Subacute spinal subdural hematoma managed by a late lumbar decompression – a case report and literature review

Bartłomiej Pala^A [⊠], Wojciech Andrusewicz^B, Elżbieta Włodarczyk, Tomasz Pala^c, Tomasz Klepinowski^D, Leszek Sagan^E

Pomeranian Medical University Hospital No. 1, Department of Pediatric Neurosurgery and Neurosurgery, Unii Lubelskiej 1, 71-252 Szczecin, Poland

^AORCID: 0000-0002-4156-6604; ^BORCID: 0000-0002-1697-3582; ^CORCID: 0000-0002-3169-9905 ^DORCID: 0000-0003-4806-2094; ^EORCID: 0000-0001-5366-1070

🖂 pala.b@edu.pum.edu.pl

ABSTRACT

Introduction: Spinal subdural hematoma is a rare condition among patients with neurosurgical traumas and so it is a real challenge to establish the correct preoperative diagnosis. Elevated levels of coagulation parameters are their most significant risk factors and occasionally constitute a contraindication for emergent surgery. Our study addresses the subject of the aftermath of postponing the cauda equina decompression.

In this report, we describe a case of a 72-year-old obese man who presented with sharp iliolumbar pain and progressive paraparesis. Clinical examination revealed bilaterally decreased deep tendon reflexes, positive straight leg raise sign on both sides, dysaesthesia, and urinary incontinence. Imaging studies showed a mass filling almost the entire spinal canal at the L3/4 level. The surgery had to be postponed due to the excessively

INTRODUCTION

Spinal subdural hematoma (SSDH) is an extremely rare condition among patients admitted to the neurosurgical emergency unit. Only 122 SSDH cases have been described in the literature. Eighty-eight of those hematomas were managed by a decompressive laminectomy. Full recovery was achieved in 36% of patients who underwent surgery later than 48 h after the onset of symptoms. However, only 27% of patients managed within 48 h completely regained neurological functions [1, 2]. Three main etiological causes can be distinguished: posttraumatic, iatrogenic, and spontaneous hematomas [1, 2]. Novel oral anticoagulants or coumarine-derivatives are responsible for the vast majority of the SSDH cases [1, 3]. Symptoms result mainly from the spinal cord and spinal roots compression. Deterioration of neurological deficits requires urgent decompression. However, performing a spine surgery when dealing with an unstable coagulation system may have dramatic consequences for the patient. The main risk is profuse intraoperative bleeding and an inability to achieve hemostasis. At the same time releasing the pressure upon the nerve structures as quickly as possible is one of the most important factors increasing the chances of the recovery of neurological function [4].

A question appears whether it is reasonable to delay the surgery when the patient requires normalization of the coagulation markers. Is it worthwhile to postpone the decompression? high international normalized ratio. The coagulation system was stabilized on the 5th day of hospitalization, hence the L2-L3-L4 laminectomy was performed. A subdural hematoma was visualized after exposing the meningeal sac. After thorough removal of the lesion and subsequent neurorehabilitation, the patient's neurological functions improved; however, urinary incontinence symptoms remained.

Conclusions: Our unique case report shows potential problems with decision-making regarding the timing of the surgery. Although early decompression is characterized by the best outcome, surgeons are obliged to take into account several factors such as dysregulated coagulation system and if necessary, delay the surgery for the benefit of the patient.

Keywords: spinal subdural hematoma; early lumbar decompression; late lumbar decompression; coagulation system.

We report a case of SSDH with stable neurological deficits and highly prolonged prothrombin time managed by the late decompression with a satisfactory outcome.

CASE DESCRIPTION

A 72-year-old obese man was admitted to the emergency department due to the sudden sharp pain within the iliolumbar region along with a progressive paraparesis as a result of a fall during mushrooming. The patient came to the hospital on the 2nd day of his symptoms. Neurological examination revealed ²/₅ muscle weakness in both lower extremities with bilaterally decreased patellar and ankle jerk reflexes, positive Lasègue sign on both sides as well as numbress in the medial thigh and groin. Further evaluation revealed urinary incontinence. The medical history included atrial fibrillation with warfarin therapy, arterial hypertension ischemic heart disease. The international normalised ratio (INR) had not been examined since the beginning of the treatment. The computed tomography (CT) imaging suggested stenosis of the spinal canal at the level of the L3 vertebral body with the suspicion of a disc herniation.

The patient was referred to the neurosurgical emergency unit. However, taking into consideration factors like the paraparesis lasting more than 36 h, the INR of more than 6, and the unclear nature of the spinal canal pathology revealed on CT examination, he was sent to the neurology department in order to continue the differential diagnostic process and stabilize the coagulation system parameters. The patient was also commenced on steroid therapy. The magnetic resonance imaging (MRI) showed significant spinal stenosis resulting from a tumor-like mass at the level of L3 vertebral body (Fig. 1). The sudden appearance of his symptoms along with the newfound lesion in the MRI raised suspicion of an intradural disc herniation. Of note, similar cases have already been described in the literature [5]. The surgery had to be postponed because of the significantly increased INR of 2.08. In the course of the 2-day long vitamin K and fresh frozen plasma therapy, the pain in the lumbosacral area intensified with a sudden exacerbation of paraparesis down to the 1/5 grade on the Lovett scale.



FIGURE 1. Preoperative imaging: (a) sagittal and (b) axial T2-weighted magnetic resonance imaging demonstrating an intradural extramedullary mass at the level of L3 vertebral body and the resulting compression of the cauda equina

Ultimately, on the 5th day of hospitalization and on the 7th day from the onset of symptoms the L2-L3-L4 laminectomy was performed, which allowed to visualize a thin, bluish meningeal sac (Fig. 2). The liquid part of the hematoma leaked out upon the 1st dura mater incision. The remaining blood clots were removed, relieving the pressure on the spinal nerve roots. After clots removal, further inspection of the intradural space was uneventful. Afterward, the hematoma fragments were sent for a histopathological evaluation. Over the course of the postoperative period and neurorehabilitation, the neurological functions gradually recovered. However, the urinary incontinence persisted. The patient was transferred to the neurological rehabilitation department on postoperative day 20.

LITERATURE REVIEW

Spinal subdural hematoma is a very rare cause of low back pain. It does not give any unique or pathognomonic signs that could distinguish them from any other potential spinal pathologies. The most frequent symptoms are motor and sensory deficits (89% and 64%, respectively) and pain (84%). Bladder dysfunction was noted among 45% of these patients; 40% of the SSDHs are localized in the thoracic spine, followed by the thoracolumbar and the cervicothoracic area. Regarding epidemiology, women may be affected more often than men – 57% vs. 43%, respectively [1]. The radiological differential



FIGURE 2. Intraoperative view of the spinal subdural hematoma at the level of L3: (a) distended and bluish dura mater can be seen directly over the hematoma; (b) an intradural view

diagnosis includes schwannoma, meningioma, lipoma as well as intradural disc herniation. The literature provides 3 treatment options for SSDH. The surgical decompression is the most suitable method for post-traumatic cases with severe symptoms lasting less than 24 h. Another therapy might be percutaneous drainage which is proposed mainly for patients with chronic ailments. Spinal subdural hematoma can also be treated conservatively, for instance, with steroid therapy. The choice of a particular method depends mainly on the duration of symptoms, their severity, and concurrent abnormalities such as abnormal coagulation system parameters and vascular malformations [6].

Although CT is the imaging modality of choice for the majority of acute spinal conditions, it is not suitable for the diagnosis of the SSDH. Hyperacute and acute hematomas are often hyperdense, so theoretically they could be easily distinguished from the adjacent fat tissue and bony structures. However, many artifacts within the spinal canal render CT less sensitive. Moreover, over the course of the hematoma evolution, deoxyhemoglobin oxidizes to methemoglobin, hence it becomes isodense in the CT images making prompt identification not always possible [7, 8]. According to the literature, MRI is currently the gold standard imaging method for the accurate diagnosis of SSDH. It also provides information regarding localization, shape, and relations to the nervous structures. However, some hematomas are not so self-evident to recognize and differential diagnosis is also to be considered even after having received MRI results, as in our case report [7].

Anticoagulation therapy can be a helpful hint to get the diagnostic process back on the right track. Novel oral anticoagulants and coumarin derivatives are the most commonly used drugs affecting the coagulation system parameters. Antiplatelet activity of certain medications like acetylsalicylic acid also increases the risk of haemorrhage from the spinal vessels [3]. Some over-the-counter medications such as sulodexide and pentoxifylline, when taken in incorrectly high doses, also affect individual stages of the clotting cascade, which may increase the risk of SSDH [9, 10]. Moreover, some nutrients consumed in excess are able to alter the coagulation process, for instance, ginger extracts increase the prothrombin time [11]. All aforementioned factors should be known to properly conduct a differential diagnostic process of spinal emergencies.

The lumbar SSDH should be promptly identified because emergent surgical decompression is the best treatment option when the diagnosis is made within 24 h after admission of the patient [12]. The 1st day of cauda equina injury is the crucial time window to perform a surgery that decreases morbidity and mortality. Early decompression also enables to achieve optimal sensorimotor recovery; however, they do not contribute to better results regarding the resolution of bladder dysfunction [13, 14]. The timing of decompression does not affect the rate of urologic surgical procedures among these patients [15]. In some cases it seems extremely difficult to choose the right answer whether to perform the emergent spine surgery or delay this management because of the elevated INR. The decompression becomes severely hindered by the high risk of intractable hemorrhage. At this point, it is worth noting that patients on warfarin therapy with 7-day-long treatment interruption and normalized INR have still twice as much intraoperative blood loss and a higher risk of postoperative transfusion in comparison to patients not receiving oral anticoagulation treatment [16].

CONCLUSIONS

Although the probability of neurological recovery among patients with lumbar SSDH diminishes over time from the onset of symptoms, there are a few conditions when the surgery needs to be postponed, including an excessively dysregulated coagulation system. Inability to achieve haemostasis creates a situation in which the neurosurgeon is not able to remove the entire hematoma without a risk of life-threatening bleeding. Our case report indicates that delayed lumbar decompression for SSDH might be effective with regard to neurological improvement in the postoperative period.

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