

Figure 1 CT findings two and a half hours after injury. Contrast-enhanced computed tomography image in the sagittal view showed a $3 \times 7 \times 17$ cm isodense cavity in front of vertebral bodies from pharynx level to the mediastinum. It also showed a contrast leakage into the cavity (arrow) without any bone fracture.

hours after injury. It revealed a $3 \times 7 \times 17$ cm isodense cavity in front of the vertebral bodies from the pharynx level to the mediastinum. In addition, it revealed a contrast leakage into the cavity without any bone fracture (Fig. 1). She was diagnosed with retropharyngeal hematoma and transferred to our hospital for further evaluation and treatment. She had hoarseness and stridor on arrival to our hospital, which was five hours after the injury. She had the following vital signs; blood pressure of 172/106 mmHg, heart rate of 72 beats/min, respiratory rate of 24 breaths/min with labored breathing, oxygen saturation of 98% in 10 L/min oxygen through a mask, and Glasgow coma scale score of E4V5M6.

Moreover, the upper airway obstruction was diagnosed, and emergent orotracheal intubation was performed with a 6.5 mm endotracheal tube using a McGRATH™ (Medtronic, Dublin, Ireland), although the upper airway was compressed to the ventral side by the hypopharyngeal mass. After six hours of injury, subsequent contrast-enhanced CT showed that contrast leakage into the cavity was still ongoing (Fig. 2). Furthermore, laboratory results revealed a hemoglobin level of 12.6 g/dl, platelet count of 288,000/ μ l,



Figure 2 CT findings six hours after injury. Contrast-enhanced computed tomography image showed that contrast leakage into the cavity was still ongoing (arrow).

prothrombin time of 10.8 s (the international normalized ratio is 0.88 s), and activated partial thromboplastin time of 22.8 s (23.5-42.5 s). Her vital signs were stable, and conducting transcatheter arterial embolization was technically difficult. Therefore, conservative treatment was adopted. On the fifth day of injury, contrast-enhanced CT revealed that the airway remained compressed to the ventral side by the retropharyngeal hematoma, although the contrast leakage disappeared.

Additionally, tracheostomy was performed on the sixth day of injury, considering complications of endotracheal intubation. On the nineteenth day of injury, contrast-enhanced CT revealed that retropharyngeal hematoma had shrunk, and the airway was no longer compressed (Fig. 3). Therefore, tracheostomy was removed on the twenty-fourth day of injury. Neither airway obstruction nor infectious complications occurred, and the patient was discharged on the twenty-seventh day of injury.

Discussion

The retropharyngeal space is the area of loose connective tissue between the middle (buccopharyngeal) and the alar layers of the deep cervical fascia, and this space can extend from the skull base to the mediastinum⁵. If blood accumulates in this space, a retropharyngeal hematoma develops, which may cause airway

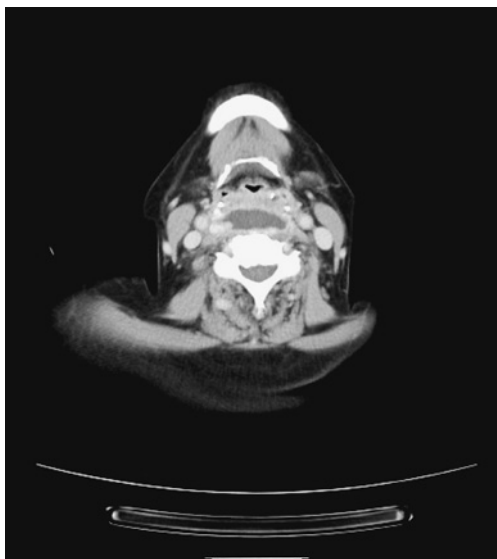


Figure 3 CT findings 19 days after injury.

Contrast-enhanced computed tomography revealed that retropharyngeal hematoma had shrunk, and the airway was no longer compressed.

obstruction in severe cases. Dyspnea, stridor, dysphagia, dysphonia, neck pain, and swelling may be noted in the cases of retropharyngeal hematoma⁹. These symptoms and signs are reminiscent of airway obstruction. Although the patient, in this case, had experienced airway obstruction a few hours after trauma, the patient's first complaints were chest and back pain. These symptoms are not typical in patients who experience airway obstruction.

Additionally, these symptoms may be due to the inferior side of the hematoma, called a posterior mediastinal hematoma. The posterior mediastinum is next to the retropharyngeal space, and some reported cases of posterior mediastinal hematoma had retropharyngeal hematomas^{6,9}. The most common presenting symptoms among hemodynamically stable patients with a mediastinal hematoma are shortness of breath and chest pain⁹. Three patients with posterior mediastinal hematoma had reported chest pain^{6,8}, and the symptoms were similar in this patient. However, retropharyngeal and posterior mediastinal hematomas do not have any specific symptoms or signs and are easily overlooked despite their fatality.

Many reported cases of retropharyngeal hematoma due to trauma had predisposing factors of bleeding. Patients receiving anticoagulants or antiplatelet drugs

are considered at increased risk for traumatic intracranial bleeding after blunt head trauma¹⁰. Preinjury clopidogrel administration may be contributed to the formation of the retropharyngeal hematoma because extrapolation of this pattern to neck and chest injury is possible. However, it is unclear how much clopidogrel contributed to the development of the hematoma. Furthermore, age is another predisposing factor for bleeding in this case. Many of the reported cases of retropharyngeal hematoma patients were over 70 years old^{1,3,7,9,11-15}. Special attention is needed for elderly population because elderly patients are generally at risk of bleeding due to numerous potential illnesses.

Many of the injuries in previously reported cases of retropharyngeal hematoma after minor trauma is because of falling^{1,4,9,11-17}. Some of these reports described that falls caused hyperextension injury to their neck^{4,11,13-15,17}, and the others were also presumed to have a similar mechanism of injury. However, the mechanism of traumatic retropharyngeal hematoma with no evidence of vertebral fracture is still unclear and controversial. The most verified hypothesis implicates tearing of the longus colli muscles attached to the vertebral bodies due to hyperextension¹¹. Penning et al. reported that hyperextension injury was related to a huge retropharyngeal hematoma rather than other causes of injury, and the difference must be explained by the extensive laceration of the cervical spine's anterior coverings in disruptive hyperextension¹⁸. Because patients with hyperextension injury to their neck, caused by minor trauma, are more likely to have a retropharyngeal hematoma, further diagnostic strategies are required in the at risk population. To diagnose the retropharyngeal hematoma, the health care provider must be highly suspicious and closely observe the patient. However, this is not perfect management because the symptoms are uncertain, and it is difficult to detect this hematoma by physical examination. Current standard care requires a CT of the chest to assess mediastinal injury⁹. Multidetector contrast-enhanced CT has been cited for approaching 100% sensitivity and demonstrates a similar negative predictive value for detecting traumatic aortic injury with mediastinal hematoma¹⁹. Retropharyngeal hematoma can be similarly detected because the retropharyngeal space is next to the posterior mediastinal space. Therefore, a

routinely performed CT for patients with minor trauma whose necks were hyperextended is an optimal strategy to diagnose a retropharyngeal hematoma in the high-risk group. This group includes the elderly, patients with intrinsic bleeding disorders, and patients taking anticoagulant and antiplatelet agents. Since this case was included in this high-risk group, contrast-enhanced CT was performed two and a half hours after injury, which diagnosed retropharyngeal hematoma.

Conclusion

The patient whose neck hyperextended may have lead to the airway obstruction due to retropharyngeal hematoma. The use of clopidogrel could have contributed to the development of a hematoma. Consequently, health care providers should be aware of this life-threatening injury, even if it is caused by minor trauma. To diagnose this injury, performing CT is recommended for patients who suffered cervical hyperextension with predisposing factors of bleeding.

Informed Consent

Written informed consent was obtained from the patient for the publication of this report and any images.

Author Contributions

MS: Developing the concept of this case report and writing the manuscript.

YK: Developing the concept of this case report.

MK: Developing the concept of this case report and editing this manuscript.

DS: Editing this manuscript.

HM: Final editing this manuscript.

All authors approved the submission of the final article.

Disclosure statement

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