Anterior Spinal Artery Syndrome-A Rare Cause Of Acute Onset Quadriparesis

Krishnan Balagopal[1], Jeyaseelan Nadarajah[2], Riya Ann Koshy[3], Munavira K Shams[4], Sreyas Santhosh[5]

[1,2,3,4,5]Department of Neurology, MOSC Medical College, Kolenchery, Kochi[2]

Date of Submission: 5th November 2023 Date of Acceptance: 5th May 2025 Date of Publication: 15th May 2025

Abstract

Spinal cord infarction secondary to Anterior Spinal Artery Syndrome is a very rare condition. It usually occurs secondary to aortic surgery, thromboembolism, aortic dissections and hypoperfusion. We present here a rare case of a 64 year old patient who presented with acute onset of quadriparesis and was found to have Anterior Spinal Artery syndrome. Initial imaging was normal while repeat imaging after forty eight hours showed features of cervical cord infarction. He was managed conservatively with intravenous corticosteroids , low molecular weight heparin and anti platelet agents and had improvement in motor power after treatment.

KEYWORDS: Spinal cord infarction, Quadriparesis, Anterior spinal artery syndrome

Introduction

Anterior Spinal Artery Syndrome is a term used to refer to ischaemic infarction of the spinal cord secondary to occlusion of the anterior spinal artery[1]. It is an uncommon cause of cervical myelopathy and accounts for only about five percent of all cases[2]. There are many causes implicated including aortic surgeries, dissection of the aorta, hypoperfusion, vasculitis, cardiac arrest and hypercoagulable states[3]. Other rarer causes include degenerative spine disease, cardiac emboli, trauma, fibrocartilaginous embolism, arteriovenous malformations and cocaine abuse. The anterior spinal artery supplies the anterior two-thirds of the spinal cord running along its total length . Multiple anastomotic channels are formed along with the posterior spinal arteries and there is reinforcement of blood supply by the radiculo medullary arteries at various levels. The lower thoracic level is said to be at greatest risk for the development of cord infarction due to poor vascularity . The artery of Adamkiwiecz is the largest radiculo medullary artery which is commonly occluded and a major cause of anterior spinal artery syndrome[4]. Occlusion of the anterior spinal artery will result in ischaemic infarction of the anterior part of the spinal cord. This will result in bilateral lower extremity weakness along with loss of pain and temperature sensation. This presentation of clinical features is called the anterior spinal artery syndrome (ASA). There will be sparing of proprioception and vibration sense with bladder and bowel involvement. Autonomic involvement resulting in hypotension and bradycardia are frequently seen[5]. Late complications include the development of spasticity, neurogenic bladder and sexual dysfunction. We present here a case of a sixty four year old patient who presented with upper back pain and weakness of all four limbs of sudden onset.

Access this article online

Website: https://www.nepjol.info/index.php/NJN

DOI: 10.3126/njn.v22i1.59777

HOW TO CITE
Krishnan Balagopal, Jeyaseelan Nadarajah, Riya Ann Koshy, Munavira K Shams, Sreyas Santhosh. Anterior Spinal Artery Syndrome-A Rare Cause Of Acute Onset Quadriparesis. NJNS. 2025;22(1):54-56

Address for correspondence:
Krishnan Balagopal
Consultant neurologist, MOSC Medical College, Kolenchery, Kochi, India
Email: krishnan.balagopal@gmail.com

ISSN: 1813-1948 (Print), 1813-1956 (Online)

REPORT

This 64 year old patient with no prior co morbidities presented with sudden onset of pain over the front of the chest followed by weakness of both lower limbs initially, followed by both upper limbs. He was unable to walk and had bladder incontinence. Clinical examination revealed flaccid quadriparesis-power Grade 1-2 in all four limbs with absent reflexes , bladder involvement and decreased sensations of pain and temperature over the body from D2 level downwards. Joint position and vibration sense were preserved. A clinical diagnosis of a cervical cord infarction secondary to anterior spinal artery syndrome was made. Blood investigations including coagulation profile, vasculitic markers and peripheral smear were negative. MRI scan of the spinal cord done within 24 hours was normal(Figure 1). MR Angiogram of the Aorta and the cerebral vessels done showed no evidence of Aortic dissection or aneurysm. Repeat MRI done after 48 hours showed hyperintensity involving the anterior aspect of spinal cord from C3 to C7 levels. There was diffusion restriction

suggestive of spinal cord infarction(Figure 2). A final diagnosis of an anterior spinal artery syndrome with cord infarction was made.The patient was managed conservatively with high dose pulse corticosteroids, low molecular weight Heparin, antiplatelet agents and statins. He had improvement in motor power in lower limbs after initiation of treatment. He was started on physiotherapy and rehabilitation. He was subsequently discharged after improvement and advised to continue home physiotherapy and bladder care.

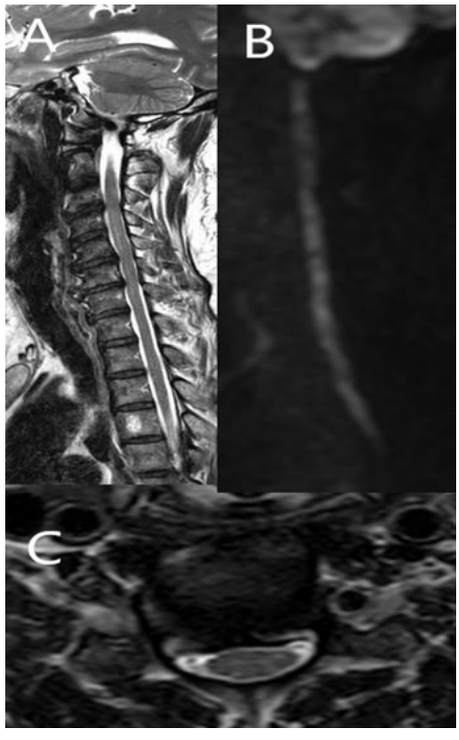

Figure 1-MRI done on day 1 of admission

A-T2 sagittal images of cervical spine showing no abnormalities
B- Diffusion weighted imaging(DWI) of cervical spine showing no restriction
C- T2 Axial images of cervical spine showing no abnormalities

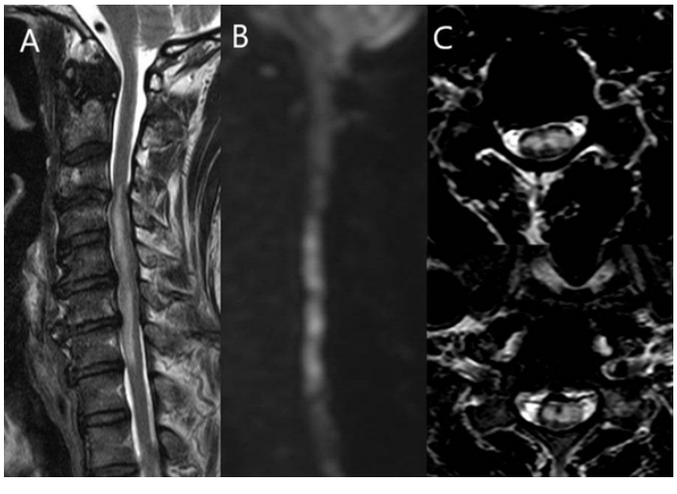

Figure 2-MRI done on day 3 of admission(after 48 hours)
A-T2 sagittal images of cervical cord showing long segment hyperintensity extending from C3 to C7 levels
B-Diffusion weighted imaging showing bright signal and restriction of diffusion at the same levels suggestive of spinal cord infarction C- T2 axial images showing hyperintensity involving the anterior two thirds of sinal cord suggestive of anterior spinal artery syndrome

DISCUSSION

Anterior spinal artery syndrome with spinal cord infarction is a rare cause of quadriparesis.

The pathophysiology is because of spinal cord infarction causing involvement of the corticospinal and spinothalamic tracts bilaterally resulting in quadriparesis with sensory loss below the level of the lesion.

The diagnosis should be suspected with the history and suggestive physical examination findings. Neuroimaging should be done as quickly as possible. MRI scans are the gold standard for diagnosis.

Results can be negative in the first 24 hours as was the case in our patient. Scans should be repeated after 48 to 72 hours for confirmation. The hallmark characteristic finding seen is a hyperintensity involving the anterior horns in the T2-weighted imaging which on axial sequences are described as the owl eye appearance6. The other finding seen is a long segment vertical pencil like hyperintensity extending over multiple spinal cord levels. Other findings that suggest spinal cord infarction include spinal cord expansion at the affected site due to early signs of cord edema and signs of infarction of the vertebral bodies at the same levels.

MR Angiography is done in most cases to look for associated dissection or vascular malformations. Lumbar puncture is sometimes done to rule out infective and inflammatory causes. Echocardiogram is done to rule out cardiac emboli and a blood work up is essential to look for hypercoagulable states and evidence of vasculitis.

There is no recommended treatment for ASA syndrome and supportive management is followed in most cases. High dose corticosteroids are used in some cases with reports of improvement. In patients presenting in the window period, use of thrombolytic agents has been done but more studies are needed in this respect. The main supportive treatment options include intravenous fluid for hypotension, use of mechanical ventilation for respiratory involvement in high cervical cord lesions, heparin for venous thrombosis prevention and intermittent catheterization for bladder involvement7. The long term prognosis remains poor in most cases. Older age at onset and female sex carry a poorer outcome. The etiology also determines the outcome with aortic dissection and high cervical lesions having a poorer outcome. Most patients are left with degree of motor and sensory dysfunction. Long term complications include deep venous thrombosis, pressure sores, sexual dysfunction and neuropathic bladder8. Patients must be managed by a team of experts including critical care specialists, neurologists, and rehabilitation experts.

CONCLUSION

Anterior Spinal artery syndrome is a rare but potentially devastating cause of quadriparesis. A high index of suspicion is needed to diagnose and start early treatment . Initial imaging

studies may be negative and may have to be repeated after an appropriate time interval. Long term prognosis remains poor for most patients. Multidisciplinary care is important for better outcomes.

References

1. Yogendranathan N, Herath HMMTB, Jayamali WD, Matthias AT, Pallewatte A, Kulatunga A. A case of anterior spinal cord syndrome in a patient with unruptured thoracic aortic aneurysm with a mural thrombus. BMC Cardiovasc Disord. 2018 Mar 5;18(1):48. doi: 10.1186/s12872-018-0786-4
2. Gupta M, Chhabra HS. Nucleus Polposus Embolism Causing Anterior Spinal Artery Occlusion: A Rare but Possible Cause of Fibrocartilaginous Embolic Myelopathy. Int J Spine Surg. 2020 Jun 30;14(3):391-396. doi: 10.14444/7051
3. Rubin MN, Rabinstein AA. Vascular diseases of the spinal cord. Neurol Clin. 2013 Feb;31(1):153-81. doi: 10.1016/j.ncl.2012.09.004
4. Padgett M, Abi-Jaoudeh N, Benn BS, Rahimian R, Nelson K. Anterior Cord Syndrome after Embolization for Malignant Hemoptysis. Semin Intervent Radiol. 2019 Jun;36(2):111-116. doi: 10.1055/s-0039-1688424. Epub 2019 May 22
5. Klakeel M, Thompson J, Srinivasan R, McDonald F. Anterior spinal cord syndrome of unknown etiology. Proc (Bayl Univ Med Cent). 2015 Jan;28(1):85-7. doi: 10.1080/08998280.2015.11929201
6. Müller KI, Steffensen LH, Johnsen SH. Thrombolysis in anterior spinal artery syndrome. BMJ Case Rep. 2012 Sep 7;2012:bcr2012006862. doi: 10.1136/bcr-2012-006862.
7. Hanson SR, Romi F, Rekand T, Naess H. Long-term outcome after spinal cord infarctions. Acta Neurol Scand. 2015 Apr;131(4):253-7. doi: 10.1111/ane.12343. Epub 2014 Oct 27
8. Salvador de la Barrera S, Barca-Buyo A, Montoto-Marqués A, Ferreiro-Velasco ME, Cidoncha-Dans M, Rodriguez-Sotillo A. Spinal cord infarction: prognosis and recovery in a series of 36 patients. Spinal Cord. 2001 Oct;39(10):520-5. doi: 10.1038/sj.sc.3101201