## IMAGES

# Penetrating spinal cord injuries with retained canal fragments

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Case 1: A previously healthy 15-year-old boy was brought by paramedics to the emergency department (ED) after suffering multiple penetrating gunshot wounds (GSWs) to the lower extremities and a single entry to the left suprascapular region. Vital signs were within normal limits upon presentation.

Case 2: A previously healthy 19-year-old man was brought by paramedics to the ED after suffering multiple stab wounds to the back. The patient was hypoxic and in severe respiratory distress upon arrival. A left thoracostomy tube was placed. Clinically the patient improved and vital signs returned to normal.

Both patients reported a loss of sensation below the epigastrium and bilateral flaccid paralysis of the lower extremities; decreased rectal tone and priapism were noted. Supine anteroposterior radiographs (Fig. 1 and Fig. 2) and computed tomography scans (Fig. 3 and Fig. 4) of the chest were obtained.

## Discussion

Violence remains the third most common cause of spinal cord injury (SCI) in the United States, where more than 99% of penetrating SCIs result from GSWs and less than 1% occur from stab wounds.[1] Approximately one-third of GSWs causing SCI are likely to involve a retained bullet fragment within the spinal canal.[2]

Retained canal fragments may have a more subtle clinical presentation than complete spinal transection, ranging from occult to partial cord syndromes. Although rare, retained canal fragments must always be considered in penetrating trauma. The majority of published case reports of stab wounds with retained canal fragments originate in South Africa, where, historically, there has been limited access to firearms.[3]

Retained canal fragments that are blunt (e.g., a bullet fragment) are recommended for surgical removal if progressive neurologic symptoms develop, historically, if made of copper or lead causing toxicity and, commonly, if located below the T12 spinal level because of the risk of

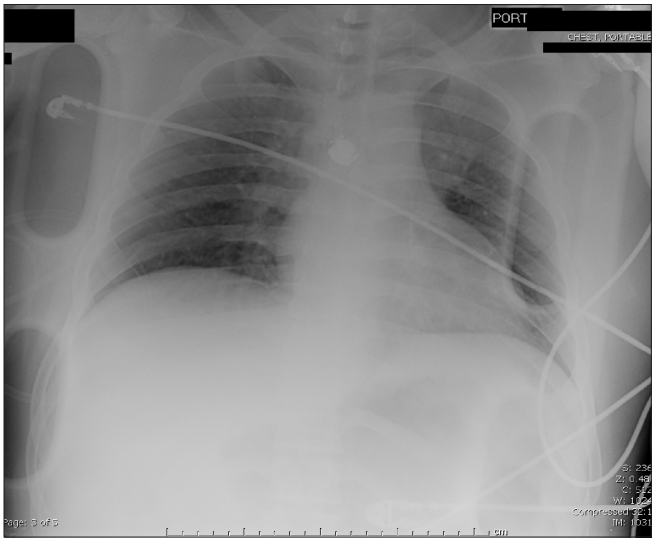


**Fig. 1. Case 1: supine anteroposterior radiograph of the chest showing a wide mediastinum, left pulmonary contusion and a midline metallic foreign body consistent with a bullet fragment at the T4-5 spinal level.**

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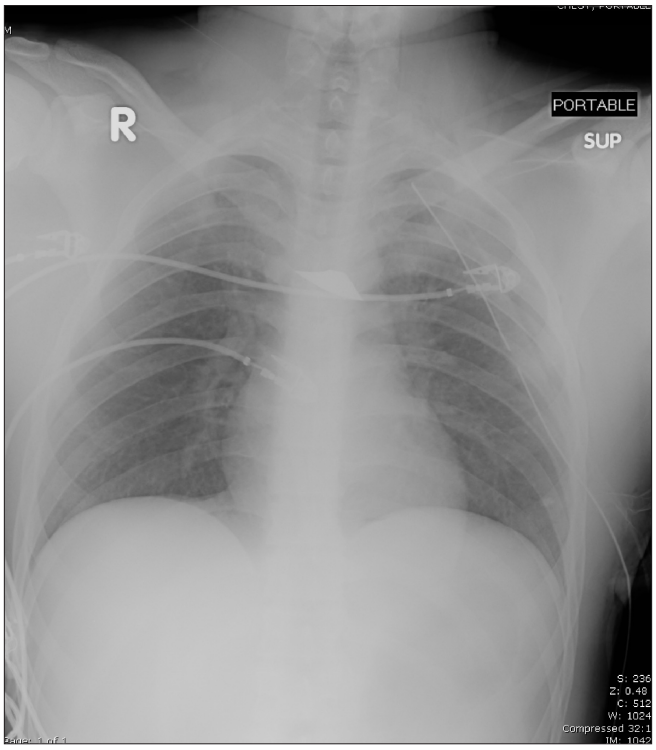


**Fig. 2. Case 2: supine anteroposterior radiograph of the chest showing left thoracostomy tube with good placement and a midline metallic foreign body consistent with a knife tip at approximately the T4-5 spinal level.**

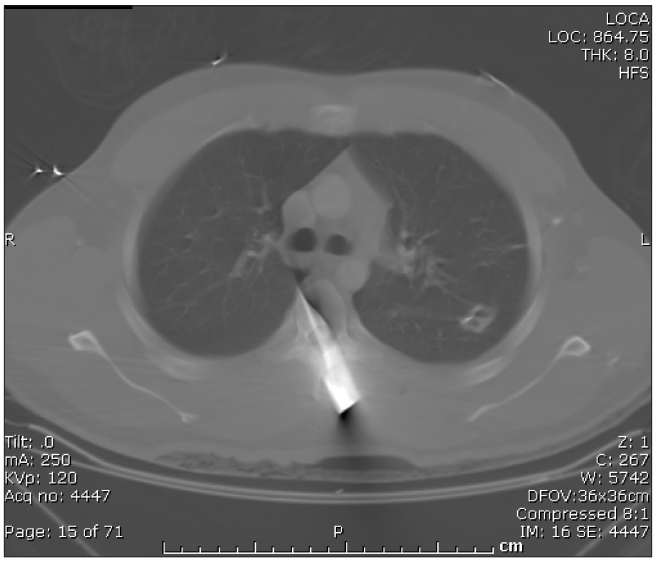


**Fig. 4. Case 2: computed tomography scan of the chest revealing a retained knife tip overlying the spinal canal without evidence of a pneumothorax.**

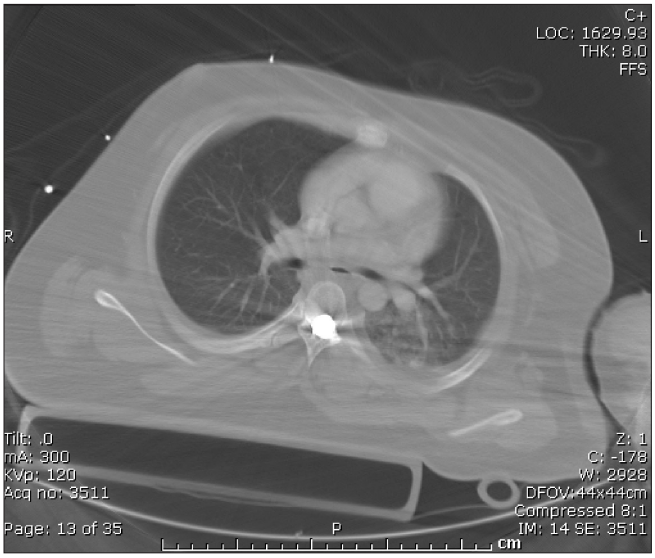


**Fig. 3. Case 1: computed tomography scan of the chest revealing a retained bullet fragment within the spinal canal, a small left hemothorax and pulmonary injury without evidence of a pneumothorax.**

fragment migration.[2] Sharp retained canal fragments (e.g., a knife tip) are recommended for surgical removal irrespective of spinal level to prevent worsening of the SCI.[2]

**Competing interests:** None declared.

**Keywords:** spinal cord injury, penetrating trauma, gunshot wounds, stab wounds, paralysis

## References

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