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Dissecting Aneurysm of the L1 Radiculomedullary Artery Associated with Subarachnoid Hemorrhage: A Case Report

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Abstract

Background Both spinal artery aneurysm and spinal subarachnoid hemorrhage represent a very rare event.

Methods We report a case of a ruptured dissecting aneurysm of the right L1 radiculomedullary artery associated with subarachnoid hemorrhage and severe motor weakness.

Results An urgent decompressive hemilaminectomy was performed due to worsening in motor deficit. A subsequent spinal angiography showed a dissection of radiculomedullary artery of L1 on the right side, treated conservatively.

Conclusion Nowadays, therapeutic strategies for this aneurysm remain controversial. Conservative strategy can represent a valid alternative.

Keywords

subarachnoid hemorrhage - dissection aneurysm - radiculomedullary artery - conservative treatment

Introduction

Spinal subarachnoid hemorrhage (SSAH) is a very rare event.[1] [2] It is usually associated with tumors (neurinomas, ependymomas, hemangioblastomas) or spinal arteriovenous malformations.[3] We report a case of ruptured dissecting aneurysm of the right L1 radiculomedullary artery associated with SSAH and severe motor weakness.

Case Report

History

A 62-year-old man presented with acute pain in the left crural region, irradiating to the left anteromedial thigh. These symptoms partially improved with nonsteroidal anti-inflammatory drugs (NSAIDs); the next day, paresthesias in the lower limbs and walking impairment arose.

Neurologic examination on admission showed objective functional limitation of movements of the lower left limbs, associated with paresis of the thigh flexors and hypoesthesia in the left inguinal region and in the anterolateral surface of the thigh.

Radiologic and Clinical Examination

A spinal magnetic resonance imaging (MRI) showed a hyperintense lesion in T1-weighted sequence, extending from T6 to the cauda with an oval component on the left posterolateral side of the spinal canal at the T12 level, and associated with severe spinal cord compression, without signs of myelopathy ([Fig. 1]).

His symptoms regressed after steroid therapy. The day after a rapid worsening of the strength tests of the lower right limb was observed, with impaired flexion–extension movements of the foot and toes (2/5), associated with paresis of the iliopsoas and quadriceps muscles (2/5). There was no sphincteric dysfunction.

Operation

An urgent decompressive hemilaminectomy at the D12–L2 level on the right side was performed. ([Fig. 2a]). Following dural opening, a diffuse SSAH was noticed ([Fig. 2b,c]); no cause of the bleeding was found intraoperatively.

Postoperative Course

A spinal digital subtraction angiography (DSA) showed a dissection of radiculomedullary artery of L1 on the right side ([Fig. 3]). The first day after surgery, the patient presented minimal weakness of the ileopsoas and anterior tibialis muscles, which resolved completely in the following days until discharge.

MRI performed 12 days after the operation showed a reduction in the hematoma volume ([Fig. 4]).

Two weeks after surgery, the spinal DSA was repeated. A complete occlusion of the dissecting aneurysm and preservation of the spinal artery were observed ([Fig. 5]).

Discussion

Isolated spinal aneurysms not associated with spinal arteriovenous malformations or tumors represent a rare condition.[4] [5] [6]

We have presented the case of a ruptured dissecting aneurysm of a right radiculomedullary L1 artery.

Natural history and causes of these lesions remain unknown, and there are no guidelines concerning the treatment strategy.

Sudden back pain, associated with motor or sensory lower extremity symptoms, represents the most common symptom. Dissection of the aorta is a differential diagnosis that must be considered.

In patients presenting with SSAH, the aneurysm location should be intradural (at the radiculopial or posterior spinal artery); in case of subdural hematoma, the aneurysm is located more frequently at the radiculomedullary or anterior spinal artery, due to their passage through the dural sleeve.

In this case, the exact etiology of the aneurysm remains unknown. We hypothesized the artery dissection as the first event that resulted in the formation of a pseudoaneurysm with subsequent hemorrhage because of rupture. Inflammatory processes, dissections of arterial vessels, and defects in the tunica intima are all potential etiologies for these rare lesions.[7] [8] [9] [10]

Thirteen cases of ruptured isolated aneurysms of the radiculomedullary arteries have been reported in the literature ([Table 1]).

Of these, 2 had been localized at the radiculomedullary artery of T11, 3 are of T12, 1 of T6, 2 at radiculomedullary artery of the posterior spinal artery, and 5 at the radiculomedullary artery of the anterior spinal artery.[4] [6] [7] [11] [12] [13] [14] [15] [16] [17] [18] [19] [20] Nowadays, no standardized therapeutic approach for ruptured aneurysm of a radiculomedullary artery has been reported due to the rarity of the pathology.[15]

Surgical or endovascular treatment of the ruptured aneurysm could prevent rebleeding. Decompression of the spinal canal is mandatory in case of acute-onset symptoms of spinal cord compression; direct surgical exclusion of the aneurysm can be associated with a high risk of occlusion of the anterior spinal artery, even if it is possible.[16]

Endovascular treatment can be a valid option, but it is also associated with high morbidity. In fact, the diameter of radiculopal artery is small and technically difficult to access by microcatheters.[9] [21] [22]

Coiling of the aneurysm and parent artery occlusion with coils or particles represent the most common endovascular options. Coil occlusion of the origin of the artery is the preferred treatment option for some authors; however, the risk of aneurysm re-occurrence by arterial supply from the posterior spinal artery is higher.[23]

The wait-and-watch strategy can be the treatment of choice if expecting spontaneous thrombosis of the dissected vessel with occlusion of the aneurysm.[24]

Sometimes, spontaneous spinal aneurysm thromboses are associated with radicular artery thrombosis. Radicular artery could thrombose without any neurologic deficit in cases of good anastomoses to radiculopal and radiculomedullary arteries from anterior or posterior spinal artery.[24]

Conclusion

This case of dissecting radiculomedullary artery aneurysm with SSAH and subsequent spontaneous occlusion indicates that the conservative strategy can represent a valid alternative.

Conflict of Interest

None declared.

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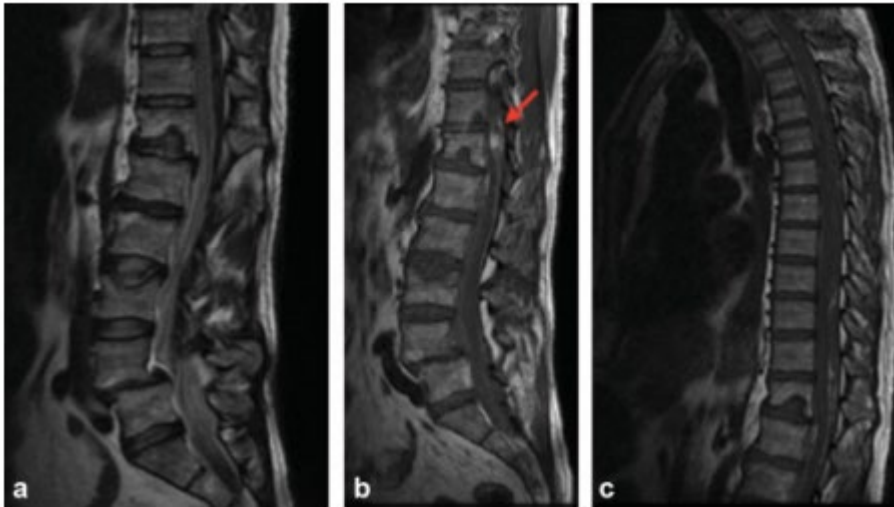


Fig. 1 (a–c) Magnetic resonance imaging performed on admission documented a hyperintense lesion in the T1-weighted sequence, with an oval component (red arrow) at T12 level and spinal cord compression.



Fig. 2 (a) Hemilaminectomy T12–L2. (b,c) Presence of diffuse subarachnoid hemorrhage.

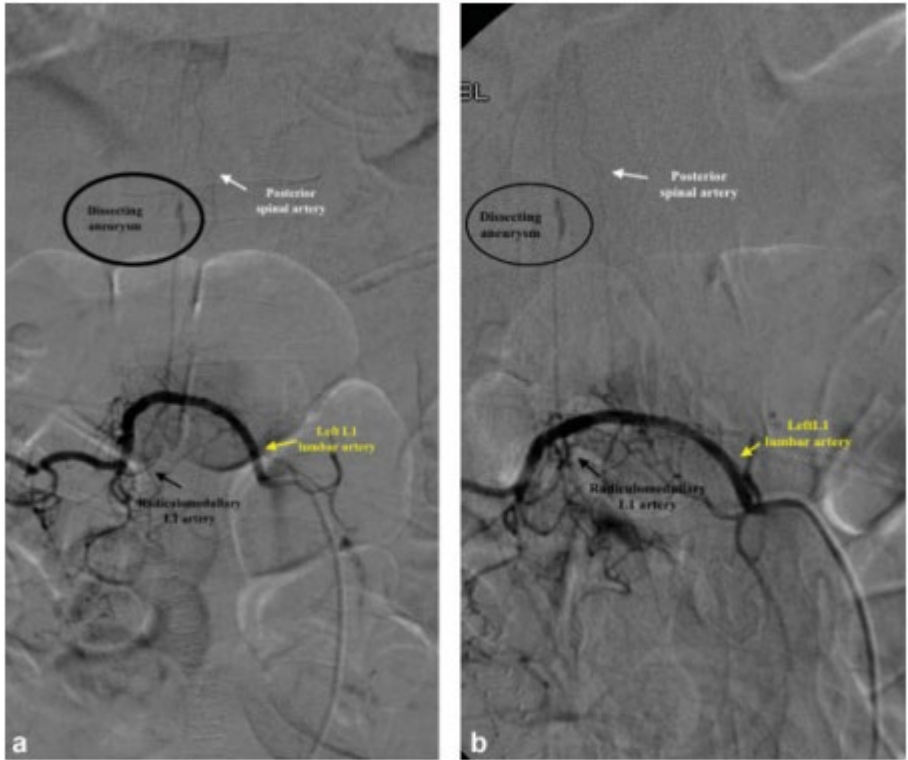


Fig. 3 (a,b) Digital subtraction angiography demonstrated a dissecting aneurysm of the posterior radiculomedullary artery arising from right L1 (a). Oblique imaging (b).

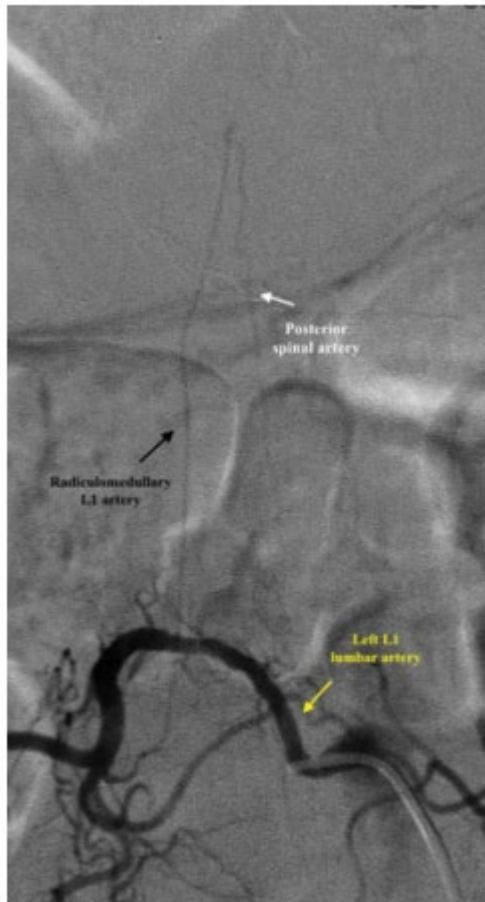


Fig. 5 Spinal angiography performed 14 days after surgery documented complete occlusion of the dissecting aneurysm with patency of the parent artery.

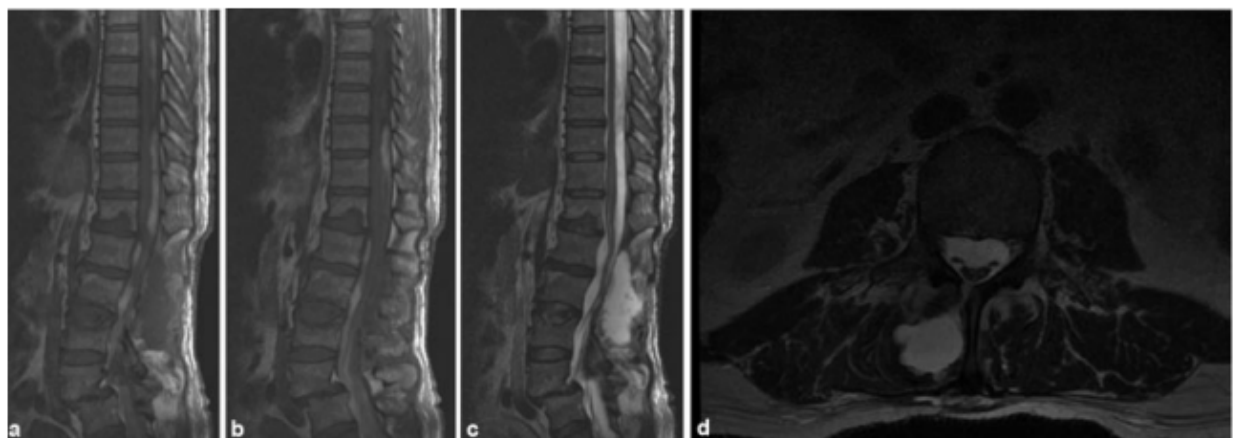


Fig. 4 (a–d) Sagittal magnetic resonance imaging performed 12 days after surgery documented a reduction of spinal subarachnoid hemorrhage, visible also on the axial image (d).

Age (y)/Sex	Location	Clinical symptoms	Treatment	Author (y)
34/F	T6	paraplegia, headache	Not available	Garcia et al (1979)
30/M	T11	abdominal pain, back pain, anesthesia	Conservative treatment	Berlis et al (2005)
34/F	T6	back pain, paresthesias	Surgical treatment	Massand et al (2005)
69/F	T12	back pain, lower limb pain	Conservative treatment	Iihoshi S. et al (2011)
67/F	T8	paraparesis and sphincter disturbance	Conservative treatment	Sato et al (2012)
74/F	Posterior spinal artery	severe lower back pain that radiated to the right leg	Surgical treatment	Caglar et al (2005)
54/M	Fusiform aneurysm of the radiculopial artery	headaches and back pain	Surgical treatment	Ikeda et al (2016)
67/M	T10 thrombotic spinal artery aneurysm	nausea and low back and right thigh pain	Surgical treatment	Takebayashi et al (2020)
62/F	Fusiform dilatation of L1 radiculopial artery	headache and back pain sensory changes in her legs	Surgical treatment	van Es et al (2013)
30/M	aneurysm of the artery of Adamkiewicz	headache and back pain, light headedness, and bilateral lower extremity paresthesias	Surgical treatment	Vishteh et al (1997)
43/F	cervical anterior spinal artery dissection aneurysm	Coma	Conservative treatment	Pahl et al (2014)
47/M	ACoA aneurysm (coiled) small aneurysm in the branch of the anterior spinal artery	Semicomatose state	Conservative treatment	Yang et al (2013)
51/M	SAH of aneurysm in the anterior spinal artery at C1 level	neck pain and numbness of the extremities	Conservative treatment	Karakama et al (2010)
62/M	dissection aneurysm of radiculomedullary artery of L1 on the right side	acute pain in the left crural region	Conservative treatment	Our case

Abbreviations: ACoA, anterior communicating artery; SAH, subarachnoid hemorrhage.

Table 1 Cases with ruptured isolated aneurysms of the radiculomedullary arteries described in literature