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Case Report

Perforating pharyngeal injury caused by minor blunt trauma to the neck: A case report

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ABSTRACT

Background: Pharyngeal perforation has been documented as a consequence of substantial external force applied to the neck. Such trauma is frequently accompanied by additional organ injury and cervical fracture. In this report, we present an exceptionally rare instance in which minor blunt trauma to the neck resulted in pharyngeal injury without concomitant damage to other organs.

Case presentation: An 18-year-old woman sustained a contusion of the neck due to blunt trauma to the left submandibular region from her bicycle handlebar grip following a collision with a motor vehicle. The patient exhibited a minor contusion of the neck, devoid of active bleeding or hematoma. Furthermore, she did not express any concerns regarding the condition of her neck or throat. A medical examination revealed the absence of abnormal breath sounds in the neck and the absence of any deformity or deviation of the airway. Despite the absence of a foreign body, computed tomography demonstrated the presence of free air extending through the interstitial space between the sternocleidomastoid muscle and larynx, reaching the posterior pharyngeal wall. While the wound was being cleansed with saline solution, the patient reported a sensation of water entering the mouth, which led to the confirmation of a perforation injury to the pharynx. No evidence of leakage was observed during the drinking tests, and the fistula was determined to be unidirectional. The patient was admitted to the hospital for follow-up and discharged on the third day without any additional complications. The outpatient examination conducted on the sixth day following the injury revealed no abnormalities in the physical findings.

Conclusion: Perforating pharyngeal injuries resulting from minor blunt trauma are exceedingly uncommon. In the present case, the water injection test and drinking test were instrumental in both confirming the diagnosis and determining the appropriate treatment plan.

Introduction

It has been documented that pharyngeal and cervical esophageal injuries occur in 0.14 % of patients who have sustained traumatic injuries, with direct penetrating trauma being the most common cause [1]. Severe trauma to this region may occasionally result in

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significant conditions necessitating urgent medical intervention [2]. Nevertheless, pharyngeal perforation subsequent to blunt external trauma is exceedingly uncommon. Barkovich et al. [3] conducted a review of 29 cases published between 1964 and 2021. In approximately half of the cases, the injuries were the result of high-energy trauma from motor vehicle accidents. Pharyngeal injuries resulting from blunt trauma are frequently accompanied by collateral damage to other organs. However, there have only been two documented cases in which no discernible cervical or pharyngeal symptoms were present at the time of injury [4]. We present an extremely rare case in which minor blunt trauma to the neck resulted in a pharyngeal injury, yet the patient remained asymptomatic with respect to her general condition.

Case report

An 18-year-old woman sustained a neck contusion (Fig. 1a) following blunt trauma to the submandibular region from her bicycle handlebar grip end after a light contact with a motor vehicle. Upon initial examination, the patient's level of consciousness and vital signs were within normal ranges, and she did not report any previous medical history of concern. The patient did not express any concerns regarding the condition of the neck or throat. A secondary survey revealed a 25-mm contusion in the submandibular region with a 3 × 5 mm laceration at its center (Fig. 1b). The wound was free of contamination, exhibited no active bleeding, and did not present with surrounding hematoma formation. Furthermore, it was determined that there was no tracheal injury due to the absence of abnormal breath sounds at the neck and the absence of any airway deformity or deviation. Computed tomography (CT) revealed the presence of interstitial air extending through the soft tissue gap between the sternocleidomastoid muscle and the larynx, extending to the retropharyngeal space (Fig. 2). While the wound was cleansed with saline solution, the patient reported the presence of water in her oral cavity. Therefore, we established a connection between the pharynx and the exterior laceration site. Subsequently, a water drinking test was conducted to ascertain the presence of a fistula from the pharyngeal side to the neck wound. However, no fluid was observed to leak from the wound, and the fistula was thus determined to be unidirectional. A film-shaped drain was placed within the wound, and the wound was sutured in a roughly approximated manner. The patient was admitted to the hospital for a follow-up examination. Fluids and oral antimicrobials were administered 3 h after admission, and the patient was permitted to commence oral feeding after 12 h. The patient was discharged on the third day without any issues with her general condition or neck. Subsequent to her discharge from our institution, the patient did not contact us to express any concerns regarding unusual occurrences. The outpatient examination conducted on the sixth day following the injury revealed no abnormal physical findings, and the drain was subsequently removed.

Discussion

Puncture wounds can directly penetrate the pharynx; however, pharyngeal perforation resulting from blunt trauma is rarely reported. We present a rare case in which minor blunt trauma to the submandibular region resulted in a penetrating pharyngeal injury.

In cases of penetrating neck injuries, the so-called hard signs noted in the guidelines [5], which are clear indications of serious tracheal or vascular injury, usually requires prompt exploratory surgery. However, in the current case, there were no such findings, suggesting that urgent surgical treatment was not necessary. CT scans are valuable for diagnosing and making treatment decisions for perforating trauma based on their imaging findings [6], but they are reported to be less sensitive for diagnosing injuries to the pharynx

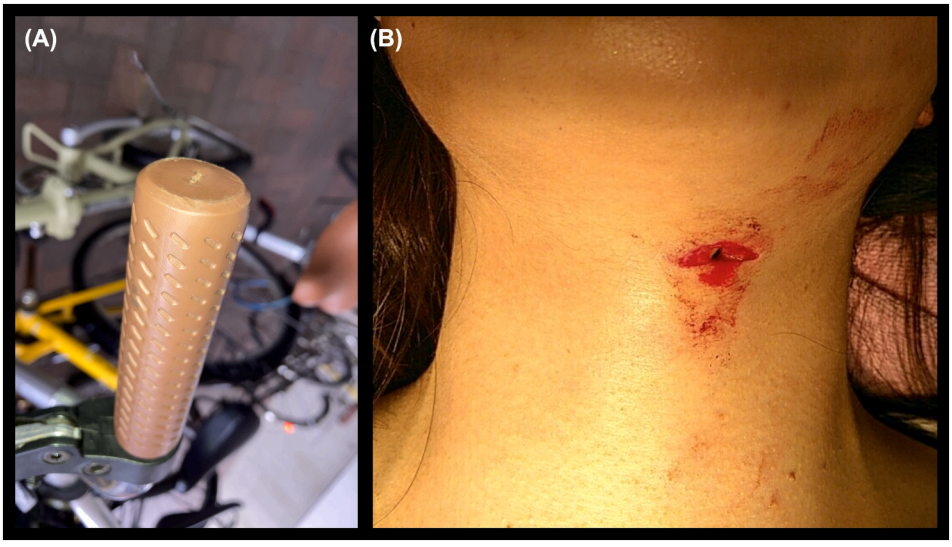

Fig. 1. (A) A bicycle handlebar grip (a sample photo of the same type and shape). (B) Contusion wound with laceration at the submandibular region.

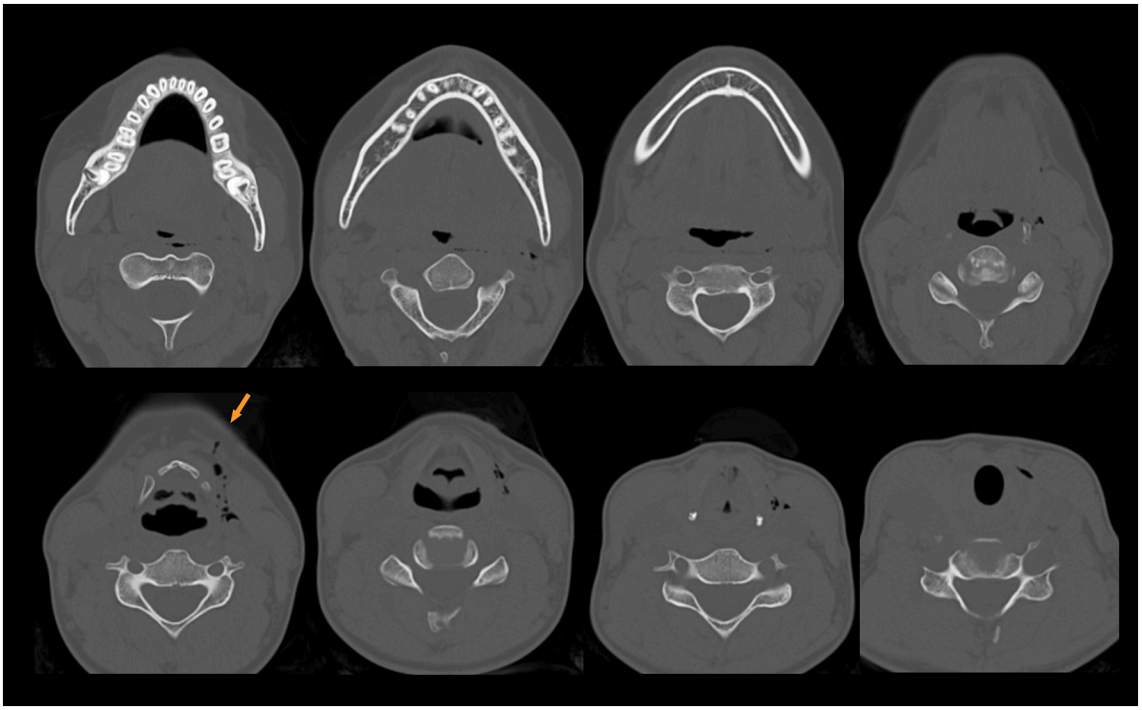

Fig. 2. Serial computed tomography images of the cervical region.
Orange arrows indicate the outer site of neck injury. It demonstrated no residual foreign body but an interstitial air was observed in the neck. (For interpretation of the references to colour in this figure legend, the reader is referred to the web version of this article.)

and esophagus [7]. In our case, the three-dimensional CT imaging clearly demonstrated the free air up to the pharynx through the interstitial space, but no evidence of direct injury to the pharynx or esophagus was identified (Fig. 3). A fistula to the pharynx was only confirmed by the patient's complaint when the water solution for wound cleansing was injected. The concurrent water drinking test also confirmed that the fistula was unidirectional, as there was no flow from the pharynx to the cervical wound. It is essential to have this information during the initial examination to establish the diagnosis and develop a treatment plan. Since it is extremely difficult to confirm the formation of fine fistulas in the pharynx using conventional imaging techniques, the clinical diagnosis made using noninvasive water injection and drinking tests was highly useful in our case. However, the patient in our case was young, her vitals were stable, her consciousness was normal, and she had a clear recollection of the injury sequence. Therefore, it was possible to accurately indicate that the injected fluid had regurgitated into the oral cavity, and there was no risk of an aspiration event. These tests are feasible only for the above-mentioned conditions, and caution should be exercised when administering them to patients with the following conditions: unstable vital signs, positive hard signs, severe injury findings on CT imaging, decreased level of consciousness, and a patient with dementia or aspiration risk.

While neck trauma resulting from a minor injury may not initially appear to be a significant concern, it is important to recognize that even seemingly minor injuries can potentially lead to fatal complications if left untreated. In patients who are taking anticoagulants and antiplatelet drugs, there have been reports of upper tracheal obstruction due to delayed posterior retropharyngeal hematoma [8]. Therefore, caution must be exercised in such cases. It is imperative that patients, regardless of whether they are in an inpatient or outpatient setting, be provided with sufficient explanations and monitored meticulously for the development of neck-specific symptoms.

Conclusion

We experienced an extremely rare case of a pharyngeal injury caused by minor blunt trauma. In this case, the CT scan did not reveal any direct injury to the pharynx. However, the water injection and drinking tests proved useful for verifying the pharyngeal perforation and informing the decision-making process regarding the most appropriate treatment strategy.

CRediT authorship contribution statement

Makoto Kobayashi: Writing – original draft, Conceptualization. **Junnosuke Saito:** Data curation. **Hiroki Fujino:** Data curation. **Kyohei Sakurai:** Validation. **Yoshimatsu Ehama:** Supervision.

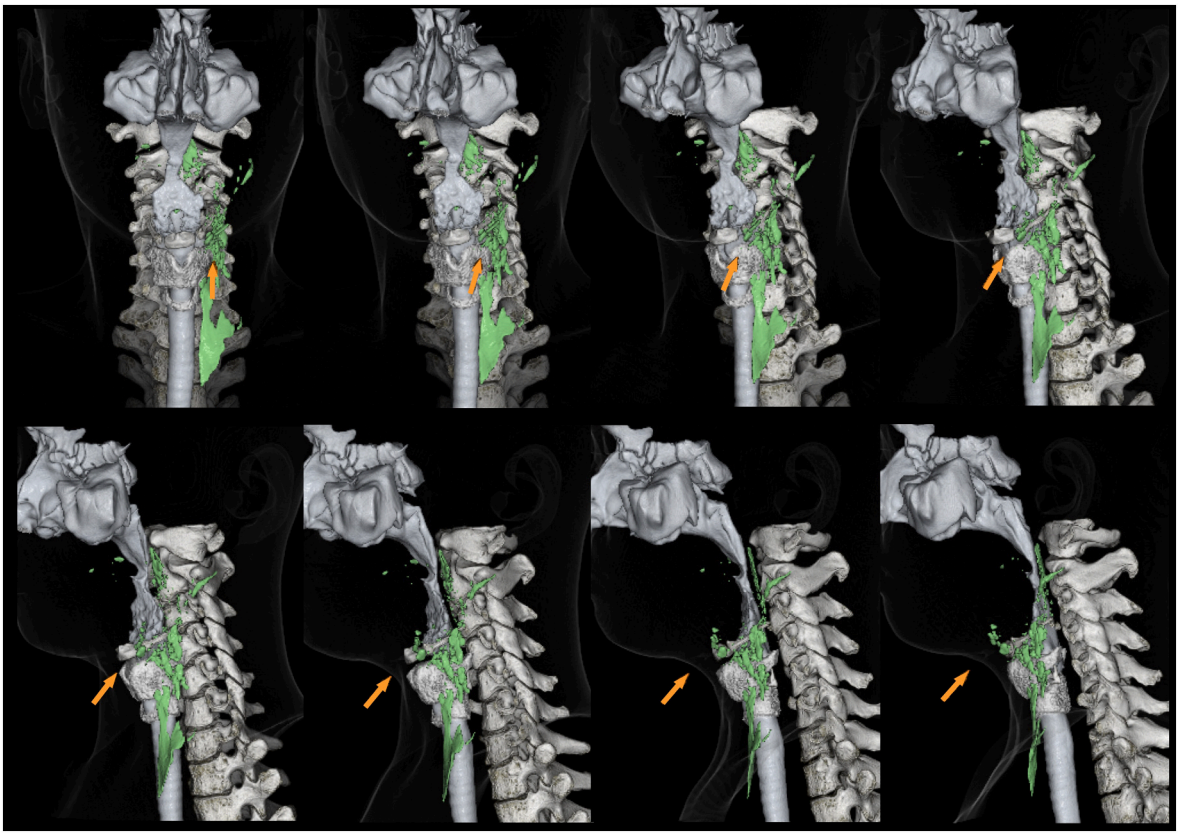

Fig. 3. Sequential pictures of three-dimensional transformed images from the computed tomography. Orange arrows indicate the outer site of neck injury. The interstitial air through the soft tissue is painted yellow-green which was extending to the retropharyngeal space. (For interpretation of the references to colour in this figure legend, the reader is referred to the web version of this article.)

Declaration of competing interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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