

A Traumatic Cervical Epidural Hematoma that Showed Rapid Progression and Significant Improvement Without Surgery

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Case: A 76-year-old woman receiving ongoing aspirin therapy was transported by ambulance following a traffic accident. Before her arrival, about 30 min after the accident, she began complaining of dyspnea and developed quadriparesis. On admission, we performed tracheal intubation and initiated artificial ventilation. Computed tomography of the neck revealed cervical epidural hematoma anterior to the cervical spinal cord, from the first to sixth cervical vertebrae. Within four hours of the traffic accident, she demonstrated gradual improvement in movement in her upper extremities.

Outcome: The patient was discharged home without significant complications on Day 19.

Conclusion: We suggest the consideration of non-surgical management of traumatic cervical epidural hematoma when the patient's condition is rapidly improving, with onsite facilities for neurosurgery in reserve if surgical management becomes necessary.

Keywords: trauma, traffic accidents, cervical spinal cord, epidural hematoma, conservative treatment

INTRODUCTION

Cervical spinal epidural hematoma is a rare condition, and most cases are caused by spontaneous bleeding [1]. Traumatic cervical spinal epidural hematoma is extremely rare [1-6]. Cervical epidural hematoma is usually managed surgically. A case of traumatic cervical epidural hematoma that showed rapid progression to difficulty breathing and quadriplegia about 35 min after minor trauma, followed by significant improvement without operation is presented.

CASE REPORT

A 76-year-old woman was transported by ambulance because of a traffic accident. Her car crashed into a wall at a speed of approximately 30 kilometers per hour at AM 9:35. The patient was in the front passenger's seat and was not wearing a seatbelt. The air bag system did not activate. There was a large subcutaneous hematoma on her forehead. The windshield of the car was damaged. The patient had been receiving ongoing aspirin therapy (100mg per day). At the time that the emergency medical technicians arrived at the scene, the patient was able to speak and did not have dyspnea, muscle weakness, or sensory disturbance. Her respiratory rate was twelve per minutes, and respiratory sounds were clear. Her systolic blood pressure was 150 mmHg, and her pulse rate was 60 beats per minute. Percutaneous oxygen saturation was 93% on room air. The emergency medical technicians performed neck immobilization and fixed the patient to a backboard. The patient was transported to the Emergency Medical Center of Shimane University Hospital. At 10:05, she began complaining of dyspnea. On ar-

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rival to our hospital at 10:10, she was apneic, and the emergency medical technicians provided ventilatory support. Her consciousness level fell from E3V4M6 to E1V1M1. Her systolic blood pressure was 100 mmHg. Her heart rate dropped briefly to 40 beats per minute. Percutaneous oxygen saturation was 55% with an oxygen mask. There was no subcutaneous emphysema, flail chest, or deformity of the chest. Spontaneous respiration was weak. Immediately, tracheal intubation was performed, and artificial ventilation was initiated. There was no movement in the upper and lower extremities bilaterally in response to painful stimulation. The anal sphincter was relaxed.

Focused assessment with sonography for trauma showed no pleural hemorrhage, peritoneal hemorrhage, or cardiac tamponade.

Computed tomography (CT) of the head, neck, chest, abdomen, and pelvis was performed. CT of the head showed a large forehead subcutaneous hematoma (Fig. 1a). CT of the neck showed a cervical epidural hematoma anterior to the cervical spinal cord, from the first to sixth cervical vertebrae (Fig. 1b). Spinal compression had produced respiratory

failure and quadriplegia. CT also showed a compression fracture of the third thoracic vertebra. There was no intracranial hemorrhage, and no other injury in the chest, abdomen, or pelvis.

Laboratory findings included a platelet count of $227 \times 10^3/\text{mL}$, prothrombin time (PT) of 11.9 seconds, prothrombin time-international normalized ratio (PT-INR) of 0.95, and activated partial thromboplastin time (aPTT) of 28.8 seconds. All of these coagulation related test results were within their respective normal ranges. Tests of liver and kidney function were also normal. Arterial blood gas analysis after intubation showed pH was 7.276, Pao₂ was 110 mmHg, Paco₂ was 46.5 mmHg, and HCO₃⁻ was 20.9 mmol per liter.

Surgical treatment was considered for this patient. However, the patient showed remarkable spontaneous improvement without treatment. Her consciousness was almost clear after artificial ventilation was started. Within four hours of the trauma, she demonstrated gradual improvement in movement of her upper extremities. The patient was admitted to the intensive care unit (ICU). Magnetic resonance imaging (MRI) seven hours post-trauma showed a

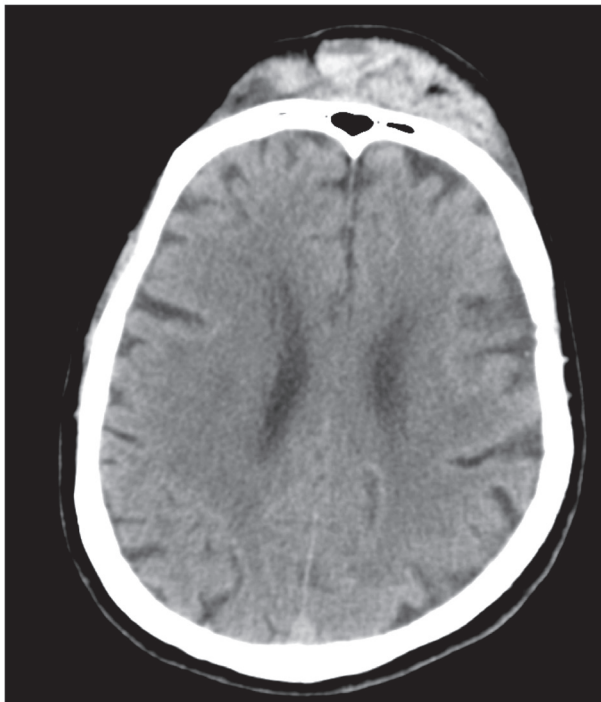


Fig. 1a. CT of the head showed a large forehead subcutaneous hematoma.



Fig. 1b. CT of the neck shows cervical epidural hematoma on the anterior spinal cord, from the first to sixth cervical vertebrae, with spinal compression.



Fig. 2. Magnetic resonance imaging (MRI) seven hours post-trauma shows a slightly decreased hematoma.

slightly decreased hematoma (Fig. 2). CT 24 hours after trauma revealed a remarkable decrease of the hematoma (Fig. 3). The patient was extubated on the sixth hospital day. The patient recovered satisfactorily over time and was able to eat and walk. She was discharged home without any sequelae on Day 19.

DISCUSSION

Cervical spinal epidural hematoma is rare, and most cases are caused by spontaneous bleeding [1]. Traumatic cervical spinal epidural hematoma is extremely rare [1-6] (Table 1). The present patient had been on aspirin therapy, and the giant subcutaneous hematoma of her forehead indicated a bleeding tendency.

The present patient's trauma was not severe. Some reports indicate minor trauma, such as manipulation therapy [2-4] or stretch exercise [5], can cause cervical spinal epidural hematoma. The present patient showed life-threatening symptoms, with rapid progression to difficulty breathing and quadriplegia, approximately 35 min after minor trauma. However, adequate life support was effective.

Many cervical spinal epidural hematomas occur on the posterior side of the spinal cord [1-6]. In the

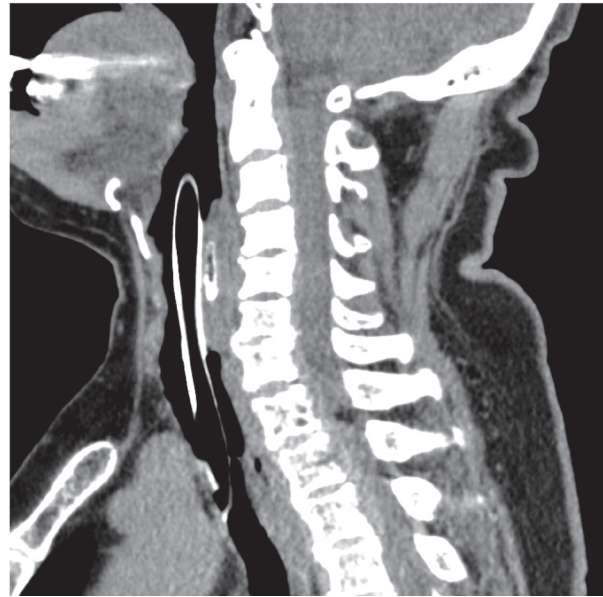


Fig. 3. CT 24 hours post-trauma shows a remarkable decrease in the size of the hematoma.

present case, the hematoma occurred on the anterior side. Extensive force may be the reason behind this difference.

To make diagnosis of the spinal injury, it is important to closely assess for neurological finding including sensation, paralysis, and paresthesia. However, we could not assess closely to this case, because she faced apnea.

CT imaging was very useful in arriving at a diagnosis of cervical spinal epidural hematoma in this case. Our practice is to perform CT from head to pelvis for multiple trauma patients. Our institution's emergency department has a CT room allowing for rapid CT imaging even in patients on ventilatory support. By comparison, MRI is more time-consuming and difficult in patients with unstable vital signs. In the present patient, MRI was obtained only after her vital signs and general condition had been stabilized.

The treatment of cervical epidural hematoma is usually surgical; specifically, decompression by laminectomy and evacuation of the clot [1-6]. There have been some reports of non-surgical management to spontaneous hematoma [7-10]. According to these reports, rapid improvement within several hours is the decisive factor in the choice to stay with conservative therapy. The present patient

Table 1. The summary of reported cases of traumatic cervical epidural hematoma

| | age | sex | event of the injury | cervical fracture | anticoagulant therapy | the location of hematoma | Frankel classification | treatment | prognosis |
|---------------|-----|--------|------------------------|-------------------|-----------------------|--------------------------|------------------------|--------------|-----------|
| Foo(1982) | 28 | male | motor vehicle accident | + | - | C7,8 | B | operation | survive |
| | 72 | male | fall | + | - | C5,6 | B | operation | died |
| | 58 | male | motor vehicle accident | - | - | C6,7 | C | operation | survive |
| Segel (1996) | 33 | female | chiropractic | - | - | C4,5,6 | E | operation | survive |
| Tseng (2002) | 67 | female | spinal manipulation | - | - | C3,4,5 | D | operation | survive |
| Whedon (2006) | 79 | male | chiropractic | - | + | C4,5 | C | operation | survive |
| Abe (2009) | 60 | male | stretch exercise | - | - | C5,6 | D | operation | survive |
| Lin (2010) | 32 | male | motorcycle accident | - | - | C3,4,5 | D | operation | survive |
| Garg (2014) | 33 | male | motor vehicle accident | - | - | C6,7 | C | operation | survive |
| Our Case | 76 | female | motor vehicle accident | - | + | C3,4,5,6,7 | E | conservative | survive |

operation: laminectomy and evacuation of hematoma

showed rapid improvement, and the hematoma diffused and thinned within a short time. We suggest that nonsurgical management be considered in traumatic cervical epidural hematoma only when the condition is improving rapidly on its own. Of course, patients must be closely monitored with on-site facilities available for neurosurgery should surgical treatment become necessary.

The hematoma of this case was thin, and rapidly decreased. The reason of that phenomenon is unclear, but complete rest may be effective.

CONCLUSION

Clinicians need to recognize that even minor trauma can cause cervical spinal epidural hematoma, which may show rapid progression. We suggest that nonsurgical management of traumatic cervical epidural hematoma be considered when the condition is rapidly improving with conservative management, but with onsite facilities available for neurosurgery should surgical treatment become necessary.

Conflict of interest: There is no potential conflict of interest to disclose.

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