Nonmissile Penetrating Spinal Injury with an Impaled Knife: Case Report

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Abstract We report a case of non missile penetrating spinal injury (NMPSI) caused due to an impaled knife in the lumbar region. The patient was neurologically preserved and presented with the knife blade retained in his back. The wound with the knife in situ was explored, the knife removed and a dural laceration was repaired. The wound healed without evidence for cerebrospinal fluid leakage or infection.

Keywords Lumbar spine · Penetrating spinal injury · Stab wound

Case details

Fifty year old male was stabbed in the lower back with a native butcher's knife following an altercation. The patient walked to a nearby health centre with the knife sticking out of his back and was referred to our centre. On examination the patient was hemodynamically stable and neurological examination revealed no deficits. Examination of the lumbar region revealed a stab wound in the right paraspinal region at the fourth lumbar vertebral level with the retained weapon sticking out. Computed tomography of lumbar spine showed the knife blade entering the fourth lumbar vertebra through the left pedicle (Fig. 1) but the exact location of the tip could not be visualised due to artefacts. The patient was taken up for surgery, he was intubated and anaesthetised in prone position using laryngeal mask. The stab wound was included in the incision, paraspinal muscles around the knife blade were dissected and the

course taken by the knife was traced. The knife entered the spine through the right paraspinal muscles pierced the interspinous ligaments entered the fourth lumbar vertebral body through its left pedicle. Laminectomy of fourth and fifth lumbar vertebral bodies was done; the knife was removed under vision without any consequences. There was a small puncture wound in the duramater due to the impingement of the knife which was primarily closed. The patient recovered well without any complications.

Discussion

Spinal injury results mostly from blunt injuries sustained during road traffic accidents and falls. Penetrating spinal injuries mostly result from missile (gunshot) wounds. The non missile penetrating spinal injuries account to less than one percent of spinal cord injuries. Non missile penetrating spinal injury (NMPSI) caused due to direct stabbings are uncommon (1%) outside of South Africa from where the majority of the literature on this topic is presented [1]. Most cases of NMPSI result from stab injuries inflicted with a knife and usually the assailant withdraws the weapon after the attack but rarely the weapon gets impacted into the bone and is retained either as a whole or as fragments [1].

The tendency of the assailant to attack the neck or chest of the victim explains the incidence of NMPSI in various spinal regions, most commonly involving the thoracic region (54–63%) followed by cervical region (27–30%) and lumbosacral region (7%) [2]. Three patterns of injuries have been described depending upon the extent of neurological damage caused. The most common being incomplete injuries (Brown-Sequard syndrome) followed by complete lesions and the rare group being those with no deficits [1].

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Fig. 1 Scout film from CT scan revealing retained knife at the L4 vertebra. The knife appears to enter the vertebral body through the pedicle

These patients pose a challenge in terms of transportation, positioning and management. Optimal management of such cases is not outlined clearly and there are no well established guidelines [2]. The optimal management of these patients involve careful transportation to a trauma centre evaluation and delivery of basic trauma care. A complete assessment is made to detect injury to major vascular structures, bronchi and other visceral organs. Manipulation or removal of the retained foreign bodies in patients with NMPSI prior to proper imaging and neurosurgical consultation may lead to increased risk of bleeding, neurological damage, and Infection [3] and should be avoided.

The surgical management of NMPSI is a controversial topic and there are no published guidelines leading to

varying rates of surgical interventions among institutions [3]. The preponderance of published reports to date suggests that neurological deficits are improved and progressive deficits prevented by surgical removal of the material and irrigation of the wound [1]. The consensus is that surgical exploration should be carried out for those patients with incomplete neurological deficits, persistent cerebrospinal fluid leak, retained intraspinal foreign body or bone fragment and persistent pain [1].

Nonmissile penetrating spinal injuries are generally stable, and internal fixation should be considered only when extensive bone destruction is documented on imaging Studies. Intravenous steroid administration does not improve neurological function in patients with penetrating spinal injuries and may be associated with an increased risk of Infection. It is therefore not recommended as a management option [3]. Patients with wounds created by high-risk penetrating items and those that are significantly contaminated [1] therefore, may benefit from a course of broad-spectrum antibiotic therapy with or without surgical debridement. All patients should be closely monitored postoperatively for evidence of delayed neurological deficits, particularly those in whom complete radiographic documentation was not achieved and/or dural exploration was not performed [1].

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