Severe retropharyngeal haematoma after apparent minor injury

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Abstract · A case of severe upper airway obstruction due to a retropharyngeal haematoma after an apparent minor precipitating traumatic injury is presented. The patient, a 77-year-old woman was treated with supportive therapy only, as is recommended for most cases [1-4]. Her hospital stay was complicated by a ventilator-associated pneumonia. After eleven days she could be extubated and discharged from the ICU. Her recovery was uneventful.

Keywords · Retropharyngeal, haematoma, trauma, airway

Introduction
Retropharyngeal haematomas are rare, but can cause life-threatening airway compromise. Relatively few cases of airway obstruction due to traumatic retropharyngeal haematoma can be found in the literature, especially after apparent minor trauma [2]. A case of severe upper airway obstruction due to a retropharyngeal haematoma after apparent minor precipitating traumatic injury in an elderly patient is presented here, and the literature regarding this complication reviewed.

Case
A 77-year-old woman consulted her family physician for pain and swelling of the neck after an apparent minor fall resulting from stumbling in her house. She was referred to the orthopaedic outpatient clinic where an X-ray of her cervical spine raised suspicion of a dens fracture. Nevertheless, she was told to make her own way to the hospital. While she was at home packing her bags, she developed shortness of breath and difficulty in breathing which increased rapidly. On arrival of the paramedics and the trauma physician, she was found to be respiratory insufficient and stridorous. She was crash intubated (using etomidate, fentanyl and rocuronium). An endotracheal tube size 6 was inserted with difficulty. Her neck was subsequently immobilized with a collar.

At the ER of the nearest hospital trauma work included a CT scan of the head/neck region which revealed a processus spinosus fracture on level C2 and a massive retropharyngeal haematoma, but ruled out a dens fracture (Figure 1). The patient was subsequently transferred to the ICU in our university hospital because of clinically progressive swelling with a possible need for surgical intervention. Furthermore, a lesion of the myelum could not be ruled out and MRI had not been available in the referring hospital.

Further expansion of the patient’s medical history revealed occasional aspirin use. Laboratory tests were normal, including clotting times (PT and APTT), haemoglobin, platelet count, and platelet function test. The subsequently performed MRI ruled out a myelum lesion, confirmed the processus spinosus fracture and the retropharyngeal haematoma, with no apparent progression when compared with the CT scan performed in the referring hospital (Figure 2).

A conservative, supportive approach was chosen. After cessation of sedatives, the patient quickly regained consciousness, with maximal Eye-Motor-Verbal score. Apart from standard supportive care with enteral feeding, stress ulcer and deep venous thrombosis prophylaxis, she received treatment with glucocorticosteroids in an attempt to diminish possible

Table 1

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<tr>
<th>EXAMPLES OF POTENTIAL CAUSES OF RETROPHARYNGEAL HAEMATOMA</th>
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<tbody>
<tr>
<td>- cervical fractures</td>
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<tr>
<td>- extreme coughing</td>
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<td>- ruptured aneurysms</td>
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<td>- pharyngeal foreign bodies</td>
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<td>- injury of the great vessels</td>
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<td>- anticoagulation therapy</td>
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<tr>
<td>- vomiting</td>
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<td>- muscular exercise</td>
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<tr>
<td>- deep neck infection</td>
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<td>- haemorrhagic parathyroid adenoma</td>
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<td>-iatrogenic injury associated with cardiac catheterization, cerebral angiography and jugular vein cannulation</td>
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<td>- flexion and hyperextension of the neck (often associated with a fall, motor vehicle accident or airbag deployment).</td>
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Secondary oedema formation. On day four after admission, rigid laryngoscopy was performed in the OR which still revealed substantial swelling of the glottic and supraglottic areas. A tube-exchange to a size 8 was nevertheless attempted and successfully performed over a Cook tube exchanger. On day five a *S. aureus* ventilator-associated pneumonia was diagnosed by means of bronchoalveolar lavage, and treated with intravenous flucloxacillin. Repeatedly performed flexible endoscopy showed rapid improvement of the supraglottic swelling, with the swelling notably persisting a few days longer at the level of the glottis. Eleven days after ICU admission the swelling had completely disappeared. Air could easily pass the deflated cuff of the endotracheal tube and the patient was successfully extubated. Further recovery was uneventful.

Discussion
To understand the potential implications of development of a retropharyngeal haematoma, knowledge of the anatomy of the various fascial planes in the neck is essential. The fascial planes of the neck can be divided into the following three layers: the superficial, the middle, and the deep divisions (with the carotid sheath formed by all three). The retropharyngeal space is located in front of the alar layer of the prevertebral fascia. Its space extends from the base of the skull to the superior mediastinum at the level of the tracheal bifurcation at T4. Here, the alar layer of the prevertebral fascia merges with the anterior border of the retropharyngeal space, the middle visceral layer of the deep cervical fascia. The retropharyngeal space is found immediately posterior to the nasopharynx, oropharynx, hypopharynx, larynx, and trachea. Laterally, the space is continuous with the parapharyngeal space and bound by the carotid sheath. It contains lymph nodes and connective tissue and is a potential area for blood or pus to accumulate and compromise the airway[1,3,5,6].

Approximately 50 cases of traumatic airway obstruction due to retropharyngeal haematoma have been reported in the literature [3,4]. Retropharyngeal haematoma is thus a very rare occurrence, but its causes are numerous (table 1) [1-3,7].

Traumatic retropharyngeal haematoma is thought to be due to the rupture of the small anterior branches of the vertebral arteries during hyperextension injury, which can be isolated or described in association with cervical spine or occipital condyle fractures. Tearing of longus colli muscles or the anterior longitudinal ligament is another mechanism potentially contributing to haematoma formation [1,2,8,9]. Elderly patients have multiple risk factors for ligamentous injury, fractures and haematoma formation, including laxity of connective tissue, presence of degenerative osteophytes, ankylosing spondylitis, and pharmacologic anticoagulation[2,9,10]. Among 18 cases of retropharyngeal haematomas occurring after cervical spine injury, Penning noticed that the largest haematomas were found in hyperextension injuries with extensive ligamentous damage and rupture of many blood vessels covering the anterior aspect of the spine [3,7,11].

Minor bleeding in the retropharyngeal space will thus usually stop spontaneously in young patients, while bleeding may continue unabated in elderly patients [4,9]. As a consequence apparently minor head and neck trauma causing hyperextension injury may be associated with retropharyngeal haematoma, especially in elderly patients [1,3,7].

**Figure 1a.** CT image, axial view showing the retropharyngeal hematoma (black arrows) and the compression on the trachea. Endotracheal tube visible in trachea (white arrow).

**Figure 1b.** CT image, sagittal reconstruction showing the hematoma (arrow).
Massive bleeding in the retropharyngeal space affects the pharynx, larynx, oesophagus, and trachea. The amount of bleeding is directly related to the severity of signs and symptoms such as, inspiratory stridor, dyspnoea, hoarseness, neck pain, dysphagia, and odynophagia. These symptoms usually appear several hours after the trauma, thus after an asymptomatic interval [1,5].

The local increase in volume causes dysphagia and salivation. A compression of the arytenoid cartilages can also occur, closing the vocal cords and thus obstructing the airway, as seen in our case. A lateral neck X-ray or a cervical CT image may show marked widening of the prevertebral space confirming the clinical diagnosis of retropharyngeal haematoma [1,7]. Usually a CT scan is sufficient to make the diagnosis, but occasionally an MRI is needed to differentiate blood from pus [6].

Increased awareness of the possibility of airway obstruction secondary to massive haematoma formation after an asymptomatic interval is needed [4].

Initial treatment of patients with retropharyngeal haematoma should be directed towards airway management, and awareness of the possibility of airway obstruction secondary to massive haematoma formation after an asymptomatic interval is needed. Generally, the treatment-of-choice for emergent airway protection is oral endotracheal intubation, during which cervical spine injury must be assumed and the spinal cord protected. Intubation may be difficult due to an inability to visualize the uvula and epiglottis secondary to anatomic distortion caused by expansion of the haematoma [4,12]. Based on this knowledge, many authors advocate tracheostomy as the preferred method for maintaining the airway [2,4,5]. After securing the upper airway, two treatment options are available: surgical drainage and observation [1]. In cases of rapid expansion of the haematoma, or secondary bacterial infection of the retropharyngeal haematoma, surgical drainage may be emergently needed to relieve the trachea compression [1,3]. When it has been confirmed radiologically that the size of the haematoma has not increased and the trachea distal to the end of the tracheal tube is patent, careful observation may be warranted. However, until the retropharyngeal haematoma is absorbed sufficiently, repeated radiological evaluation of airway patency, for example, by CT scanning is required. Bedside tracheal fiberoscopy may be another method which can provide helpful information about the airway patency, and for example the resolution of lower tracheal obstruction due to retropharyngeal haematoma. If the lower tracheal obstruction progresses during this period of watchful waiting, surgical drainage should be performed as soon as possible [1].

**Conclusion**

Retropharyngeal haematoma with life-threatening airway compromise can develop hours or days, even after an apparently minor precipitating injury. The elderly appear to be especially at risk for developing this potentially lethal complication after such mild injuries. Clinicians should be alert to the potential occurrence of this cause of acute or delayed airway collapse. However, rapidly securing the airway in these patients may be hazardous due to the presence of concomitant cervical spinal or head injuries.

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**Figure 2a.** MRI image, axial view of the hematoma (arrows)

**Figure 2b.** MRI image, sagittal view of the hematoma (arrow)
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References