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Case Report

Cardiac arrest with retropharyngeal hematoma caused by minor facial injuries from a ground level fall

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ABSTRACT

Background: Traumatic retropharyngeal hematoma followed by airway obstruction is extremely rare. In this report, we show unique images from two cases of out-of-hospital cardiac arrest due to airway obstruction caused by massive retropharyngeal hematoma after a minor facial injury.

Case presentation: Case 1: A 78-year-old man was transferred to our emergency department due to cardiac arrest. He presented with respiratory insufficiency after a ground level fall. His neck was swollen, and the attending physician performed an emergent cricothyroidotomy to secure his airway and administered intravenous adrenaline. Computed tomography revealed a massive retropharyngeal hematoma and severe hypoxic encephalopathy. Despite a temporary return of spontaneous circulation (ROSC), the patient died on the admission day.

Case 2: A 68-year-old woman presented with dyspnea, prompting her family to call an ambulance. On the way to the hospital, the ambulance crew determined the patient was in cardiac arrest. The patient's history revealed a ground level fall in which she hit her face. Computed tomography revealed a massive retropharyngeal hematoma compressing her upper airway. Although ROSC was obtained, the patient died on the 12th day of hospitalization due to hypoxic encephalopathy. Extension views of cervical spine images identified angular instability without cervical bone fracture in both cases, suggesting that possible injuries of the anterior longitudinal ligament contributed to the retropharyngeal hematoma.

Conclusions: Patients presenting with asphyxia after a simple ground level fall accompanied by minor facial injuries should be assessed by emergency physicians for the possibility of a retropharyngeal hematoma. In both cases presented here, unique images indicate possible injuries of the anterior longitudinal ligament.

Introduction

Background

Prognosis of patients experiencing out-of-hospital cardiac arrest is typically poor [1]. While airway obstruction after migration of a foreign body is one of the main causes of cardiac arrest from a non-cardiac origin [2], it is quite rare to see an airway insufficiency

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caused by a traumatic massive retropharyngeal hematoma. Airway obstruction due to retropharyngeal hematoma is reported to occur in only 1.2 % of patients with cervical spine injury [3]. Direct insult or extreme neck movement can cause a cervical bone fracture and damage to the soft tissue around the neck; however, the origin of a hematoma is always debatable. Due to its rare occurrence, traumatic retropharyngeal hematoma is not fully understood.

We treated two cases of out-of-hospital cardiac arrest caused by airway obstruction due to massive retropharyngeal hematoma after a minor facial injury. Extension views of cervical spine images in both cases identified angular instability without cervical bone fracture, suggesting possible injuries of the anterior longitudinal ligament. In case 2, exacerbation of asthma was thought to be the reason for the patient's cardiac arrest. In fact, when the clinician asked her family about a minor facial injury observed on her nose, it was revealed the patient had fallen at ground level seven hours before. Emergency clinicians need to be aware of the possibility that a retropharyngeal hematoma caused by a minor facial injury may result in an airway obstruction. Herein, we describe two case reports of this nature, and include unique images of each injury.

Case presentation

Case 1

A 78-year-old man was transferred to our emergency department complaining of respiratory insufficiency. He was on a daily anticoagulant (Rivaroxaban) for arrhythmia and presented with asphyxia 2 h after a ground level fall during which there was a hit to his chin. His family called an ambulance and emergency medical technicians (EMTs) found the patient suffocating due to an airway obstruction. His neck was swollen due to a hematoma, preventing the EMTs from opening his mouth manually or performing an endotracheal intubation. The attending physician performed an emergent cricothyroidotomy to secure the patient's airway and administered intravenous adrenaline since the patient presented with cardiac arrest. Return of spontaneous circulation (ROSC) was observed; however, computed tomography (CT) revealed a massive retropharyngeal hematoma (Fig. 1A) and severe hypoxic encephalopathy. Compared to an X-ray of a normal spine position, an extension view of the cervical spine X-ray demonstrated an angular instability between C5/6, which suggested a possible injury of the anterior longitudinal ligament without cervical bone fracture (Fig. 1B). Resuscitation was terminated due to poor neurological outcome and the patient died on the same day he was admitted.

Case 2

A 68-year-old woman with a history of bronchial asthma as well as cerebral infarction (for which she was taking a daily antiplatelet, Clopidogrel), presented in respiratory discomfort. She used a corticosteroid inhaler to relieve her symptoms, to little effect. She had aggravated dyspnea, leading her family to call an ambulance. EMS diagnosed cardiac arrest in the patient at the scene. En route to the hospital, endotracheal intubation was performed and intravenous adrenaline was administered. Wheezing was not heard upon auscultation, and swelling around the neck was not observed. Upon arrival at the ED, the physician noticed an injury on her nasal bridge. After asking her family about any trauma history, they reported the patient had experienced a ground level fall seven hours earlier. After ROSC, CT disclosed a massive retropharyngeal hematoma (Fig. 2C) and severe hypoxic encephalopathy. Extension views of a cervical spine CT revealed an angular instability with widening C3/4 and C5/6 gaps (Fig. 2D), but no cervical bone fracture. Despite continuous neurological critical care, brain herniation developed and the patient died on the 12th hospital day.

Discussion

The cases discussed above demonstrate that minor facial injury may cause massive retropharyngeal hematoma, which can lead to airway obstruction and subsequent cardiac arrest. Neither patient presented with respiratory discomfort immediately after falling;



Fig. 1. Computed tomography and X-ray images of Case 1. Arrows indicate the hematoma in the retropharyngeal area (A), and angular instability between C5/6 under extension view of cervical spine (B).

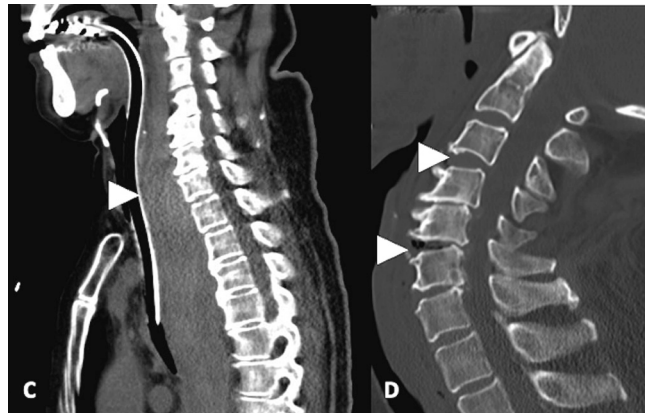


Fig. 2. Computed tomography images of **Case 2**. Arrows denote a massive retropharyngeal hematoma under normal spine position (C), and angular instability between C3/4 and C5/6 under extension view of cervical spine (D).

however, insidious progression of the hematoma over several hours induced delayed symptoms. In **case 2**, both the family and EMS initially thought the exacerbation of asthma was the cause of respiratory failure. However, the patient's nose injury led the physician to inquire about her trauma history, at which point it was reported she had experienced a simple ground level fall causing her to hit her face.

Traumatic retropharyngeal hematomas have diverse etiologies, including whiplash injury [4,5], idiopathic bleeding [6], iatrogenic procedures [7], and secondary consequence of cervical spine surgery [8]. The pathogenesis of retropharyngeal hematoma is supposedly a vascular injury with intimal damage resulting from a direct insult or extreme neck movement. However, the origin of retropharyngeal hematoma is debatable, and not fully understood. Cervical fractures above the level of C6 are prone to develop a retropharyngeal hematoma [3]. In our cases, the unique images of angular instability without spinal bone fractures suggest that potential injuries to the anterior longitudinal ligament may have contributed to retropharyngeal hematoma formation. X-ray and CT images support our hypothesis that a mechanism involving unexpected neck hyperextension caused by minor facial injuries may induce retropharyngeal hematoma.

CT is the gold standard method to identify the presence of retropharyngeal hematoma. Most papers discussing traumatic retropharyngeal hematoma include CT images [4,9]. However, extension views of cervical spine images with angular instability are fairly unique, as we were unable to find similar images in any previous reports of patients with traumatic retropharyngeal hematoma. We believe the reports presented here will help physicians understand the etiology of traumatic retropharyngeal hematoma.

Retropharyngeal hemorrhages occur rarely, and are easily missed during primary assessment since patients are typically asymptomatic [10]. Indeed, a large cohort study of trauma patients reported these injuries are missed at an incidence rate of 8.2 % [11]. However, a systematic review reported that 23.5 % of the patients with blunt trauma-induced retropharyngeal hematoma needed surgical treatment [12]. Subsequent surgical intervention is complicated by the presence of massive hematomas, which often obscure the appropriate anatomical landmarks [13]. With recent advances in imaging techniques and endovascular procedures, patients who need active bleeding controlled can now undergo transarterial embolization when presenting with a retropharyngeal hematoma.

Apparent potential risk factors for massive retropharyngeal hematoma include being elderly [12], use of anti-coagulant/platelet drugs [14], and chronic alcoholism [9]. Patients who have a fall episode and present with asphyxia should be diagnosed quickly for immediate consideration of early intervention, including endotracheal intubation, tracheostomy, cricothyroidotomy, neck exploration, and drainage of hematoma [15]. Emergency situations with unexpected management difficulties can be quite challenging, especially when a surgery for a retropharyngeal hematoma is involved [16]. Emergency clinicians should always be aware of the possibility of an airway obstruction, especially for patients with respiratory insufficiency; in these cases, ED personnel should immediately and carefully secure the airway before there is a complete obstruction, even after a minor trauma.

Conclusion

Based on these cases, our recommendation is for physicians to add the possibility of retropharyngeal hematoma to their differential when encountering patients with asphyxia, even after a simple ground level fall. In both patients presented here, angular instability was suggested by images from extension views of their cervical spines, meaning probable injuries to the anterior longitudinal ligament contributed to retropharyngeal hematoma formation.

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Consent

The patients' families provided informed consent for publication of these cases. Approval from the ethical committee was waived.

CRedit authorship contribution statement

T.N., Y.N., M.S., S.K., K.T., and S.I. contributed to the conception and writing of the manuscript. All authors read and approved the final manuscript.

Declaration of competing interest

The authors declare no conflict of interest.

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