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CASE REPORT

Management of Severe Polytrauma in a 16-Year-Old Male Involving Cervical Foreign Body (Metal Cap with Barcode): A Multidisciplinary Approach

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ABSTRAK

Kemalangan kenderaan bermotor merupakan antara penyebab utama trauma dalam kalangan individu muda, yang sering mengakibatkan kecederaan pelbagai organ yang kompleks. Laporan kes ini memperincikan pengurusan menyeluruh terhadap seorang remaja lelaki berusia 16 tahun yang mengalami patah pada tulang klavikula kiri yang hancur dalam luka terbuka dengan berhampiran arteri karotid biasa kiri, kewujudan objek asing dalam otot pada aras C6, luka terbuka pada dinding dada atas kiri dengan emfisema subkutaneus, kontusi paru-paru kiri dan pneumomediastinum selepas terlibat dalam kemalangan. Melalui pendekatan pelbagai disiplin yang melibatkan pasukan otorinolaringologi, ortopedik, vaskular dan pembedahan am, pesakit menjalani pengimejan menyeluruh serta eksplorasi pembedahan bagi menangani kecederaan dan komplikasi lain yang dialaminya. Kes ini menekankan kepentingan penjagaan yang terkoordinasi dan pembuatan keputusan strategik dalam pengurusan politrauma yang kompleks.

Kata kunci: *Kemalangan kenderaan bermotor; patah tulang klavikula; pembuangan objek asing; politrauma; trombosis vena jugular dalaman*

ABSTRACT

Motor vehicle accidents (MVA) are a leading cause of trauma in young individuals, often resulting in complex multiorgan injuries. This case report detailed the comprehensive management of a 16-year-old male who sustained an open comminuted fracture of the left clavicle with displacement near the left common carotid artery, an intramuscular foreign body at the C6 level, left upper chest wall open wound with subcutaneous emphysema, left lung contusion and pneumomediastinum following an MVA. Through a multidisciplinary approach involving otorinolaryngology, orthopaedic, vascular and surgical teams, the patient underwent thorough imaging, as well as surgical exploration, to address his injuries and other complications. This case highlights the importance of coordinated care and strategic decision-making in managing complex polytrauma.

Keywords: Comminuted clavicle fracture; neck foreign body removal; internal jugular vein thrombosis; motor vehicle accident; polytrauma

INTRODUCTION

Motor vehicle accidents (MVA) remain a significant cause of trauma worldwide, often leading to severe, multisystem injuries that require immediate and coordinated medical intervention (Tan et al. 2016). The neck and thoracic regions are particularly vulnerable due to their anatomy complexity, the proximity of major vascular structures, and the potential for associated respiratory and neurological complications. Polytrauma cases involving injuries such as comminuted clavicle fractures with vascular compromise, retained foreign bodies and subcutaneous emphysema demand a multidisciplinary approach to ensure timely diagnosis, effective management and optimal outcomes (Mccrary et al. 2016). This report presented the case of a 16-year-old male who sustained severe injuries following an MVA, explaining the diagnostic flow, surgical interventions and the important role of a multi-speciality coalition in his recovery.

CASE REPORT

A patient, previously healthy 16-year-old male with no known medical conditions or allergies, presented following a car-on-car collision. He was driving at night when he attempted to turn his vehicle and was struck by another car at an intersection. He was wearing a seatbelt at the time of the accident. Following the collision, he sustained an open chest wound over the left anterior chest region but reported no loss of consciousness, neck swelling, shortness of breath, chest pain or dysphagia. He also denied hoarseness of voice or palpitations.

On presentation, he was vitally stable, not in respiratory distress and had a full Glasgow Coma Scale (GCS) score. On examination, there was localised tenderness and swelling over the left clavicular region, with palpable subcutaneous crepitus extending to the lower neck. The open wound was clean without active bleeding. Neurovascular status of the upper limbs was intact, with good capillary refill and no neurological deficit. A bedside flexible nasopharyngolaryngealscopy examination revealed a patent airway with no medialisation, active bleeding, masses or foreign body. However, given the proximity of the medial left clavicle fracture fragments to the left common carotid artery (CCA) and the presence of internal jugular vein (IJV) thrombosis, further evaluation and management by otorinolaryngology (ENT) and vascular surgery specialists were made.

Advanced imaging studies, including computed tomography (CT) brain, contrast-enhanced computed tomography (CECT) neck and chest radiography were performed to delineate the extent of his injuries. Initial imaging CT neck, brain and chest radiography revealed multiple injuries. It identified a left clavicle fracture involving the sternoclavicular joint with surrounding hematoma and air pockets, a left upper chest wall open wound with subcutaneous emphysema, left lung contusion with pneumomediastinum and a hyperdense foreign body measuring 1.8 x 2.8 x 2.5 cm in the left posterior cervical soft tissue at the C5-C6 level (Figure 1). Thoracic surgical consultation was obtained, and given the patient's stable respiratory status without oxygen supplement, no chest drain was inserted. The

FIGURE 1: Yellow arrow in coronal cut of CECT neck showed hyperdense foreign body measuring 1.8 x 2.8 x 2.5 cm in the left posterior cervical soft tissue at the C5-C6 level

pneumomediastinum and lung contusion were managed conservatively with supportive care and close monitoring. Subsequent CECT neck multiphase showed a left IJV thrombosis, no evidence of active bleeding, and further clarified the positions of bony fragments relative to major vascular structures, including a fracture fragment 0.6 cm lateral to the left CCA.

Under general anaesthesia, the patient underwent a left neck exploration, foreign body removal and wound debridement post 3 days of trauma, following initial stabilisation and completion of diagnostic imaging. Intraoperatively, multiple bone fragments from clavicle fracture (Figure 2) were identified around the left IJV, with some fragments puncturing the vein. The IJV was ligated and removed due to the presence of thrombosis. The hyperdense foreign body in the neck revealed a half cut of the metal cap of unknown origin with the presence of the barcode on top of the surface, successfully removed (Figure 3). It was likely propelled into the neck region during the high-speed collision, possibly from a loose object within the vehicle. No pus or abscess was detected. Orthopaedic surgeons simultaneously performed debridement of the comminuted clavicle fracture. Sharp fragments were removed, and the wound was closed with a suture and compression dressing.

FIGURE 2: This image showed a metal cap and multiple fragments of a clavicle bone that were surgically removed

FIGURE 3: Metal cap with a barcode sticker removed from the neck

Postoperatively, a drain was placed in the left neck to manage any residual fluid collections.

DISCUSSION

This case illustrates the complexity of managing severe trauma involving multiple anatomical regions with a comprehensive approach, which requires a multidisciplinary approach. The early step includes a thorough assessment of airway, breathing and circulation (ABCs) while ensuring cervical spine immobilisation, as recommended by Tan et al. (2016). Early imaging, specifically CT scans of the head and neck, is significant for identifying the extent of injuries and locating foreign bodies (Tan et al. 2016). For cases involving penetrating neck trauma, such as the one described, a multidisciplinary team approach is vital. This includes collaboration among trauma surgeons, otolaryngologists and neurosurgeons to address the complex anatomical and functional challenges (McCrary et al. 2016). The removal of the foreign body should be carefully planned and executed under general anaesthesia to prevent further injury and manage potential complications like vascular or nerve damage (Kim et al. 2012).

The management of severe polytrauma in a 16-year-old male with a neck foreign body, specifically a metal cap with a barcode, involves

several critical steps, mainly when fracture fragments are in proximity to vital vascular structures. The presence of IJV thrombosis necessitated ligation to prevent complications such as embolisation or uncontrolled bleeding. This approach is supported by the literature, which indicates that IJV injuries can be managed with ligation (Simmons et al. 2012).

The removal of retained foreign bodies in the neck requires meticulous surgical techniques to avoid injury to nerves and vessels. The American College of Radiology (ACR) guidelines on penetrating neck injury emphasise the importance of thorough exploration and imaging, such as computed tomography angiography (CTA), to assess the extent of the injury and plan the surgical approach (Schroeder et al. 2017). Additionally, using interventional radiology with image-guided surgery can improve precision with a risk reduction of foreign body removal, as mentioned in a study by Zhang et al. (2023). These approaches align with the latest best practices for managing complicated neck trauma involving critical vascular structures and retained foreign bodies.

Furthermore, the involvement of the orthopaedic team ensured proper wound debridement and set the stage for later definitive fixation of the clavicle. The staged approach allowed for the initial stabilisation of soft tissue and vascular injuries before addressing the structural integrity of the clavicle. This strategy minimises the risk of infection and promotes better long-term functional outcomes (Eberbach et al. 2021; Rehme-Röhrl et al. 2023; Zaldivar-Jolissaint et al. 2015)

The presence of pneumomediastinum and lung contusion underscores the need for careful monitoring of respiratory status and a multidisciplinary approach to managing chest injuries. Even if immediate surgical intervention from the thoracic team is not required, close observation and supportive care are essential for the patient's recovery (Lodhia et al. 2023).

CONCLUSION

The successful management of this case underscores the critical role of a multidisciplinary approach in handling complicated trauma. From imaging and diagnosis to surgical intervention and postoperative care, alliance efforts among ENT, vascular, orthopaedic and surgical teams were fundamental. The patient's positive outcome reflects the importance of thorough planning, early surgical intervention and the teamwork expertise of multiple specialities in treating severe polytrauma. At three-month follow-up, the patient had fully recovered with no wound complications, infection or neurovascular deficits. He resumed daily activities with full neck and upper limb mobility.

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