ORIGINAL ARTICLE

Management of acute spontaneous thoracic spinal epidural hematoma causing paraplegia

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ABSTRACT

Aim To emphasize the importance of early recognition, diagnostic processing and emergent surgical treatment of spontaneous spinal epidural hematoma (SSEH).

Methods A 39-year-old female presented with sudden onset of severe pain between the shoulder blades followed by paraparesis and alerted sensibility in the lower extremities. An hour later she developed paraplegia with sensory deficits below ThIV level, absence of patellar reflex, ankle jerk reflex and sphincter dysfunction.

Results Magnetic resonance imaging (MRI) demonstrated acute extensive epidural mass of thoracic spinal segments (ThI-ThIII). The patient underwent emergent decompressive laminectomy ThI-ThIII with epidural hematoma evacuation within 24 hours of symptoms onset. After the surgical treatment, because of suspicion on spinal arteriovenous malformation, complete diagnostic evaluation with spinal angiography was done and no form of vascular malformation was found. Idiopathic SSEH was diagnosed. Two months later the patient reached complete neurological improvement.

Conclusion The SSEH is a rare condition that should be kept in mind in patients presenting with neurological deficit and a sudden onset of back pain like it was in our case. For early diagnosis, immediate MRI is essential. Prompt surgical decompression such as laminectomy is an absolute surgical indication widely accepted for patients with progressive neurological deficit. The SSEH should be considered as one of the important differential diagnoses in patients who have developed acute myelopathy.

Key words: neurological impairment, magnetic resonance imaging, decompressive laminectomy

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INTRODUCTION

Spinal epidural hematoma, a potentially devastating problem, requires rapid diagnosis and urgent surgical intervention. If it is not recognized on time it may lead to rapid and irreversible neurological impairment. Therefore, early diagnosis and treatment are essential (1,2). Nontraumatic or spontaneous spinal epidural hematoma (SSEH) has been usually associated with coagulation disorders or some vascular malformations (3). Traumatic causes of spinal epidural hematoma include vertebral fractures, obstetric birth trauma, lumbar punctures, bleeding after surgery, epidural anesthesia and missile injuries (4). The fragile spinal veins, especially the valveless epidural venous plexus, are accused of being the site of structural weakness. Its estimated incidence rate is 1 new case per million population per year, accounting for 0.3% to 0.9% of all space-occupying spinal cord lesions (5,6). The most common clinical presentation feature is pain in the spinal column with a radicular component, which may be accompanied or followed by clinical signs of acute myelopathy (7,8). Early clinical diagnosis and confirmation with an imaging study (preferably an MRI scan) are of vital importance (9-11). The SSEH is considered as surgical emergency since early hematoma evacuation is associated with better functional outcomes (12,13).

In this study we report on spontaneous thoracic spinal epidural hematoma associated with acute paraplegia, sensory deficits below ThIV level and sphincter dysfunction, which was treated with decompression and followed by complete neurological resolution within two months.

PATIENT AND METHODS

Patient and study design

A 39-year-old woman presented to the Emergency Room of Cantonal Hospital Zenica, Bosnia and Herzegovina, complaining of pain between the shoulder blades, acute onset of paraparesis followed by numbness from the chest and lower limbs. She was conscious and awake at admission, without respiratory distress and with normal vital signs. During neurological examination and diagnostic evaluation 30 minutes later she was found to be completely paralyzed in both legs with sensory loss below the level of ThIV, turn out muscle tendon reflexes (MTR) and sphincter dysfunction (McCormic scale IV, Frankel scale A) (14). There was no history of hypertension, trauma, bleeding dyscrasia or use of anticoagulant therapy.

Methods

Laboratory analyses of blood were done immediately at the admission at the Department of Laboratory Medicine Cantonal Hospital Zenica (Cell-Dyn Ruby, IL 60064, USA, 2013) including bleeding time (60-240 seconds), clotting time (300-900 seconds), and platelet count (150-400 x10^9/L).

Urgent MRI without gadolinium enhancement of the thoracic cord was performed using T1 and T2 weighted imaging (Siemens Magnetom Avanto 1,5 T, Erlangen, Germany).

A surgical decompression with total laminectomy form ThI-ThIII was performed. Additionally, spinal angiography was done at the Neurosurgery of the Clinical Center Tuzla (Siemens, Germany 2015).

RESULTS

The laboratory findings including bleeding time, clotting time and platelet count had referent values.

The MRI confirmed the presence of epidural lesion compressing the cord posteriorly extending from ThI to ThIII. The lesion had an isointense signal on T1- weighted (Figure 1, left; Figure 2) and a hyperintense signal on T2-weighted images (Figure 1, right).

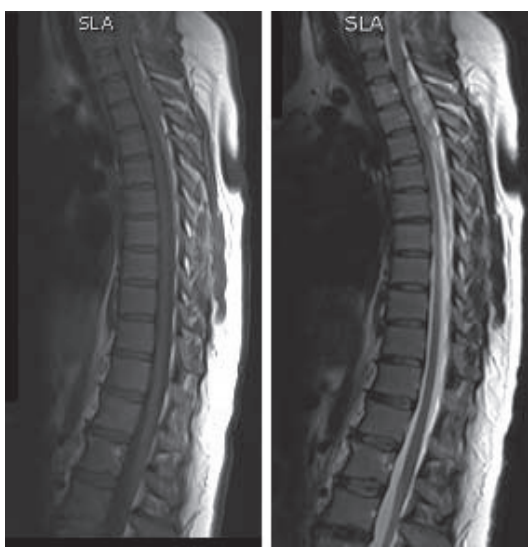

Figure 1. Sagittal noncontrast-enhanced spine echo T1-T2 weighted image of the thoracic cord, showing an isointense (T1) (left) and hyperintense (T2)(right) signal of the lesion compressing the cord posteriorly from ThI-ThIII segment (Department of Neurosurgery, Cantonal Hospital Zenica, 2016)

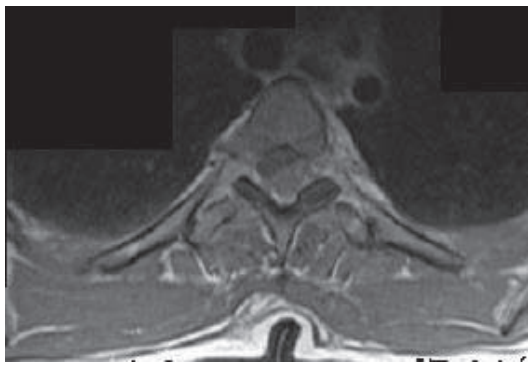

Figure 2. Axial T1-weighted image showing the compressing lesion of the thoracic cord into the spinal canal (Department of Neurosurgery, Cantonal Hospital Zenica, 2016)

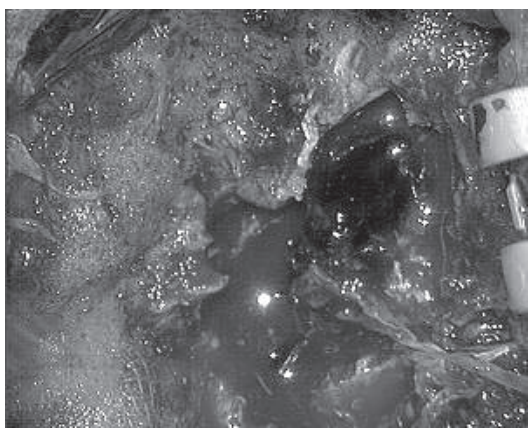

Figure 3. Intraoperative aspect of spontaneous thoracic spinal epidural hematoma (Department of Neurosurgery, Cantonal Hospital Zenica, 2016)

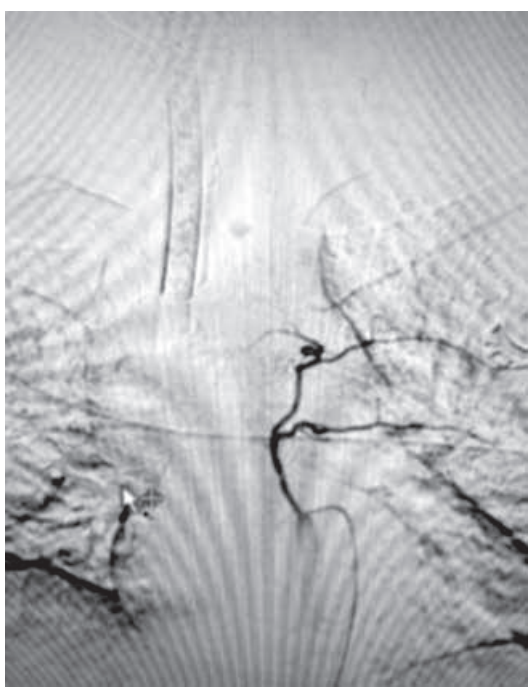

Figure 4. Spinal angiography without any signs of arteriovenous malformation or aneurysms (Department of Neurosurgery, Clinical Center Tuzla, 2016)

After surgical decompression with total laminectomy form ThI-ThIII which was performed within 24 hours (Figure 3), initially in the postoperative period the patient showed symptomatic improvement of motor function in feet (1/5) with the same sensory disturbances below Th IV. The patient was transferred to the Neurosurgery Clinical Center Tuzla for further radiological evaluation and possible endovascular treatment. Spinal angiography did not show presence of arteriovenous malformation (Figure 4) and the patient was involved in daily, intensive physical therapy. Two months later she experienced full recovery of sensorimotor function.

DISCUSSION

Spontaneous spinal epidural hematomas include all forms of extradural spinal hemorrhages not consequent to vertebral trauma, coagulation disorders, vertebral angiomas, or any other apparent cause. It is potentially disabling neurosurgical emergency, representing 0.3%-0.9% of lesions that occupy the vertebral epidural space (15). Nontraumatic spinal epidural hematoma was described as early as 1869 by Jackson (16). Since that time, many spontaneous spinal epidural hematoma cases have been reported. The incidence of SSEH as estimated by Holtas et al. is 0.1 per 100.000 people (17) and is higher in men (18). The characteristic clinical onset is sudden dorsal local pain, in or over the spine, followed by progressive sensory or motor deficits, usually within minutes or hours (seldom days), which may progress to complete paralysis (18). Authors believe that congestion followed by rupture of the spinal venous system is the primary event (19). Beatty and Winston (20), on the other hand, suggest that an arterial source of bleeding originating from the extensive network of epidural arteries better explains the precipitous neurological deterioration seen clinically. No cause is evident in 40-50% cases, even after open surgical exploration and removal of the clot (21), as in our case. The region of spinal hematoma is often at cervical and thoracic vertebrae level, spreading throughout the thoracolumbar spine (22). Most of the spinal hematomas are seen at the dorsal dural sac, because it adheres to the posterior longitudinal ligament at the front of the spinal canal (22). Posterior or posterolateral thoracic or lumbar regions are often involved. Usually the hematoma is

limited to a few vertebral level (23). Retrospectively, our patient's first symptom of dorsal back pain between shoulder blades may be the manifestation of nerve root irritation of the ThII to ThIV dermatomes, which innervate interscapular region. Further compression of the cord caused progressive paresthesia, paraplegia and urinary retention within 1 hour after the first presentation to the emergency department.

Magnetic resonance imaging has been used to diagnose spinal epidural hematoma since 1987. Within 24 hours of onset, the hematoma is isointense with the cord on T1-weighted images and heterogeneous on T2-weighted images (24). By 48 hours, due to the accumulation of methemoglobin, the hematoma will give an increased signal on T1 weighted images but will remain hyperintense on T2 weighted sequences (25).

The standard therapy has included prompt evacuation of the hematoma, usually with good neurological recovery. The outcomes for these patients depend on the time interval between the onset of symptoms and the surgical therapy. There is a correlation between early decompression surgeries with a better neurological recovery (26). If laminectomy is performed within 8 hours after the onset of neurological dysfunctions, spinal cord ischemia tends to be reversible (27). In our case successful decompressive laminectomy was made in the first 24 hours of the onset of symptoms, which allowed full recovery of sensorimotor and sphincteric function. In general, the earlier operative evacuation leads to the better neurological outcome (28, 29).

In conclusion, the SSEH is a rare, disabling or even fatal entity which requires early diagnosis and prompt surgical treatment in order to improve the neurological and functional outcome. For early diagnosis, immediate MRI is essential. The SSEH should be considered as one of the important differential diagnoses in patients who have developed acute myelopathy.

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TRANSPARENCY DECLARATION

Competing interests: None to declare**.**

REFERENCES

1. Torres A, Acebes JJ, Cabiol J, Gabarros A, López L, Plans G, TeixidorP. Review of 22 cases of spinal epidural hematomas. Prognostic factors and therapeutic management. Neurocirugía (Astur) 2004; 15:353-9.
2. Oh JY, Lingaraj K, Rahmat R. Spontaneous spinal epidural haematoma associated with aspirin intake. Singapore Med J 2008; 49:e353-5.
3. Ziyal IM, Aydın S, Inci S, Şahin A, Ozgen T. Multilevel acute spinal epidural hematoma in a patient with chronic renal failure. Case report. Neurol Med Chir (Tokyo) 2003; 43:409-12.
4. Lefranc F, David P, Brotchi J, De Witte O. Traumatic epidural hematoma of the cervical spine: magnetic resonance imaging diagnosis and spontaneous resolution: case report. Neurosurgery 1999; 44:408-10.
5. Lo CC, Chen JY, Lo YK, Lai PH, Lin YT. Spontaneous spinal epidural hematoma: a case report and review of the literatures. Acta Neurol Taiwan 2012; 21:31-4.
6. Paiva WS, Amorim RL, Rusafa E, Taricco MA, Bor-Seng-Shu E, Figueiredo EG. Idiopathic spinal epidural hematoma in patients with sudden paraplegia: a case report. Rev Neurol 2008; 46:540-2.
7. Varela Rois P, González García J, Regueira Portas M, Martínez Cueto P, Azevedo González E. Spinal hematomas: spinal apoplexy. Neurología 2010; 25:96-103.
8. Park J, Lee JB, Park JY, Lim DJ, Kim SD, Chung YK. Spinal cord infarction after decompressive laminectomy for spontaneous spinal epidural hematoma-case report. Neurol Med Chir (Tokyo) 2007; 47:325-7.
9. Gopalkrishnan CV, Dhakoji A, Nair S. Spontaneous cervical epidural hematoma of idiopathic etiology: case report and review of literature. J Spinal Cord Med 2012; 35:113-7.
10. Sirin S, Arslan E, Yasar S, Kahraman S. Is spontaneous spinal epidural hematoma in elderly patients an emergency surgical case? Turk Neurosurg 2010; 20:557-60.
11. Doymaz S, Schneider J. Spontaneous spinal epidural hematoma in a teenage boy with cholestasis: a case report. Pediatr Emerg Care 2013; 29:227-9.
12. García García ME, de Las Heras V, Kurtis Urra M, Vela Souto I. Spontaneous spinal epidural hematoma. Neurología 2008; 23:59-61.
13. Woon CY, Peng BC, Chen JL. Spontaneous spinal epidural haematomas and the prognostic implications of interval to surgical decompression: a report of two cases. J Orthop Surg (Hong Kong) 2009; 17:216-9.
14. Ellenbogen RG, Abdulrauf SI, Sekhar LN. Principles of neurological surgery. New York, USA: Elsevier, 2012.
15. Zhong W, Chen H, You C, Li J, Liu Y, Huang S. Spontaneous spinal epidural hematoma. J Clin Neurosci 2011; 18:1490-4.
16. Jackson R. Case of spinal apoplexy. Lancet 1969; 2:5-6.
17. Gundag M, Seyithanoglu MH, Dogan K, Kitis S, Ozkan N. Spontaneous resolution of paraparesis because of acute spontaneous thoracolumbar epidural hematoma. Iran Red Crescent Med J 2012; 14:45-8.

18. Kotil K, AkÇetin MA, KuŞcuoĞlu U, Eras M, Acar C, Bilge T.Spontaneous thoracic spinal epidural hematoma causing paraplegia. Turkish Neurosurgery 2004; 14:45-8.
19. Wittebol MC, VanVeelen CWM. Spontaneous spinal epidural haematoma. Etiologic considerations. Clin Neurol Neurosurg 1984; 86:265-70.
20. Beatty RM, Winston KR. Spontaneous cervical epidural hematoma. A consideration of etiology. J Neurosurg 1984; 61:143-8.
21. Simmons EH, Grobler LJ. Acute spinal epidural hematoma. J. Bone Joint Surg 1978; 60:395-6.
22. Erby HR, SenogluN, AtalayH. Spinal or Epidural Haematoma. In: Whizar-Lugo VM, ed. Topics in spinal anaesthesia. Chapter 8. 2014. http://www.intechopen.com/books/topics-in-spinal-anaesthesia/spinal-or-epidural-haematoma (22 November 2016)
23. Jabri RS, Deschner S, Benzon HT. Diagnosis & Management of Intraspinal, Epidural, & Peripheral Nerve Hematoma. In: Hadzic A, ed. Textbook of Regional Anesthesia and Acute Pain Management.Part XI. Neurologic Complications of Regional Anesthesia. Chapter 71.New York: McGraw-Hill Companies, Inc., 2007.
24. Kong JK, Mak KH. Spontaneous spinal epidural haematoma--an unusual cause of spinal cord compression. Hong Kong Med J 2003; 9:55-7.
25. Lovblad KO, Baumgartner RW, Zambaz BD, Remonda L, Ozdoba C, Schroth G. Nontraumatic spinal epidural hematomas. MR features. Acta Radiol 1997; 38:8-13.
26. Li SL, Wang DX, Ma D. Epidural hematoma after neuraxial blockade: a retrospective report from China. Anesth Analg 2010; 111:1322-4.
27. Horlocker TT, Wedel DJ, Benzon H, Brown DL, Enneking FK, HeitJ A, Mulroy MF, Rosenquist RW, Rowlingson J, Tryba M, Yuan CS. Regional anesthesia in the anticoagulated patient: defining the risks (the second ASRA Consensus Conference on Neuroaxial Anesthesia and Anticoagulation). Reg Anesth Pain Med 2003; 28:172–97.
28. Markham JW, Lynge HN, Stahlman GEB. The syndrome of spontaneous spinal epidural hematoma. Report of three cases. J Neurosurg 1967; 26:334-42.
29. McQuarrie IG. Recovery from paraplegia caused by spontaneous spinal epidural hematoma. Neurology 1978; 28:224-8.

Tretman spontanog epiduralnog hematoma torakalnog segmenta kičmenog kanala s posljedičnom paraplegijom

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SAŽETAK

Cilj Naglasiti važnost ranog prepoznavanja, dijagnostičke obrade i urgencije hirurškog tretmana spontanog spinalnog epiduralnog hematoma (SSEH).

Metode 39-godišnja ženska osoba javila se na neurološki Odjel zbog iznenadne boli između lopatica, praćene paraperezom i poremećajem senzibiliteta u donjim ekstremitetima. Sat vremena kasnije došlo je do produbljivanja motornog deficita i do paraplegije, praćene senzornim poremećajem ispod ThIV nivoa, odsutnosti pateralnog refleksa, refleksa Ahilove tetive, kao i sfinkterijalnom disfunkcijom.

Rezultati Magnentna rezonanca (MR) kičmenog kanala pokazala je opsežnu akutnu epiduralnu masu torakalnog segmenta kičme (ThI-ThIII). Pacijentica je podvrgnuta hitnoj dekompresivnoj laminektomiji nivoa ThI-ThIII, uz evakuaciju epiduralne kolekcije unutar 24 sata od pojave simptoma. Nakon hirurškog liječenja, zbog sumnje na moguću spinalnu arteriovensku malformaciju, urađena je dijagnostička obrada spinalnom angiografijom koja nije pokazala bilo kakav oblik vaskularne malformacije. Dijagnosticiran je idiopatski spontani epiduralni hematom. Dva mjeseca kasnije pacijentica je postigla potpuni neurološki oporavak.

Zaključak Spontani spinalni epiduralni hematom (SSEH) je rijetko stanje koje treba imati na umu kod pacijenata s neurološkim deficitom i naglim nastupom bola u leđima, kao što je bio u našem slučaju. Za ranu dijagnozu, neposredni MRI je esencijalan. Promptna hirurška dekompresija, u vidu laminektomije, apsolutna je hirurška indikacija, široko prihvaćena za pacijente s progresivnim neurološkim deficitom. SSEH treba uzeti u obzir kao jedan od diferencijalno dijagnostičkih oblika u bolesnika s akutnom mijelopatijom.

Ključne riječi: neurološko oštećenje, magnetna rezonanca, dekompresivna laminektomija