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Case Report

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An Unusual Case of Traumatic Cervical Epidural Hematoma in an Infant

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ABSTRACT

Spinal epidural hematoma (SEH) is exceedingly rare, especially in children. Acute cervical epidural hematoma presents suddenly, with progressive neurologic deficits. However, it is difficult to diagnose in infants, which results in delayed diagnosis. We report a case of rapid diagnosis of traumatic cervical epidural hematoma in an infant with successful hematoma evacuation.

An 11-month-old patient was brought to the emergency department after falling backward from a o30cm-high bed. The child, who previously was able to stand without support, could not stand alone and frequently fell prone when he sat down. The brain magnetic resonance imagingshowed no abnormalities. On the spinal MRI, an acute epidural hematoma located at the C3-T1 level and pressed against the spinal cord was confirmed. Three months after surgical evacuation, the Korean version of the Bayley Scales of Infant and Toddler Development -III (K-Bayley-III) assessment was performed, and a developmental quotient (DQ) of 95 or higher was demonstrated for all parameters, including motor functions.

This report described an exceedingly rare case of acute cervical epidural hematoma in an infant, induced by trauma. The diagnosis and treatment were performed within one day of injury. This process was significantly faster than other reported infantile cases of cervical epidural hematoma, which were diagnosed within 4 days to 2 months.

KEYWORDS: Cervical epidural hematoma, Pediatrics, Spinal epidural hematoma, Spinal injury

INTRODUCTION

Spinal epidural hematoma (SEH) is an exceedingly rare condition with an overall annual incidence of approximately 1 per 1,000,000 people (3). SEH can occur either traumatically, spontaneously, or due to an increased bleeding tendency (4). Most cases present spontaneously, especially those that occur in the fourth or fifth decades (12). Furthermore, in most cases, symptoms appear in the subacute phase because of spontaneous bleeding.

Acute cervical epidural hematoma presents suddenly, with progressive neurological deficits, including severe neck pain and quadriplegia. Diagnosis in infants is often delayed due to their inability to communicate their symptoms. (10,11). To our knowledge, no reported infantile cases have been diagnosed immediately after a traumatic event (2). Moreover, laminectomy performed for SEH treatment can result in spinal deformation in children, especially in the presence of axial musculature weakness (5). These conditions make both diagnosis and treatment of SEH difficult in infants. We described an infantile case of acute cervical epidural hematoma that was diagnosed rapidly and treated successfully via hematoma evacuation with only ligamentum flavectomy.

CASE PRESENTATION

An 11-month-old boy was brought to the emergency department after falling backward from a 30cm high bed. He presented drowsy and with constant whining. The baby's vital signs were stable with a body temperature of 36.8°C. The initial

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neurological evaluation revealed normal deep tendon reflexes and the absence of both the Babinski sign and ankle clonus. Both extremities were active in the supine position. However, the child, who previously was able to stand without support, could not stand alone and continuously fell prone when he sat down. We examined the brain and cervical magnetic resonance imaging (MRI) simultaneously. Brain computed tomography (CT) scans were normal. The brain parenchyma showed no significant damage on brain MRI. On cervical MRI, an acute epidural hematoma located at the C3-T1 level and pressed against the spinal cord was confirmed (Figures 1A and 1B). Coagulation parameters were within the normal ranges (platelet, 503,000/$\mu\ell$; prothrombin time, 12.6 seconds, and activated partial thromboplastin time, 31.7 seconds). The patient underwent emergency surgery 23 h after his injury. To minimize trauma, after right unilateral exposure of the cervical lamina from C4 to C7, we removed only the ligamentum flavum from C4 to C7, without laminectomy (Figure 2). Histopathological analysis of the hematoma did not reveal any neoplasm or vascular malformation. One month later,

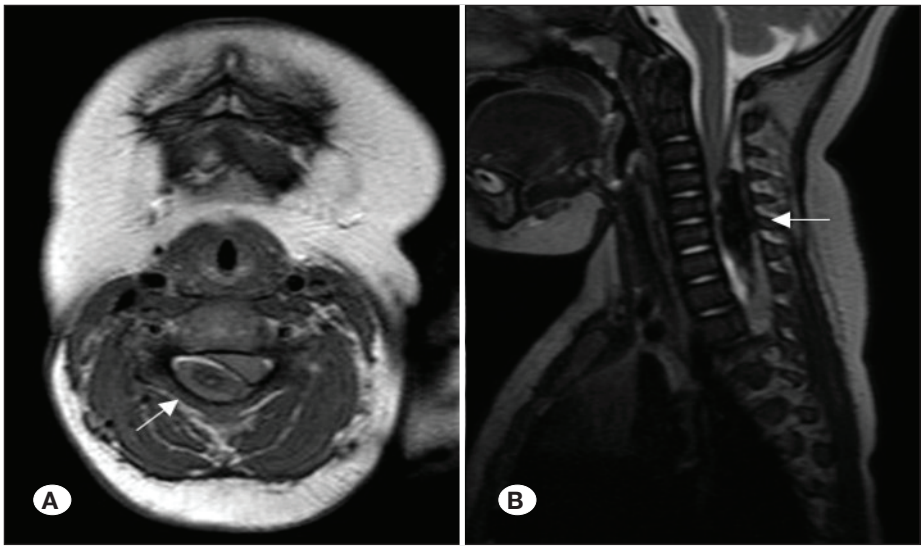

Figure 1: Cervical magnetic resonance imaging shows an acute hematoma compressed against the spinal cord over the right anterolateral aspect at the C3-T1 level **(A:** axial, **B:** sagittal).

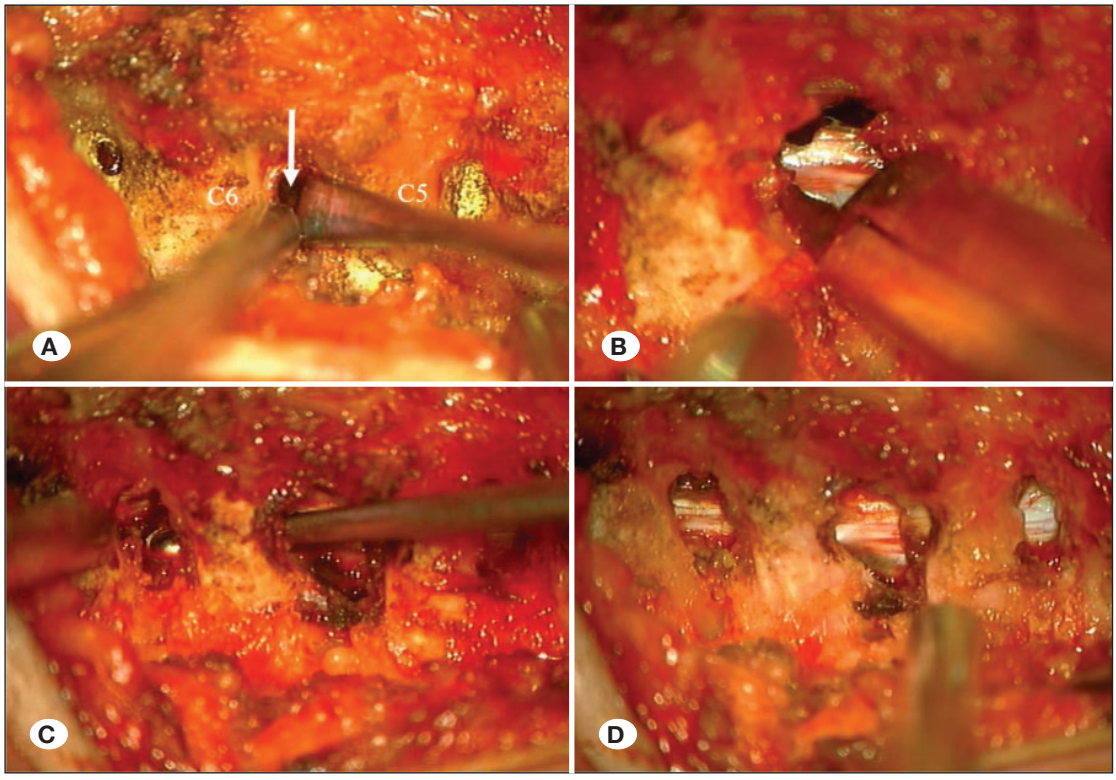

Figure 2: Intraoperative photographs showing epidural hematoma through the interlaminar space after ligamentum flavectomy (arrow) **(A)**, and successful hematoma removal with the intact dura **(B)**. After the complete evacuation of the epidural hematoma underneath the lamina using a curette, the epidural compression resolved **(C, D)**.

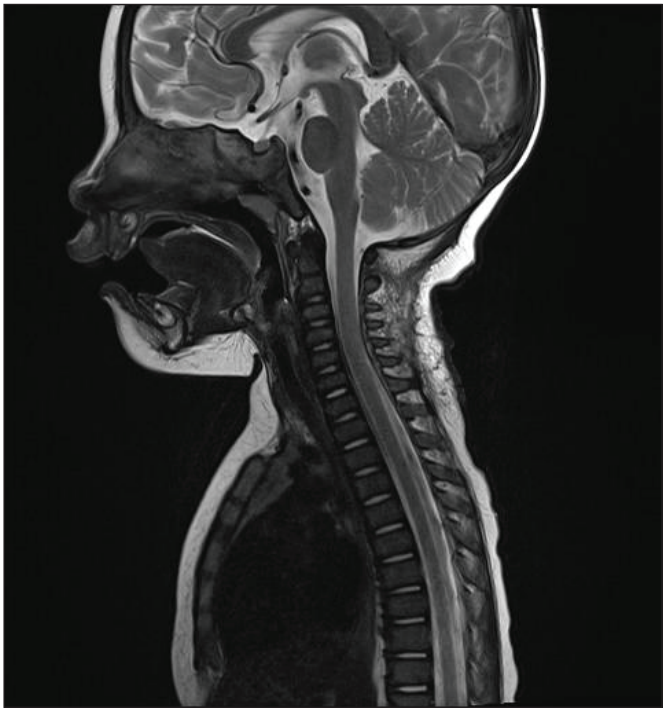

Figure 3: The follow-up sagittal T2W magnetic resonance imaging 1 month later shows complete mass reduction indicative of a resolving hematoma.

the postoperative MRI demonstrated successful resolution of the hematoma (Figure 3). Three months after the surgery, the Korean version of the Bayley Scales of infant and toddler development -III (K-Bayley-III) assessment was performed. The baby demonstrated a developmental quotient (DQ) of 95 or higher in all parameters, including motor functions.

DISCUSSION

The main cause of cervical epidural hematoma is spontaneous neck manipulation. A few reported cases have a minor trauma origin (1,6). SEH caused by minor trauma is not only extremely rare but also presents with nonspecific symptoms. Therefore, it may take hours or days to recognize any neurological decline (7). Due to its rarity, SEH may be misdiagnosed as Guillain-Barré syndrome (GBS), which presents with acute or subacute neurologic decline in children (8,12). Even when a history of trauma is confirmed, the presenting neurological symptoms may be suspected as problems associated with the brain. For these cases, caution is needed. Without MRI techniques, patients with traumatic SEH and ambiguous symptoms may have been underestimated. For good functional outcomes, early diagnosis with spinal MRI, and urgent removal of the hematoma, are most important (9). For SHE, poor outcomes are related to shorter progression intervals or rapidly worsening preoperative neurological deficits (13). A prompt diagnosis and urgent surgical evacuation are critical in children with progressive neurological symptoms. Our patient was diagnosed and treated within one day from symptom onset. This is significantly faster than other reported infantile cases of cervical epidural hematoma, in which a diagnosis is reached within four days to two months (7,11). Furthermore, despite the growth-related side effects of laminectomy, it remains the preferred choice for the management of I in infants (10,11). In contrast to the conventional method, we removed the hematoma via the interlaminar space after unilateral ligamentum flavectomy to avoid post-laminectomy deformation of the growing spine. This method is possible because of the flexible and soft nature of the spine in infants.

CONCLUSION

Cervical spine injuries in infants with unexplained neurological symptoms after head trauma must be considered. Furthermore, it is possible to decompress without laminectomy by taking advantage of the spine's laxity in infants.

AUTHORSHIP CONTRIBUTION

Study conception and design: SJK, YMO
Data collection: MJH
Analysis and interpretation of results: MJH
Draft manuscript preparation: MJH
Critical revision of the article: SJK YMO
All authors (MJH, SJK, YMO) reviewed the results and approved the final version of the manuscript.

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