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Spontaneous spinal epidural hematomas: is the role of dural arteriovenous malformations underestimated?

Abstract Two recent observations of spinal epidural hematomas (SEH) are presented: one of them was associated with iatrogenic coagulopathy, the other, apparently "spontaneous", required reoperation for early recurrence and was finally attributed to ruptured epidural arteriovenous malformation missed during the first procedure. Both patients underwent complete recovery. Although modern neuroimaging provides quick, noninvasive, and sensitive assessment of spinal epidural bleeding, we believe that preoperative spinal angiography is indicated in "spontaneous" SEH with subacute clinical course. Demonstration of underlying vascular anomaly would allow better surgical planning, complete obliteration of abnormal vessels, and prevention of recurrences. Essential epidemiological, pathogenetical, and clinical aspects of SEH are reviewed.

Key words Spinal epidural hematoma · Spinal arteriovenous malformations · Spinal surgery

Introduction

Spinal epidural hematomas (SEH) are rare, yet potentially devastating, lesions. The clinical picture is characterized by abrupt onset with axial and radicular pain, followed by symptoms and signs of spinal cord or cauda compression [26]. Course is usually rapid and emergency surgical evacuation is mandatory in most cases. Cervical SEH carries the worst prognosis, with an overall mortality in surgical cases of 16%, which rises to 21% in rapidly deteriorating patients [2]. In contrast, location in the wider lumbosacral canal, where the cauda equina is less susceptible to compressive/ischemic injury, may lead to the formation of "chronic" SEH [4, 19], displaying an insidious, sometimes misleading, course [11]. The etiopathology of SEH is still poorly understood, and a large fraction of SEH are classified as "spontaneous" (sSEH), i.e., "of unknown etiology". On the basis of past experience, recent evidence, and our own observations, we suggest that the role of vascular malformations as a cause of SEH may have been underestimated: a more widespread use of spinal angiography in selected cases would probably reduce the group of sSEH.

Case reports

Case 1
A 62-year-old woman developed abrupt posterior cervical pain radiating to upper extremities and distal paresthesias. Twelve years earlier she had undergone prosthetic mitral valve substitution, and she had been on oral anticoagulants (Sintrom) since then. On admission, her prothrombin time was 13% of normal value and therapy was immediately discontinued. Neurologic examination disclosed mild quadriparesis with hyperactive deep tendon reflexes and positive Lhermitte sign. CT scan revealed right posterolateral C3–C6 SEH (Fig. 1). Neither angiography nor MRI were performed, the latter due to incompatibility with the prosthetic valve. In spite of significant clinical improvement, persistence of right upper limb weakness suggested surgical evacuation, which was performed 60 h from onset. A large clot was removed; exploration of underlying dura revealed no abnormalities, and pathological examination of the specimen failed to reveal abnormal vessels. The postoperative course was uneventful and the patient was discharged without symptoms.

Case 2
A 59-year-old white woman with unremarkable clinical history suffered recurrent cervical pain radiating to the upper limbs, re-
Fig. 1 Case 1: axial CT scan shows acute cervical epidural hematoma, posterolaterally located with respect to the dural sac. MRI was contraindicated because of an incompatible prosthetic heart valve. Bleeding was "secondary" to oral anticoagulant prophylaxis.

Fig. 2A, B Case 2. A A T2-weighted sagittal MR image reveals C2-T2 acute hematoma obliterating perimedullary cerebrospinal fluid spaces and compressing the cord from behind. The epidural location of bleeding is confirmed by the outline of the anteriorly displaced dura, cranially attached to the posterior edge of the foramen magnum. B Re-bleeding, a few hours after surgical evacuation, led to dramatic clinical deterioration and required an emergency second-stage procedure.

Fig. 3 At reoperation, exploration of the dural surface disclosed a cluster of abnormally dilated vessels (arrowhead) consistent with dural arteriovenous malformation.

Fig. 4 Control MRI after a second operation: T2-weighted sagittal view. The hyperintense focus (arrowhead) is consistent with spinal cord injury. Persistent sphincteric disturbances subsided within a few weeks and the patient was asymptomatic at the 6-month follow-up.