

## Case Report

**Traumatic cervical epidural hematoma in an infant**

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## Abstract

An 8-month-old male infant had presented with a history of a fall from the crib a fortnight ago. He had developed progressive weakness of both lower limbs. On examination, the infant had spastic paraplegia. Magnetic resonance (MR) imaging of the cervical spine showed an epidural hematoma extending from the fourth cervical (C4) to the first dorsal (D1) vertebral level with cord compression. The patient had no bleeding disorder on investigation. He underwent cervical laminoplasty at C6 and C7 levels. The epidural hematoma was evacuated. The cervical cord started pulsating immediately. Postoperatively, the patient's paraplegia improved dramatically in 48 hours. According to the author's literature search, only seven cases of post-traumatic epidural hematoma have been reported in pediatric patients, and our patient is the youngest. The present case report discusses the etiopathology, presentation, and management of this rare case.

**Key words:** Cervical epidural hematoma, cervical trauma, traumatic spinal hematoma

## INTRODUCTION

Spinal epidural hematoma was first described by Jackson in 1869.<sup>[1]</sup> Isolated spinal epidural hematoma can be post-traumatic or spontaneous. Spontaneous hematomas are more common than post-traumatic epidural hematomas. The annual incidence of spontaneous epidural spinal hematoma has been reported to be 0.1 in 100,000 in the general population, whereas, in the pediatric population, this incidence is significantly lower. Only 40 pediatric cases have been reported in the literature, of which 34 were spontaneous and the rest were traumatic.<sup>[2]</sup> According to the author's literature search, only 7 cases of post-traumatic epidural hematoma have been reported in pediatric patients till now, and the present case is the youngest.<sup>[3,4]</sup>

Although the lesion is located in the thoracolumbar region in older patients, the cervicothoracic site is more common in children.<sup>[5]</sup> Presenting symptoms in children are usually nonspecific like irritability and crying, making diagnosis difficult. Early surgical intervention has been reported to result in more favorable outcomes in pediatric patients as compared to adults.<sup>[5,6]</sup> However, the present case of an 8-month-old child with post-traumatic cervical epidural hematoma though diagnosed and treated late, resulted in a complete recovery.

## CASE REPORT

An 8-month-old male infant had a history of a fall from the crib a fortnight prior to admission. The mother noticed a progressive decrease in movement in both the lower limbs of the child, which gradually worsened to paraplegia. On examination, the infant had spastic paraplegia. The hematological profile was normal. Magnetic resonance (MR) scan of the cervical spine with screening of the entire spine showed an epidural hematoma from C4 to D1 vertebral levels with severe cord compression [Figures 1 and 2].

At surgery in prone position, C6 and C7 laminoplasty was performed. An approximately 20 mL liquefied blood clot was drained. Dural pulsation resumed immediately after removal of the hematoma.

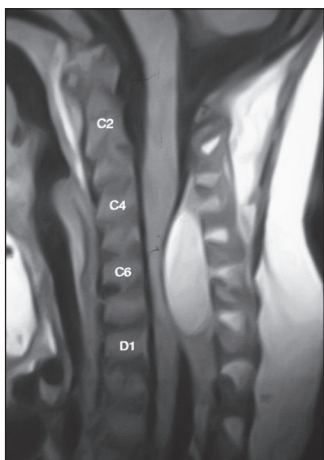
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**Figure 1:** T1-weighted sagittal image of the cervicodorsal spine shows an hyperintense epidural hematoma with severe cord compression

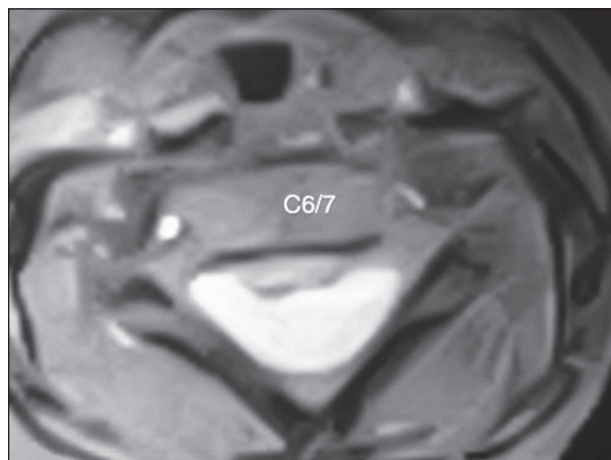
The patient had a dramatic recovery of the lower limb function in the 48-hour postoperative period and started moving both lower limbs well. Bladder voiding was normal and complete and did not require catheterization.

## DISCUSSION

The spinal epidural space contains loose fatty tissue and a venous plexus. The epidural venous plexus is a network of large thin-walled veins. The epidural vertebral venous plexus is divided into anterior and posterior parts. The anterior part runs fairly constant and is tightly attached to the posterior longitudinal ligament via Hofmann's ligaments.<sup>[7]</sup> On the other hand, the posterior part courses variably and disperses into the loose epidural fat. Most authors agree that the rupture of this valveless epidural internal venous plexus is the primary source of an epidural hematoma.<sup>[8,9]</sup> The sudden elevation of pressure induced by crying, coughing, voiding, straining, and trauma can cause a bulk of backflow into the valveless venous system, which makes the loosely supported posterior part of the vertebral venous plexus prone to rupture. Thus, the majority of spontaneous bleeds occur in the posterior aspect of the spinal canal in both adults and children.

Gaining head control is an important neuromuscular development milestone during the first 4-6 months of life. During this period, the control of cervical spine mobility gradually improves. Therefore, the combined effect of the weight of the head and increased cervical mobility in the presence of undeveloped muscular capacity of the neck predisposes the cervical spine to injury with sudden flexion and extension movements. Hence, although epidural hematomas are located in the thoracolumbar region in older patients, the cervicothoracic site is more common in children.<sup>[6]</sup>

The clinical presentation depends on the speed of blood accumulation, location, and extent of the hematoma.<sup>[10]</sup> The infant initially presents with irritability, crying, neck stiffness, and limited range of motion of the neck, followed by motor



**Figure 2:** T2-weighted axial image at the C6-7 vertebral level demonstrates severe anterior cord displacement

neurological deficits as noted by decreased ability to roll over and decreased limb movements. Presenting symptoms in children are usually nonspecific, making the diagnosis difficult. However, an early diagnosis followed by surgical intervention has been reported to result in a more favorable outcome as compared to adults.<sup>[6]</sup>

Spinal MR imaging clearly delineates the location of an epidural hematoma and identifies an associated vascular malformation.<sup>[9]</sup> Spinal cord enhancement may be apparent and should be distinguished from inflammation or neoplasia. As noted in our case, the hematoma is seen as a posterior high-signal intensity lesion on T1-weighted image. On T2-weighted images, the clot appears as a low-signal intensity lesion suggesting a subacute-type hemorrhage of more than 3 days' duration. T1-weighted MR images are most valuable because of the pathognomonic signal shift from isointensity with the cord in the early period to hyperintensity in the intermediate stage of clot resolution. Cervical spine radiographs with anteroposterior, lateral, and odontoid views are useful to identify associated traumatic fractures.

Early surgical evacuation of the clot is recommended as a treatment of choice for symptomatic traumatic spinal epidural hematoma. In exceptional cases where the neurologic deficit is minor, conservative management may be undertaken, especially with the coexistence of a serious coagulopathy and associated serious medical disease.<sup>[11]</sup> A laminoplasty is favored compared to laminectomy in the pediatric population to avoid postlaminectomy deformity in the growing spine.<sup>[9,12]</sup>

## CONCLUSION

Early diagnosis and surgical intervention have the most favorable outcome for spinal epidural hematomas. In infants, as noted in our case, even a delayed diagnosis and treatment results in a good outcome probably due to the plasticity of the infant nervous system.

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