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Hidden within the cord: A rare case of thoracic intramedullary arteriovenous malformation

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Abstract
Background: Spinal arteriovenous malformations (AVMs) are a rare and heterogeneous group of abnormally developed spinal blood vessels associated with an increased risk of haemorrhage and neurological deficits secondary to mass effect and normal spinal blood flow disruption. Anson and Spetzler (1992) [1] classified spinal AVM into four categories. Type II AVMs commonly presents in young adults.
Results: Contrast enhanced MRI of thoracic spine with whole spine sagittal screening was performed revealing an intradural-intramedullary AVM (Anson-Spetzler classification Type II) involving thoracic spine with adjacent serpentine vascular channels along anterior and posterior dural spaces. Intra-lesional haemorrhage with surrounding cord edema was also noted.
Conclusion: Spinal intramedullary AVMs are a rare entity. The increased likelihood of haemorrhage with intramedullary AVMs contributes to its higher rate of mortality. Contrast enhanced MRI (CE-MRI) and Digital subtraction angiography (DSA) are the key modalities for diagnosis.

Keywords: Avm, ce-mri, dsa

Introduction
Spinal arteriovenous malformations (AVMs) are a rare and heterogeneous group of abnormally developed spinal blood vessels associated with an increased risk of haemorrhage and neurological deficits secondary to mass effect and normal spinal blood flow disruption.
Anson and Spetzler (1993) classified spinal AVM into four categories [1] with further modifications by Kim and Spetzler in 2006.
Type II AVMs commonly presents in young adults.

TABLE 1: Anson-Spetzler morphologic classification of spinal vascular malformations (1993).

Anson-Spetzler morphologic classification (1993)		Description
Type I	Spinal Dural AVF (SDAVF)	Radicular artery communicating directly with a dural vein
Type II	Glomus AVM	Intramedullary pial AVM fed by radiculomedullary or radiculopial arteries
Type III	Juvenile or metameric AVM	Complex juvenile metameric AVMs involving multiple compartments (extradural and intradural), along discrete somite levels
Type IV	Spinal cord AVF (SCAVF)	Pial AVF fed by radiculomedullary or radiculopial arteries

TABLE 2: Kim and Spetzler modified anatomic classification (2006).

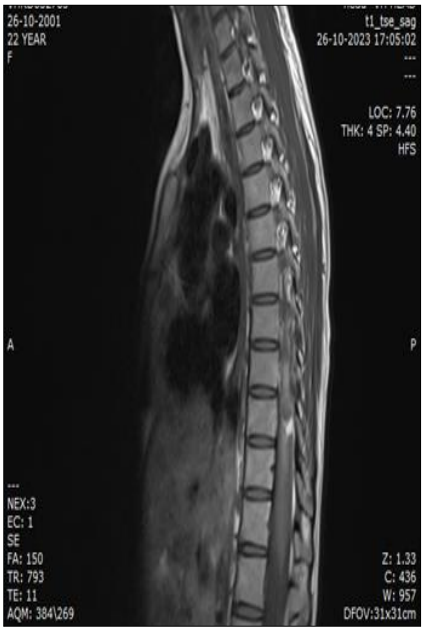
Types		Other descriptions
Fistulae	Extradural	Osteodural or anterior epidural and posterior epidural fistulae belong to this group
	Intradural dorsal	Classic Type I lesions (SDAVF)
	Intradural ventral	Classic Type IV lesions (SCAVF)
AVM	Extradural-intradural	Classic Type III lesions (juvenile/metameric AVM)
	Intradural	Classic Type II lesions (Glomus AVM)
	Conus	Conus AVMs

Aim and Objective
To describe the imaging features of a rare case of intramedullary/ glomus AVM involving thoracic spine on CE-MRI and classify it according to Anson-Spetzler classification.

Clinical History
A 22-year-old female with obstetric score G2 P2 L2, post-natal day-2.
Complains of sudden onset lower limb weakness and tingling sensations since 4 days with acute urinary retention.
No other comorbidities detected.
No history of similar complaints in the past.
No significant surgical history, No history of chronic drug intake.

Materials and Methods
Patient was subjected to CE-MRI of thoracic spine with whole spine screening.
T1, T2, DWI, GRE, T1FS pre and post Gadolinium contrast sequences were acquired in relevant planes.

Results
A well-defined T1 isointense, T2 hypointense intradural intramedullary lesion with few T1 hyperintense areas within (likely to represent subacute haemorrhage) causing mild cord expansion is noted located eccentrically in left postero-lateral aspect of thoracic spinal cord at the level of body of T9 vertebra.
The lesion showed few areas of suppression on STIR sequence with no diffusion restriction on DWI.
Long segment T2, STIR hyperintensity noted in thoracic spinal cord showing diffusion restriction on DWI, extending from inferior endplate of T3 to superior endplate of T11 vertebra- suggestive of cord edema.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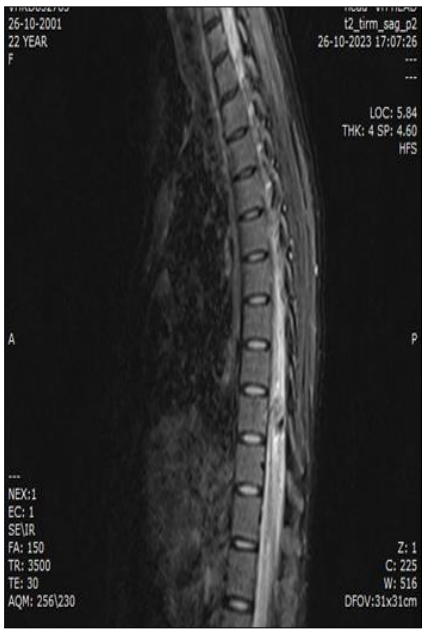
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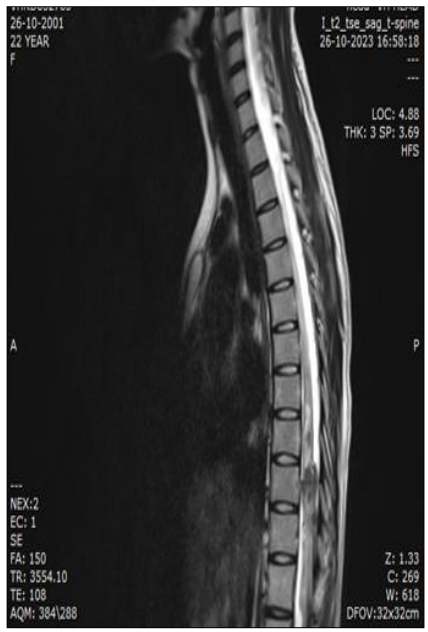
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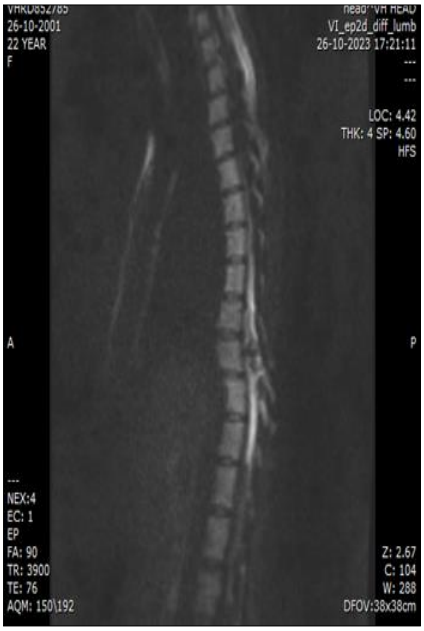
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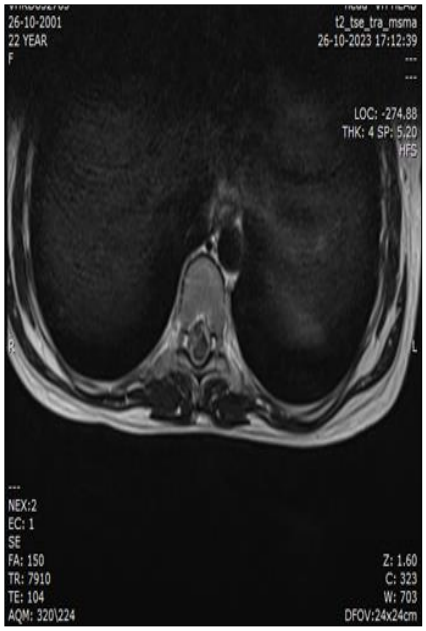
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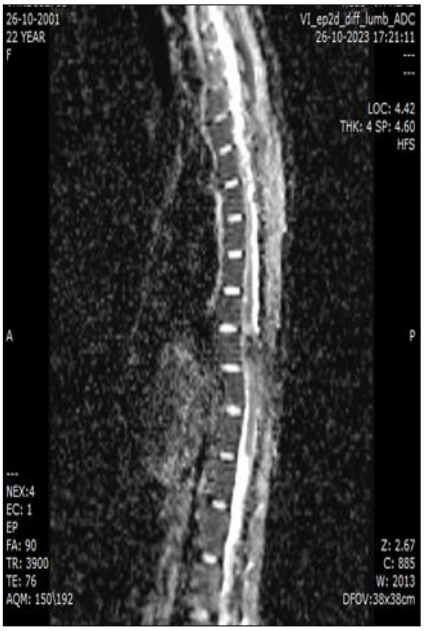
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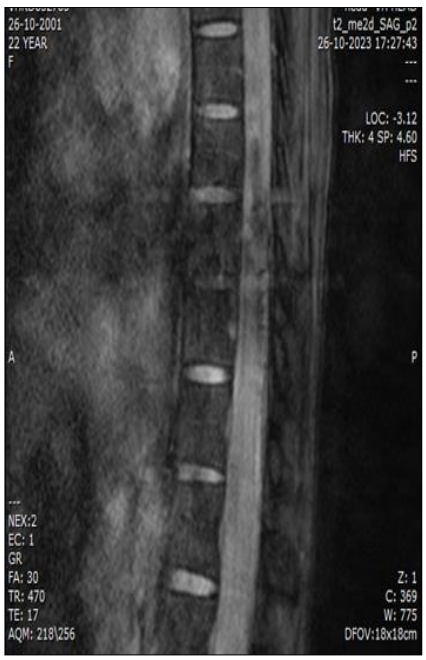
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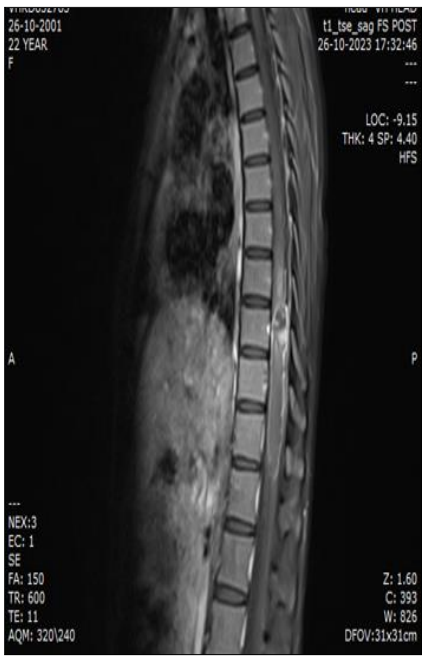
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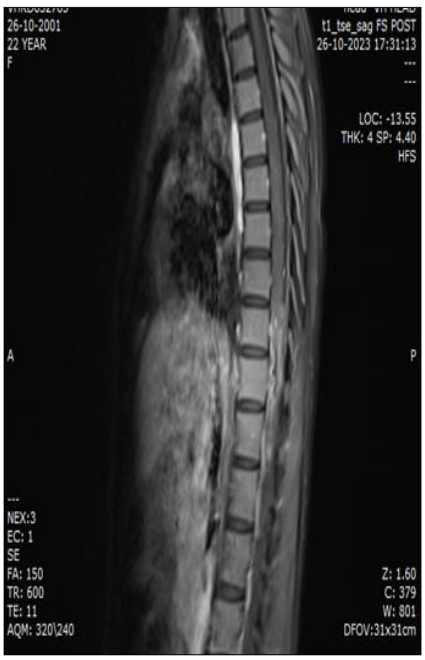
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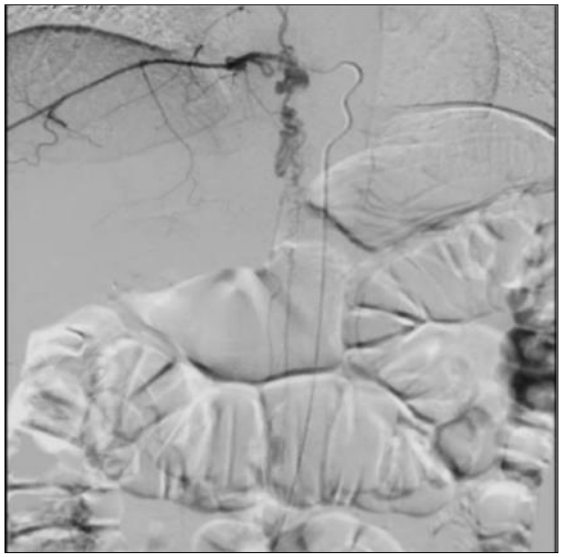
C: 379
W: 801
DFOV:31x31cm

The lesion showed few foci of blooming on Gradient echo (GRE) sequence
The lesion also showed heterogenous enhancement on post contrast study. Few serpentine tubular T2 flow voids (likely to represent vascular channels) noted within the anterior and posterior dura, above and below the lesion showing homogenous enhancement on post contrast study.



The patient was later referred to a neuro-intervention centre for subsequent spinal Digital subtraction angiography (DSA) and embolization.
Spinal DSA showed the AVM with the nidus at the level of body of T9 vertebra.

Discussion & Conclusion

With the afore- mentioned imaging features, a diagnosis of spinal intramedullary/ Glomus AV malformation with intra-lesional haemorrhage and adjacent long segment thoracic cord edema was made.
It was classified according to Anson-Spetzler classification (1993) as Type II.
Intramedullary AVM is a congenital malformation that most commonly occurs within the thoracolumbar region. Increased likelihood of hemorrhage with intramedullary AVMs contributes to its higher rate of mortality. MRI is the modality of choice for initial visualization for spinal AVMs. However, spinal digital subtraction angiography (DSA) is the current gold standard in visualizing and characterizing spinal AVMs prior to treatment [2].
Microsurgical resection is still the preferred treatment modality. Presurgical embolization may achieve partial lesion obliteration and facilitate intraoperative localization via casting of the embolic material. (most commonly Onyx and NBCA) [3]. Stereotactic radiosurgery is an emerging treatment strategy.

References

1. Anson JA, Spetzler RF: Classification of spinal arteriovenous malformations and implications for treatment [Article in Japanese]. BNI Q,1992:8:2-8.
2. Patchana T, Savla P, Taka T M, *et al*. (November 21, 2020) Spinal Arteriovenous Malformation: Case Report and Review of the Literature. Cureus,2020:12(11):11614. DOI 10.7759/cureus.11614.
3. Kona MP, Buch K, Singh J, Rohatgi S. Spinal Vascular Shunts: A Patterned Approach. American Journal of Neuroradiology,2021:42(12):2110-8.
4. Anju Garg, MS Sandhu, AK Gupta: AIIMS-MAMC-PGI'S Comprehensive Textbook of Diagnostic Radiology, 3rd edition. (for classification tables)