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Letter to Editor

Iatrogenic Median and Ulnar Nerve Damage Accompanying Acute Spinal Cord Ischemia

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This case was presented as a poster presentation at the 8th Medical Rehabilitation Congress held in Ankara on 9-13 November 2022.

Abstract

Peripheral arterial catheterization can be performed for hemodynamic monitoring during major cardiovascular operations. Different neurologic and cardiovascular complications may develop depending on the site of intervention. Peripheral nerve injuries are a rare complication of these catheterizations. Herein, we report median and ulnar nerve injury due to axillary catheterization in a patient with paraplegia due to spinal cord ischemia and rehabilitation results.

Keywords: Acute spinal cord ischemia, Axillary catheterization, Peripheral nerve injury

Dear Editor,

Acute spinal cord ischemia is a rare but highly significant clinical outcome, and aortic dissection (AD) is one of the causes of spinal cord ischemia [1-3].

Peripheral arterial catheterization can be performed for hemodynamic monitoring during major cardiovascular operations. Radial, brachial, and axillary arteries in the upper extremity can be used for this purpose and different neurologic and cardiovascular complications may develop depending on all these intervention sites [4]. Although peripheral nerve injuries due to these catheterizations are rare, they should be kept in mind due to the functional limitations they cause.

In order to emphasize these rare cases, we aimed to present a patient who underwent surgery for AD and was followed up for rehabilitation due to paraplegia and in whom we found median and ulnar nerve neuropathy in the right upper extremity due to axillary cannulation.

A 47-year-old woman presented to our clinic with complaints of weakness in the right upper and bilateral lower extremities. Her medical history was unremarkable. From her medical history and records, it was learned that she was admitted to the emergency department 1.5 months ago with complaints of sudden onset of

back and chest pain, nausea and vomiting and was operated under emergency conditions for Type 1 AD. During the operation, cardiopulmonary bypass was performed by cannulation from the right axillary artery due to pericardial tamponade and dissection repair was performed (Fig. 1). The patient was admitted to the intensive care unit in the postoperative period and cardiac arrest occurred. Cardiopulmonary resuscitation was performed and spontaneous circulation was established. Thoracic computed tomography showed pericardial fluid and extravasation of the ascending aortic graft was suspected. The patient was re-operated on the 10th postoperative day. After the operation, when the patient's hemodynamics stabilized and she regained consciousness, weakness in the right upper and both lower extremities was noticed.

Figure 2. Inability to make the round 'O' sign due to weakness in flexion of the thumb interphalangeal joint and distal interphalangeal joint of the 2nd finger (O Sign)

Figure 1. Right axillary artery cannulation site

The patient could not walk and had no sitting balance. She had weakness in flexion of the right thumb interphalangeal joint and distal interphalangeal joint of the 2nd finger. The patient was unable to make a round 'O' sign between these two fingers (Fig. 2) and had difficulty flexing the first 3 fingers of his right hand (Hand of Benediction) (Fig. 3). Finger abductors and wrist flexors of the right hand were 3/5 muscle strength.

Figure 3. Difficulty in flexing the first 3 fingers (Hand of Benediction Sign)

Muscle strength in the lower extremities was evaluated as hip flexion 2/5 bilaterally, knee extension 2/5 on the right and 4/5 on the left, 1st toe dorsiflexion 1/5 bilaterally, ankle dorsiflexion and plantar flexion 5/5 bilaterally. The patient with deep anal sensation, pressure and voluntary anal contraction was evaluated as ASIA D and neurologic level T1 according to the

American Spinal Injury Association (ASIA) Impairment Scale. Wound care was performed, indwelling catheter was withdrawn and clean intermittent catheterization was started in the patient with stage 2 compression of the sacrum. The functional independence measurement score was 44, including 24 motor assessment scores.

Electroneuromyography (ENMG) was performed, and reported as "The electrophysiological findings obtained are consistent with moderate partial axonal degeneration in the median and ulnar nerves, in the proximal forearm.". The cause of these nerve injuries was thought to be intraoperative axillary catheterization. The patient underwent three weeks of rehabilitation including electrical stimulation of the upper and lower extremity muscles and right median and ulnar nerves, respiratory, range of motion, strengthening exercises, balance and ambulation training and occupational therapy. The patient showed significant improvement in both upper and lower extremity muscle strength and regression of hand symptoms due to the nerve injuries. The patient started to ambulate alone with supervision. The functional independence scale score was calculated as 116 at discharge, 81 of which were motor assessment scores.

Although the vessels supplying the spinal cord have unique anatomical connections, some regions are more susceptible to ischemia. AD, which has a reported mortality of 80%, may cause malperfusion or occlusion of segmental arteries supplying the spinal cord and paraplegia may develop in 2-8% of patients [5,6].

It is known that the prognosis of acute spinal cord ischemia is generally not very good. In one study, 115 spinal cord ischemia patients were followed up for three years and it was observed that approximately 23% of the patients died, 42% of the survivors were wheelchair dependent, 26% could mobilize with support and only 32% could walk without support [7]. Our case achieved independent ambulatory status after 3 weeks of rehabilitation.

Although peripheral nerve injuries related to angiography and endovascular interventions are rare, they may cause significant functional impairment. Most of the arteries used for these procedures are very close to a nerve, and this nerve may be injured by direct injury, hematoma, pseudo-aneurysm or compression [8].

In the literature, nerve injuries secondary to axillary and brachial artery procedures have been reported most frequently. From the axilla to just above the elbow, the medial brachial fascial compartment consists of a thick brachial fascia covering a thin axillary sheath containing the axillary and brachial vessels as well as the median and ulnar nerves. These anatomical factors make homoeostasis difficult and facilitate nerve injury [8]. In our case, axillary catheterization was performed during emergency surgery for AD, which caused partial axonal damage to the median and ulnar nerves.

In conclusion, it should be kept in mind that detailed neurological evaluation of each patient after major surgery is important for early diagnosis and treatment of possible lesions. It should also be kept in mind that nerve lesions that may develop after cardiac operations may be due to cannulation attempts.

Kind Regards

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