Disruption of the internal jugular vein by subcutaneous emphysema

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SUMMARY
A woman in her 80s was taken to the hospital after falling off a ladder and underwent a contrast-enhanced CT scan, which revealed disruption of the contrast effect in the right internal jugular vein, with multiple rib fractures and haemopneumothorax. Following reduction of the subcutaneous emphysema with treatment, the diameter of her right internal jugular vein enlarged over time, becoming equal to that on the contralateral side. It is important to diagnose compression of the internal jugular vein due to subcutaneous emphysema, because the treatment strategy varies according to the aetiology.

BACKGROUND
When the internal jugular vein is disrupted after trauma, the first consideration is generally direct injury of the vein. Although there have been reports of airway narrowing due to subcutaneous emphysema of the neck secondary to trauma, there have been no reports of disruption of the internal jugular vein due to traumatic subcutaneous emphysema.

We describe a case in which the internal jugular vein was disrupted on imaging due to its compression by subcutaneous emphysema in the cervical region.

CASE PRESENTATION
A woman in her 80s was taken to a community hospital after falling off a ladder while farming. She was diagnosed with multiple rib fractures and traumatic haemopneumothorax (figures 1–3) and back pain, and her right neck and shoulder area was swollen; physical examination indicated subcutaneous emphysema. She underwent a contrast-enhanced CT scan, which revealed disruption of the contrast effect in the right internal jugular vein (figures 4 and 5). She was also diagnosed with right haemothorax, right multiple rib fractures, right clavicle fracture, right fifth thoracic transverse process fracture and first lumbar vertebral body compression fracture.

OUTCOME AND FOLLOW-UP
On the day of the injury, her right internal jugular vein was disrupted, but the next day, her vein was visible, and blood flow was confirmed by ultrasonography. With drainage-induced reduction of subcutaneous emphysema, the diameter of her right internal jugular vein enlarged over 3 days and became equal to that on the contralateral side (figures 6 and 7). No thrombus was observed during hospitalisation. She had a thoracic drain removed on the fifth

Figure 1 Plain CT images and diagrams of the neck to chest. The images show multiple rib fractures and extensive traumatic haemopneumothorax.

Figure 2 Plain CT images and diagrams of the neck to chest. The images show multiple rib fractures and extensive traumatic haemopneumothorax.
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Figure 3  Plain CT images and diagrams of the neck to chest. The images show multiple rib fractures and extensive traumatic haemopneumothorax.

Figure 4  Contrast-enhanced CT images and diagrams of the neck to chest. The right internal jugular vein gradually narrows in the thorax and is disrupted in the neck (arrow).

Figure 5  Contrast-enhanced CT images and diagrams of the neck to chest. The right internal jugular vein gradually narrows in the thorax and is disrupted in the neck (arrow).

Figure 6  Cervical ultrasonography image. On the day of injury, the right internal jugular vein (IJV) could not be visualised. The following day, the right internal jugular vein was visible, although it was smaller than that on the contralateral side. Blood flow through the vein was confirmed.

Figure 7  Cervical ultrasonography image. We identified a normal left internal jugular vein on ultrasound.
day of admission and was transferred to the rehabilitation hospital on the eighth day.

DISCUSSION
When the internal jugular vein is disrupted following trauma, the primary consideration is frequent venous injury. Nevertheless, in the existing instance, the disruption of the internal jugular vein solely resulted from subcutaneous emphysema, without any demonstrable venous injury (figure 8).

Traumatic injury to the internal jugular vein might require invasive treatment, such as repair or ligation of the vein, while its compression due to subcutaneous emphysema can be corrected by degassing alone. Hence, it is important to differentiate between the two causes of disruption of the vein. Although there have been several previous reports of airway narrowing caused by subcutaneous emphysema resulting from traumatic pneumothorax,1–5 no mention has been made of compression of the internal jugular vein by subcutaneous emphysema, and hence, its epidemiology is unknown. The symptoms of internal jugular vein compression by subcutaneous emphysema might be similar to those of superior vena cava syndrome, with possible facial oedema, dyspnoea and cough.6 While it is useful to identify the shape of the vessel wall and the presence of haematoma as a point of differentiation between the two conditions, venous injury is not always obvious in imaging.7

Learning points
- Subcutaneous emphysema can cause compression of the internal jugular vein.
- The compression improves with drainage of the subcutaneous emphysema.
- The treatment strategy for internal jugular vein disruption identified by imaging depends on the differential diagnosis.

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Case reports provide a valuable learning resource for the scientific community and can indicate areas of interest for future research. They should not be used in isolation to guide treatment choices or public health policy.

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