

LETTER TO THE EDITOR**TO THE EDITOR****Extended Window Thrombolysis in Acute Spinal Cord Ischemia*****Keywords:** Spinal cord ischemia, Stroke, Thrombolysis

Spinal cord ischemia (SCI) is a rare entity accounting for 1%–3% of strokes and up to 8% of all myelopathies.¹ To date, there are no randomized trials to guide therapy. Most literature related to acute treatment of SCI is based on case reports and involves either intravenous thrombolysis² (IVT) or intra-arterial thrombolysis.³ The time window for treatment of SCI is extrapolated from acute ischemic stroke trials. To our knowledge, all reported cases of SCI had thrombolytic therapy administered within 4.5 h.² Herein, we present a case of acute SCI treated with IVT administered beyond the suggested time window.

An 81-year-old right-handed previously independent female known for hypertension and dyslipidemia was transferred to our institution for evaluation of hyperacute paraplegia. She woke up early morning with chest pain lasting for 10 min followed by difficulty to stand up. She denied any back pain or trauma. She had no neurological symptoms involving the face or upper extremities.

Her initial vital signs were BP 147/80 with a normal and regular heart rate. Neurologic examination revealed flaccid

paraplegia. Deep tendon reflexes were absent in the lower extremities with extensor plantar responses. Sensory examination revealed sensory level at T6, and diminished vibration up to the knees bilaterally.

CT of the head, CT angiogram of the head and neck, and CT perfusion were all normal. An MRI of the cervical and thoracic spine was performed emergently and showed signs suggestive of anterior cord ischemia extending from C5 to T4 (Figure 1).

Given the history of chest pain, a CT angiography of the thorax was performed and did not reveal evidence of dissection, however, severe atherosclerosis of the entire thoracic and abdominal aorta with multiple ulcerated plaques along the aortic arch and descending aorta were found.

By the time the patient's imaging was completed, 4 h and 45 min elapsed from the onset of symptoms. Given the significant deficits and anticipated poor outcome of SCI without treatment, the patient was offered IVT. After obtaining consent, intravenous alteplase 0.9 mg/kg (7 mg bolus and 63 mg infusion over 60 min) was administered within 5 h from the onset of symptoms.

On day 1 post-thrombolytic therapy, the patient's paraplegia improved significantly. Proximal strength exam was graded 2/5 (Medical Research Council Scale) bilaterally and 4+/5 distally.

Transthoracic echocardiogram and 48-hour Holter monitor were normal. Her stroke was deemed secondary to thromboembolism in the context of extensive atherosclerosis of the aorta. She was kept on aspirin and atorvastatin for secondary prevention.

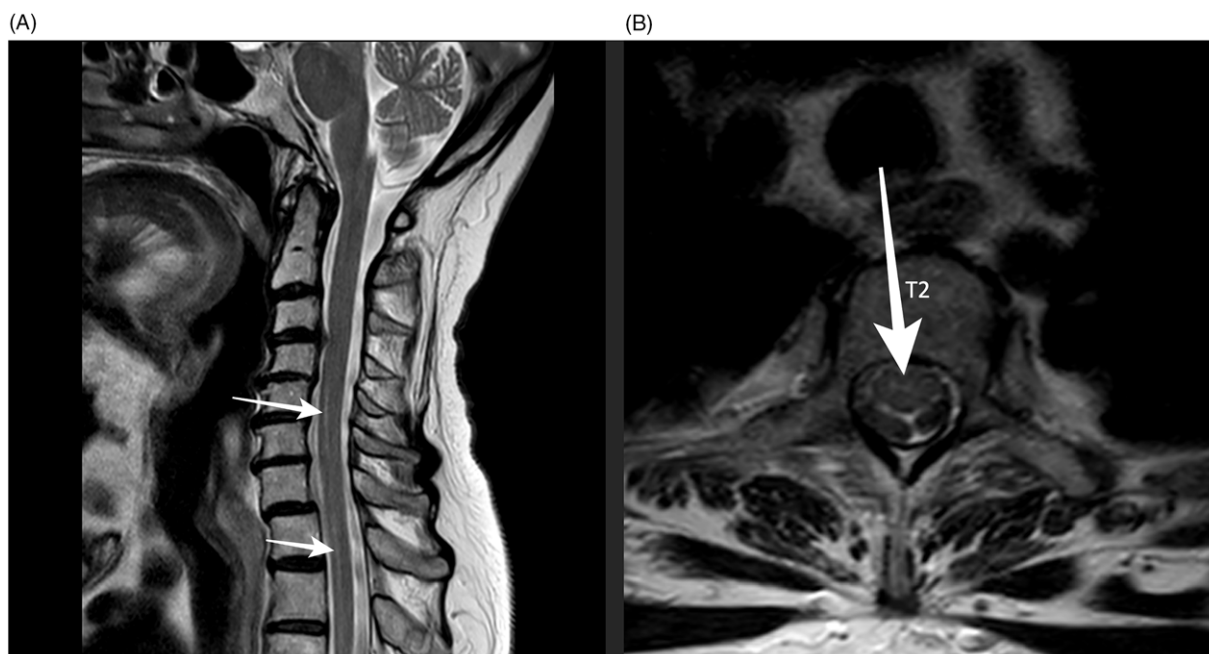


Figure 1: (A) Sagittal T2-weighted MRI of the cervical spine showing high-signal intensity in the anterior aspect of the cord extending from C5 to T4 without the evidence of edema (white arrows). (B) Axial T2-weighted MRI of the spine at T2 level showing slight high-signal intensity in the anterior aspect of the spinal cord (white arrow).

*The affiliations for Ahmad Almutlag and Abdulrahman Alkhalifa have been corrected. An erratum detailing this change has also been published (doi:10.1017/cjn.2021.219).

After several days of hospitalization, the patient was able to stand up and walk with a walker. Afterward, she was transferred to a rehabilitation center to expedite her recovery. At 1-month follow-up, she was ambulating without a walking aid and made an excellent recovery.

Due to the rarity and challenges in the timely recognition of acute ischemic myelopathy, no robust data are available to guide the therapeutic timeframe. IVT has been shown to be effective and safe in at least 13 case reports, when given within 4.5 h.^{2,4} The vast majority of cases remain untreated even when presenting relatively early. In contrast to cerebral stroke, spinal cord infarction symptoms are often preceded or accompanied by acute pain and can develop over a longer period of time. Such clinical presentation can be misdiagnosed as radicular compression, cardiac emergency, aortic pathology, or non-ischemic myelopathy. Substantial delays in obtaining spine MRI (hours to days) further limit accessibility to acute thrombolytic therapies. Inaccuracy in diagnosis leads to not only depriving patients from effective treatments, but also to initiating therapies that may significantly worsen outcomes (e.g. introducing plasma exchange in a case of SCI mistakenly diagnosed as inflammatory myelitis may lead to hypotension and subsequent worsening of ischemia).

Timely diagnosis of anterior SCI in our patient allowed administration of IVT within 5 h from symptoms onset with significant clinical improvement. The rich vascularization of the cervicothoracic spine originates from anterior, posterior spinal cord arteries and via independent blood supply from the radicular arteries. The anterior spinal artery is formed from branches of both the vertebral arteries and ascending cervical arteries and provides supply to the anterior two-thirds of the spinal cord. At the cervical and upper thoracic levels, several radicular arteries deliver blood supply without directly anastomosing with the spinal arteries thus providing critical collateral blood flow in the presence of an acute anterior spinal artery occlusion⁵. We hypothesize that the spinal cord in these segments will be more resilient to anterior SCI compared to other regions of the spinal cord.

Sequelae of SCI can be detrimental with only 47% of patients able to ambulate independently.⁶ Urinary symptoms and pain may persist for years.⁷

Increasing awareness and early recognition of acute SCI may help to avoid devastating consequences of the disease by offering thrombolytic therapy. IVT may be considered in the appropriate clinical setting even beyond the conventional 4.5-hour window.

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DISCLOSURES

The authors have no conflicts of interest to declare.

STATEMENT OF AUTHORSHIP

The conception of this report was done by AA, AK, and OB. AA and AK wrote the initial draft of this report and was reviewed and reorganized by OB.

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