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Rehabilitation of Patient with Ischemic neuropathy after aortic dissection surgery - a Case report

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Introduction

Neurologic complications are often reported after aortic dissection and cardiac surgery, usually leading to cerebral ischemia. Peripheral neuropathy is rare, most of which are accompanied by painless dissection, and few postoperative mononeuropathies are reported. This case study aims to report a rare case with extensive ischemic neuropathy involving unilateral upper and bilateral lower extremities after aortic dissection surgery.

Case report

A 38-year-old male was presented to the emergency department with sudden chest pain and without any weakness. A computed tomography (CT) aortogram was performed, which revealed extensive aortic dissection involving ascending and descending aorta, extending to right common iliac artery and aberrant subclavian artery (Stanford A, DeBakey type I) (Figure 1). The patient was taken to the operation room, where ascending hemi-arch replacement and coronary artery bypass surgery was performed for 15 hours. After surgery, he was managed in the intensive care unit for 10 days and moved to the general ward. Although the general condition of the patient was improved, the weakness of the right upper and both lower extremities remained. Serial brain CT, brain diffusion magnetic resonance imaging (MRI), brachial plexus MRI and spine MRI did not show any evidence for the neurologic deficit. Then the patient was consulted to the department of rehabilitation for further evaluation and proper rehabilitation. On referral, manual muscle test showed distal muscle weakness of affected extremities; fair grade for right wrist extension, finger flexion and abduction, bilateral ankle dorsiflexion, poor grade for bilateral ankle plantar flexion and trace grade for bilateral long toe extension. All the other muscles showed normal strength. Electrodiagnostic test showed diffuse motor and sensory peripheral polyneuropathy with severe axonal injury pattern on the right upper and both lower extremities (Table 1). We considered the neurologic deficit and consequential muscle weakness are most likely due to ischemic neuropathy after long duration open-heart vascular surgery. In this case, extensive aortic dissection also might have affected the surgery outcome. The patient was treated for about 6 weeks in the department of rehabilitation. At discharge, muscle strength showed some improvements; to above fair grade for right hand and bilateral ankles. In addition, improved functional status enabled the patient to endure aerobic exercises using the stairs, treadmill, and ergometer.

Conclusion

In this case, long duration of vascular surgery and severity of aortic dissection both might have affected the vascular supply and thus, cause extensive distal nerve damage. Therefore, if aortic dissection is severely extended, it would be necessary to keep close attention for the post-op neurologic deficit and seek for early post-op rehabilitation therapy.

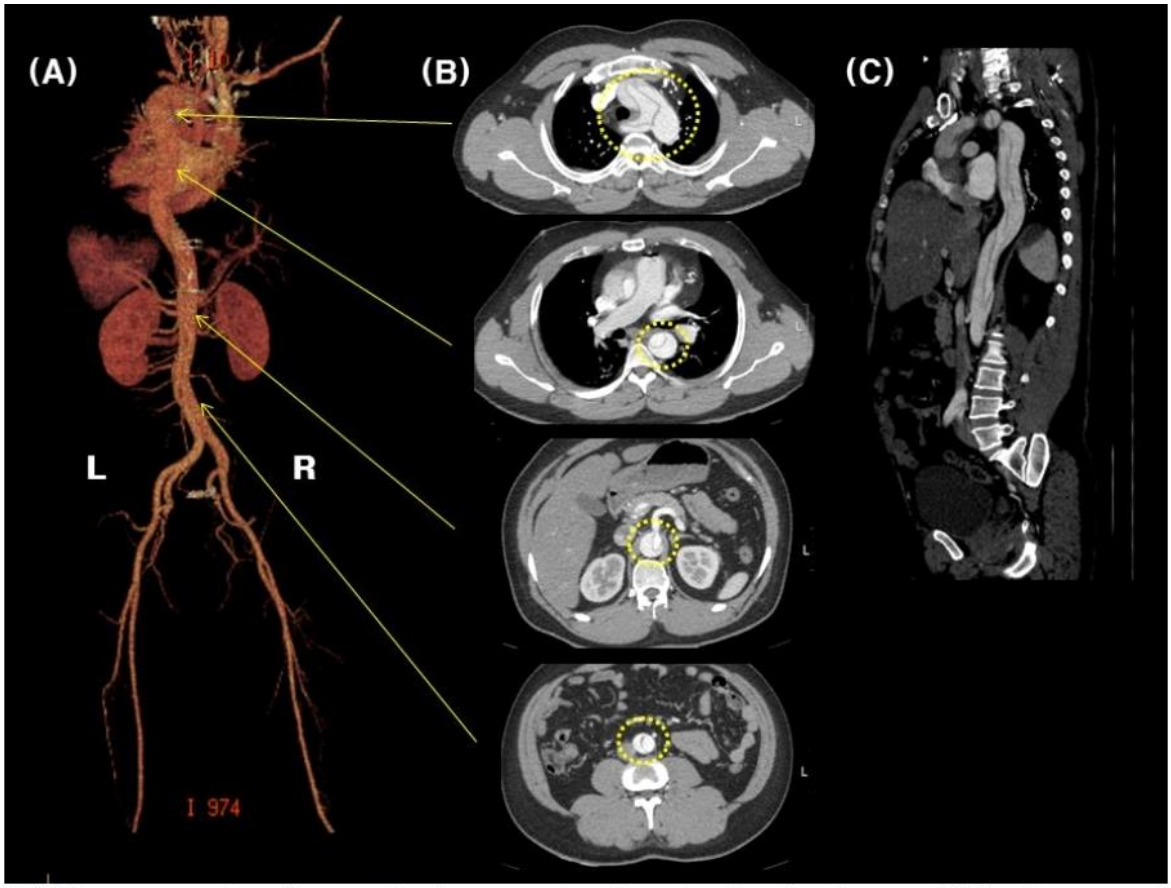
Table 1. Nerve conduction study for bilateral upper and lower extremities

Motor nerve	Stimulation - Recording site	Left		Right	
		Latency (msec)	Amplitude (uV)	Latency (msec)	Amplitude (uV)
Median	Wrist - APB	4.1	6.4	**11.3**	**0.4**
Ulnar	Wrist - ADM	3.2	6.4	**4.3**	**1.1**
Radial	Forearm - EIP	1.9	4.3	1.4	4.7
Axillary	Erb's point - Deltoid	4.4	6.1	4.4	6.9
Musculocutaneous	Erb's point - Biceps brachii	5.2	5.4	6.5	**2.2**
Peroneal	Ankle - EDB	**NR**	**NR**	**NR**	**NR**
Tibial	Ankle - AH	5.0	5.6	**NR**	**NR**
Femoral	Inguinal area - RF	2.4	**0.2**	2.8	**0.1**

Sensory nerve	Stimulation - Recording site	Left		Right	
		Latency (msec)	Amplitude (uV)	Latency (msec)	Amplitude (uV)
Median	Digit - Wrist	3.5	38	**NR**	**NR**
Ulnar	Digit - Wrist	3.4	18	**NR**	**NR**
Superficial radial	Snuff box - forearm	2.1	60	**NR**	**NR**
MABCN	forearm - elbow	2.2	5	2.1	6
LABCN	forearm - elbow	1.7	44	2	25
Sural	Calf - Ankle	**NR**	**NR**	**NR**	**NR**
Superficial peroneal	Calf - Ankle	**NR**	**NR**	**NR**	**NR**
Saphenous	Medial shin - Medial shin	**NR**	**NR**	**NR**	**NR**

Abbreviations; APB, Abductor pollicis brevis; ADM, Abductor digiti minimi; EIP, Extensor indicis proprius; EDB, Extensor digitorum brevis; AH, Abductor hallucis; RF, Rectus femoris; MABCN, Medial antebrachial cutaneous nerve; LABCN, Lateral antebrachial cutaneous nerve; NR, No response

Bold type indicates abnormal values



(A) 3D reconstruction of artery showing extensive dissection line (can be traced following arrowed lines) involving ascending and descending thoracic/abdominal aorta, extending to right common iliac artery **(B)** axial cuts of contrast-enhanced scan showing the dissected aorta (dotted circle) at different levels **(C)** sagittal scan of contrast-enhanced scan showing dissection at the descending aorta

Figure 1. Pre-operative CT aortogram