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Case Report

Intramedullary hemorrhage from a thoracolumbar dural arteriovenous fistula

Alhafidz Hamdan, MRes, MBBS[a], Rajeev Padmanabhan, FRCR[b,*]

[a]*Department of Neurosurgery, James Cook University Hospital, South Tees Hospitals NHS Foundation Trust, Middlesbrough TS4 3BW, UK*
[b]*Department of Neuroradiology, James Cook University Hospital, South Tees Hospitals NHS Foundation Trust, Middlesbrough TS4 3BW, UK*

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Abstract

BACKGROUND CONTEXT: Spinal dural arteriovenous fistulas (AVFs) are acquired lesions presenting typically with neurologic deficits secondary to chronic congestive myelopathy. The low-flow and low-volume nature of these lesions makes hemorrhage very unlikely, and intramedullary hemorrhage caused by thoracolumbar dural AVFs is exceedingly rare.
PURPOSE: The purpose of this study was to report a case of intramedullary hemorrhage caused by a thoracolumbar dural AVF.
STUDY DESIGN/SETTING: The study design included a case report and review of literature.
METHODS: A case of intramedullary hemorrhage from a thoracolumbar dural AVF was reported, and the literature regarding hemorrhagic presentations of dural AVF was reviewed.
RESULTS: A 66-year-old woman presented with a sudden onset of abdominal pain, paraplegia, sensory loss below the costal margins, and urinary retention. Magnetic resonance imaging scan showed intramedullary hemorrhage with abnormal flow voids raising suspicion of an intramedullary AV malformation. However, subsequent selective spinal angiography demonstrated a spinal dural AVF fed by the T7 intercostal artery and a varix within the draining vein. Complete obliteration of the dural AVF and the varix was achieved via embolization. As far as we are aware, there are only two other similar cases in the literature. Literature review revealed that presentation of thoracolumbar dural AVFs with hemorrhage is frequently associated with accelerated venous flow and the presence of a venous varix.
CONCLUSIONS: Although very unusual, a spinal dural AVF may present with intramedullary hemorrhage, and hemorrhage in such conditions may be associated with an accelerated venous flow and the presence of a venous varix.

Keywords: Dural arteriovenous fistula; Intramedullary hemorrhage; Venous varix; Accelerated venous flow; Embolization; Spinal

Introduction

Spinal dural arteriovenous fistulas (AVFs) are acquired lesions presenting typically with neurologic deficits secondary to chronic congestive myelopathy. The low-flow and low-volume nature of these lesions makes hemorrhage very unlikely, but cases reporting subarachnoid and subdural hemorrhages do exist, albeit predominantly occurring intracranially [1] and within the cervical region. [2–9]. Intramedullary hemorrhage caused by thoracolumbar dural AVFs is exceedingly rare. Here, we report such a case and present a review of the relevant literature.

Case report

History and examination

A 66-year-old woman with no medical history of note presented with a sudden onset of severe right-sided abdominal pain radiating to the back, immediately followed by

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* Corresponding author. Department of Neuroradiology, James Cook University Hospital, South Tees Hospitals NHS Foundation Trust, Middlesbrough TS4 3BW, UK. Tel.: (44) 1642-850-850; fax: (44) 1642-364-712.
E-mail address: rajeev.padmanabhan@stees.nhs.uk (R. Padmanabhan)

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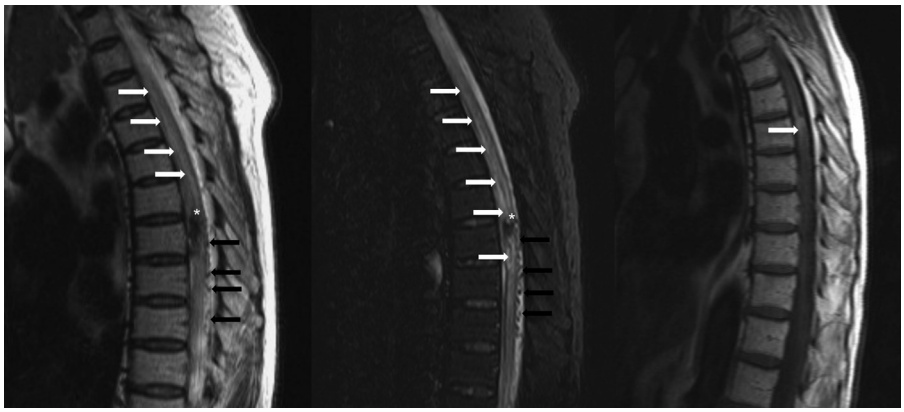

Fig. 1. Preoperative magnetic resonance (MR) images. Sagittal T2 and T2*-weighted MR images of the spine (Left and Middle) show a focal area of low T2 signal at T7 (asterisks), with associated high T2 signal intensity within the spinal cord extending from C7 to T7 (white arrowheads). Flow voids are noted on the posterior aspect of the spinal canal (black arrowheads). T1-weighted MR image (Right) reveals high T1 intensity at T7 (white arrowhead), consistent with subacute hemorrhage.

complete loss of power in lower limbs and immobility. On admission to the local hospital, the pain had become more severe, and neurologic examination revealed a paraplegia, sensory loss below the costal margins, and urinary retention. There were no other symptoms.

Imaging findings

T2-and T2*-weighted magnetic resonance imaging of the whole spine (Fig. 1, Left and Middle) demonstrated a focal area of low T2 signal within the cord (susceptibility artifact) at T7, consistent with intramedullary hemorrhage, and extensive high T2 signal involving the cord extending from C7 to T7 (edema). There were prominent signal voids posterior to the cord extending from cervicothoracic junction down to the conus. Magnetic resonance angiography (Fig. 2) revealed tortuous dilated vessels with a possible nidus in the cord, raising suspicion of an intramedullary AV malformation. Selective spinal angiography (Fig. 3), however, revealed a dural AVF arising from the right T7 intercostal artery with an associated venous varix within the draining radiculospinal vein. The anterior spinal axis received supply from the right T10 and left L1 intercostal arteries, respectively.

Intervention

Embolization of the dural AVF was performed under general anesthesia. The right T7 intercostal artery was cannulated with a left coronary catheter. Distal access was obtained with a 1.2-F Sonic microcatheter, and 25% Histoacryl (*N*-butyl-2-cyanoacrylate) was injected resulting in the penetration of the origin of the draining vein and the dural AVF. The patient's neurologic deficit remained unchanged after the procedure and at 1 month before discharge for further rehabilitation.

Discussion

Spinal dural AVFs represent the most common type of spinal vascular malformations. These acquired lesions are usually found in the thoracolumbar region, but they can occur at any point along the dura of the spinal canal. A dural

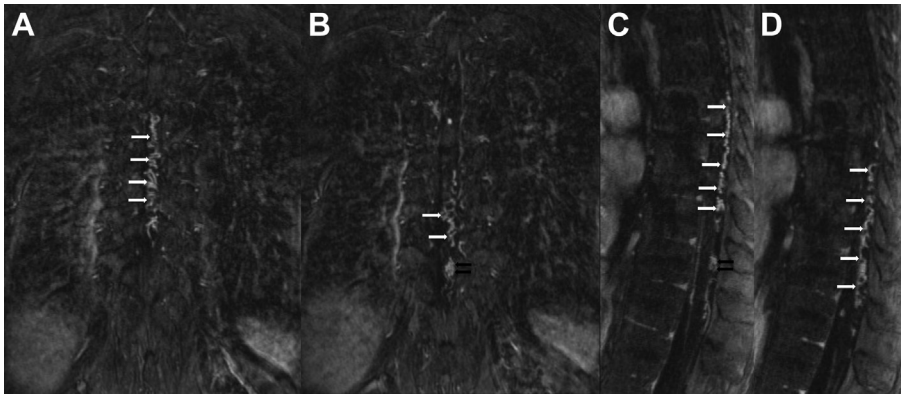

Fig. 2. Preoperative magnetic resonance (MR) angiograms. Coronal (A and B) and sagittal (C and D) images of contrast-enhanced MR angiogram in early (A and C) and late (B and D) phases demonstrate tortuous dilated veins (white arrowheads) with the presence of a venous varix (black arrowheads).