction of its superior two thirds and inferior one third, and two self-retaining Gelpi retractors were placed in the split. A longitudinal capsulotomy was done, and a Fukuda retractor was placed in the joint to retract the humeral head laterally after removing the lateral Gelpi retractor. At this step, the arm was adducted and externally rotated, and a Homman retractor was placed between the glenoid neck and the distal band of the subscapularis muscle. Then the anteroinferior aspect of glenoid was exposed by placing a Kolbel

glenoid lever medially. The anterior rim of the glenoid was decorticated. Finally, the coracoid graft was prepared by decorticating its medial surface and was fixed to the anteroinferior aspect of glenoid with the help of two cannulated cancellous screws.

Exposure of the axillary nerve: The incision was extended inferiorly to demonstrate the relation of the axillary nerve with the surgical field of the Latarjet procedure. The axillary nerve was found at the inferior border of the subscapularis and was seen to go posteriorly in quadrangular space [Table/Fig-1].



[Table/Fig-1]: a) The axillary nerve can be seen running along the lower border of the subscapularis muscle; b) showing the split of the subscapularis muscle (Black arrow) and its lower border; c) Cadaveric dissection of right shoulder through the delto-pectoral approach with coracoid osteotomy with its inferior reflection along with the conjoint tendon.

DISCUSSION

Improper retractor placement and arm positioning during the surgery may lead to excessive traction and contusion of the axillary nerve. Both McFarland EG et al. and Jobe FW et al. have recommended placement of a Homman or a similar retractor through the split subscapularis muscle along the inferior glenoid to prevent injury to the axillary nerve [5,6]. Abduction of the arm brings neurovascular structures closer to the operative site, while external rotation of the shoulder decreases the vulnerability of the nerve during surgery [6,7]. Therefore to prevent neurological injury, arm should be adducted and externally rotated during glenoid exposure. Furthermore, the use of self-retaining retractors in the subscapularis split can also injure the axillary nerve. Hence, it should be used cautiously and for a minimal duration only when exceedingly needed.

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