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Case Report

Perioperative Radial Nerve Injury in Coronary Artery Bypass Surgery

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Abstract

The radial nerve stems from the posterior cord of the brachial plexus and supplies the upperlimb. Present case depicted an unusual left radial nerve lesion during coronary artery bypass surgery, presumably due to an external compression caused by a sternal retractor that is used for dissection of the internal mammary artery and patient was taken up for emergency surgery.

Introduction

The radial nerve stems from the posterior cord of the brachial plexus and supplies the upper limb. It also supplies the triceps brachii muscle of the arm, the muscles in the posterior compartment of the forearm (also known as the extensors), the wrist joint capsule, and aspects of

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the dorsal skin of the forearm and hand. The radial nerve proper innervates (Buchanan *et al*., 2021).The ulnar nerve is most frequently affected accounting for one third of all nerve damages, whereas radial nerve lesions are much less common accounting for only 3% of such intraoperative injuries (Papadopoulou *et al*., 2006).We report the cases of left radial nerve lesion during coronary artery bypass surgery, presumably due to an external compression caused by a sternal retractor that is used for dissection of the internal mammary artery.

CasePresentation

A 74 year-oldmanhypertensive male patient presented with left side chest pain associated with palpitation. Electrocardiogram (ECG) showed ST-T wave changes in inferior leads +v3-v4 (Fig 1) and coronary angiography revealed triple vessel coronary artery disease (Fig 2). Nerve conduction study of both upper and lower limbs has conducted and found it abnormal because of a sensory motor demyelinating polyneuropahty in left C6-T1 distribution. Echocardiography of basal mid inferior wall and infero-lateral segments hypokinetic reveled the Type II diastolic dysfunction (Video1,2). Heparin infusion was started and intra-aortic balloon pump(IABP) was inserted in view of persisting chest pain. Patient's chest pain got relieved after IABP insertion and patient was taken up for emergency surgery after medical stabilization. After routine monitoring lines were placed along with the parts cleaned and draped. The chest was opened through a mid-line sternotomy. Heparin given intravenously. Pedicledleft internal thoracic artery, LITA (also called left internal mammary artery, LIMA) and two lengths of saphenous vein graft(SVG) were harvested. However, during postoperative recovery, patient complained of left wrist drop with difficulty in flexion of interphalangeal joints of middle, ring and little finger of left hand. Difficulty in fanning out of left hand fingers. Loss of sensation in medial 3½ aspects of

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left hand. Neurology opinion was required and nerve conduction study(NCS) was done, which suggested a sensory motor demyelinating polyneuropahty in left C6-T1 distribution. Patient referred for neurological advice after having undergone coronary artery bypass surgery.

Discussion

The radial nerve is the largest nerve in the upper extremity, arising as an extension of the posterior cord of the brachial plexus (Papadopoulou *et al*., 2021). The radial nerve is formed as a continuation of the posterior cord of the brachial plexus and arises from the C5-T1 nerve fibers.The radial nerve is a peripheral nerve that provides motor and sensory function to the arm. The motor function innervates the posterior compartment of the arm including the medial and lateral heads of the triceps brachii muscles in addition to all 12 muscles in the posterior forearm compartment, as well as, the extrinsic extensor muscles found in the wrist and fingers. The sensory function provides cutaneous innervation to a portion of the anterolateral arm, distal posterior arm, posterior forearm, posterior aspects of the thumb, index finger, middle finger, and the lateral half of the ring finger (Cho *et al*., 2019).

The most common cause of radial nerve injury is compression in the spiral groove which is a shallow groove formed deep to the lateral head of the triceps, where the nerve lies in close contact with the humerus. Less common sites of radial nerve compression occur in the axilla in patients with an accessory subscapularis-teres-latissimus muscle, in the triangular space, within the lateral head of the triceps, and where the radial nerve penetrates the lateral intermuscular septum (Lubahn andCermak, 1998;Chesser and Leslie, 2000). Additionally, clinicians has also been familiar with these sites to ensure a timely and accurate diagnosis because a delay in treatment is often associated with a poor recovery of nerve function (Niver andIlyas, 2013;

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Strohl andZelouf, 2017).In view of the above, the patient was taken up for emergency surgery after medical stabilization.

The post-operative complained of left wrist drop with difficulty in flexion of interphalangeal joints of middle, ring and little finger of left hand were observed with the loss of sensation in medial 3½ aspects of left hand. It may be due to the lesions in the radial nervewhich resulting in weakness of all radial-innervated muscles (most prominently a wrist drop); loss of the triceps and brachioradialis reflexes; and loss of sensation along the dorsum of the arm (Wang and Weiss2013).

Although very uncommon, external compression due to the use of a self-retractor during probably be included in the list of possible mechanisms of radial nerve injury. Considering the small number of reported with similar cases in which intraoperative radial nerve has been injured during coronary artery surgery, it may be assumed that the frequency of such intraoperative complications is probably underestimated (Papadopoulou et al., 2006). Prospective studies or even retrospective evaluation might be helpful in order to estimate the true incidence of intaoperative nerve injuries, understand the causative mechanism and eventually find effective preventing strategies.

Conclusion

Although very uncommon, external compression due to the use of a self retractor during coronary artery surgery can affect – especially in obese subjects – the radial nerve within the spiral groove leading to paresis and should therefore be included in the list of possible mechanisms of radial nerve injury.

References

Buchanan, B.K., Maini, K., Varacallo, M. Radial Nerve Entrapment. 2021 Aug 25. In: StatPearls [Internet]. Treasure Island (FL): Stat Pearls Publishing; 2021 Jan- PMID: 28613749.

Chesser TJ and Leslie IJ. (2000). Radial nerve entrapment by the lateral intermuscular septum after trauma. JOrthop Trauma 14:65-66.

Cho SH, Chung IH, Lee UY. (2019). Relationship between the ulnar nerve and the branches of the radial nerve to the medial head of the triceps brachii muscle. Clin Anat. 32(1): 137-142.

Lubahn JD andCermak MB. (1998). Uncommon nerve compression syndromes of the upper extremity. J Am AcadOrthop Surg. 6: 378-386.

Papadopoulou, M., Spengos,K., Papapostolou, A., Tsivgoulis, G. and Karandreas,N. (2006). Intraoperative radial nerve injury during coronary artery surgery – report of two cases. Journal of Brachial Plexus and Peripheral Nerve Injury. 1 (7): 1-4.

Strohl AB andZelouf DS. (2017) Ulnar tunnel syndrome, radial tunnel syndrome, anterior interosseous nerve syndrome, and pro- nator syndrome. J Am AcadOrthopSurg 25:e1–e10.

Niver GE andIlyas AM. (2013). Management of radial nerve palsy following fractures of the humerus. OrthopClin North Am 2013; 44:419-424

Wang LH and Weiss MD (2013). Anatomical, Clinical, and Electrodiagnostic Features of Radial Neuropathies. PhysMed RehabilClin N Am 24: 33-47.