

Central venous cannulation as a cause of upper airway obstruction

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Abstract

Central venous cannulation via the internal jugular vein caused an unusual complication in a patient with a coagulopathy. The formation of a non-clinically detectable haematoma, with secondary venous compression, resulted in the formation of glottic oedema, which caused significant upper airway obstruction.

Keywords

Complication; central venous cannulation; upper airway obstruction.

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Case history

A 74-year-old female was admitted to intensive care following presentation with an acute abdomen and cardiovascular instability. There was no significant past medical history or history of atopy. Clotting screen values were within normal limits. A right internal jugular venous catheter was sited using a Seldinger technique. Access was obtained in a single pass and a triple lumen catheter was inserted to 13 cm depth. The operator was called to an acute emergency at this juncture, and the line was later secured. Movement of the line was noted.

Following laparotomy for ischaemic small bowel, the patient remained ventilated and renal function remained stable. Postoperatively, a coagulopathy was noted (international normalised ratio 2.8, activated partial thromboplastin time ratio 3.6, fibrinogen 1.5 g/l) for 24 h. A thrombocytopenia persisted for 4 days (platelet count 39×10^9 /l). No visible neck haematoma or bleeding was noted. At extubation on day 9, the development of early stridor with a minimal response to an adrenaline nebuliser led to re-intubation. At laryngoscopy the posterior pharynx and laryngeal orifice was noted to be oedematous and a size 8.0 endotracheal tube was now unable to be passed. The patient was ventilated for a further 72 h, via a size 7.0 tube, nursed erect and received steroids for the presumed diagnosis of post-extubation laryngeal oedema.

A second attempt at extubation resulted in similar upper airway obstruction developing over a 24 h period, again requiring re-intubation. At laryngoscopy extensive oedema was seen of the ary-epiglottic folds, vocal cords and piriform fossa. C1 esterase was normal. A CT scan (Fig. 1) showed a haematoma under the right sternocleidomastoid muscle with internal jugular vein compression. There was no tracheal compression.

At formal tracheostomy, a small haematoma was found in the peri-tracheal space with extensive surrounding oedema.

Following an uneventful wean from respiratory support, the patient was discharged breathing spontaneously via the tracheostomy to the ward. A flexible direct laryngoscopy at day 20 revealed persistent oedema of the glottic and supra-glottic tissues. At day 30, there was no further upper airway oedema and the patient was successfully decannulated.

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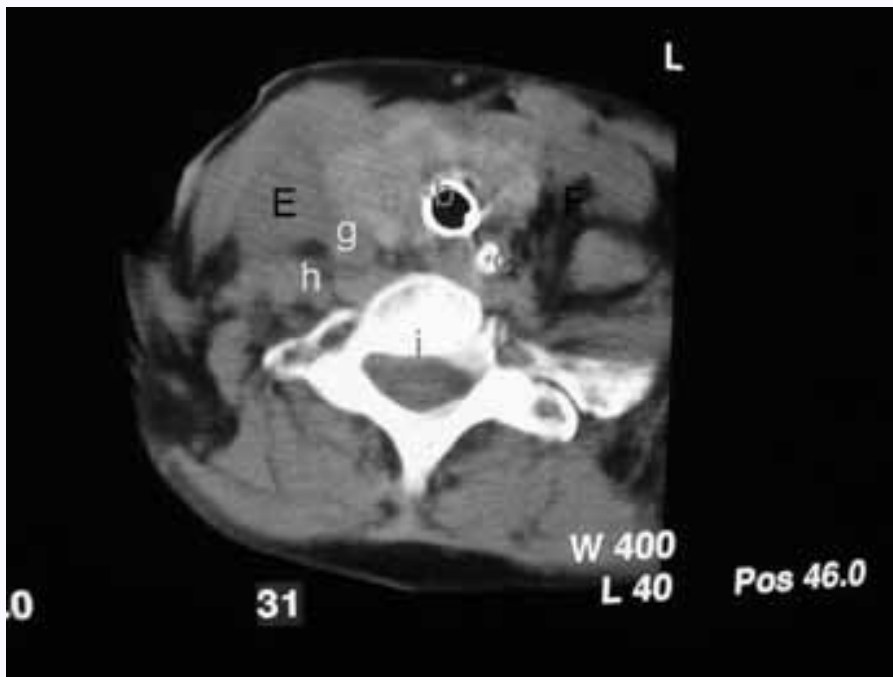


Fig. 1. (a) Right sternocleidomastoid muscle; (b) trachea (no radiological evidence of compression); (c) nasogastric tube; (d) right thyroid lobe; (e) area of low attenuation in keeping with oedema secondary to a haematoma (loss of mass tissue, compared with the normal appearance of (f) on the left); (g) and (h) region of carotid A and internal jugular V (not seen clearly on film without contrast, but appear to be preserved); (i) vertebral column.

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Diagnosis

Upper airway obstruction from glottic oedema secondary to central venous cannulation.

Discussion

Central venous cannulation has many known serious complications such as pneumothorax (incidence 0.5–2%) and arterial puncture or cannulation (incidence 3–9%)^[1].

Complications are accepted due to the benefits of central venous cannulation, invasive monitoring and venous access. The formation of haematoma is the most commonly described complication of internal vein cannulation and may cause direct airway compression and require surgical drainage^[2]. An unusual variant of this common complication resulted in the compromise of the upper airway by an indirect method. Movement of the unsecured line in association with a coagulopathy, created a small extra-vascular haematoma. Resultant venous compression of the internal jugular vein led to reactive oedema, which tracked medially to cause significant glottic oedema.

In a series of 1000 patients with coagulopathies and thrombocytopenia, cannulation of the internal jugular vein resulted in only 10 clinically detectable haematomas, suggesting that the internal jugular vein is an acceptable route to be used in these patients^[3]. Controversy surrounds the most appropriate central venous site, but each route has its limitations and potential benefits. The internal jugular vein has been shown to be a common technique with a lower incidence of pneumothorax but higher incidence of arterial puncture when compared to the subclavian route^[4]. Non-invasive measurements of cardiac output can provide information to guide therapy, avoiding central venous cannulation which may be appropriate in some patients^[5].

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Lesson

This case has shown that, even in an uncomplicated insertion with a single puncture, a non-clinically detectable haematoma may cause significant clinical effects.

References

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