Stab Injury of the Thoracic Spine with Remaining Metal Fragment - A Case Report -

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Spinal stab injury is very rare. We report on a case of a 49-year-old female who was stabbed in the left posterior thoracolumbar area. Image study revealed that the remaining tip of the knife penetrated the spinal canal at the T11 level. After emergency T11 hemilaminectomy, the remaining tip of the knife was removed safely. She was discharged with no other complications; however, mild paresthesia persisted. If the metal fragment remains in the wound, surgery should be considered in order to prevent further delayed complications.

Key Words: Metal fragment • Spine • Stab injury

INTRODUCTION

Spinal stab injury is a very rare occurrence. In the United States, only 1% of spinal injury is due to stab injury³⁾. Most injuries result in an incomplete neurologic deficit due to spinal cord hemi-section¹¹⁾. Even without acute neurologic symptoms, delayed symptoms or infection can occur^{6,8,18)}. Due to its rarity, standard management strategies for this type of injury are still controversial⁴⁾. We report on a case of a 49-year-old female who had mild sensory symptoms with a spinal stab injury that was treated surgically.

CASE REPORT

A 49-year-old female was stabbed several times on the back, hand, abdomen, and chest by a robber. On arrival, her vital signs were as follows: blood pressure, 87/70 mmHg; pulse, 88; Oxygen saturation using a pulse oxymeter, 99%.

Her physical examination revealed 6 stab wounds; 4 were on the chest and abdomen, 1 was on the left wrist, and 1 was on the left side of back. On neurological examination, she had mild paresthesia on the left side of trunk and no motor

weakness. Her total blood count and biochemical tests were within normal limits. A metallic object was observed in a thoracolumbar spine X-ray (Fig. 1). Chest and abdomen computed tomography (CT) revealed a left hemo-pneumothorax and perforated stomach. Axial CT and lateral reconstruction CT showed that the tip of the knife traversed the lateral portion of the spinal canal and stuck into the pedicle and posterior body of the T11 spine (Fig. 2). The patient underwent on an urgent surgery in the prone position. Following a midline

Fig. 1. Anteroposterior X-ray shows a metallic object at the T11 level.

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Fig. 2. Computerized tomography revealed a metallic object that traversed the lateral portion of the spinal canal and stuck into the pedicle and posterior body of the T11 vertebra.

Fig. 3. A broken tip of a knife was detected at the posterior portion of the left lamina of T11.

T10-T12 skin incision, a broken tip of a knife was detected at the posterior portion of the left lamina of T11 (Fig. 3). After a left T11 hemilaminectomy, the broken tip was removed (Fig. 4). A copious cerebrospinal fluid (CSF) leakage from dura tear was observed at the shoulder of the exiting root and ventrolateral portion of the thecal sac. Fortunately, there was no direct damage to the spinal cord. After primary repair of dura with 7-0 prolene, a lumbar drainage was installed to prevent CSF leakage. After the surgery, video assisted thoracotomy, open exploration, and closure of the perforated stomach were performed. Five days after the surgery, the wound was found to be clean without CSF leakage. We increased level of lumbar drainage up to 20 cm from heart. After confirming of no CSF leakage, we removed the lumbar drainage. We administered intravenous ceftriaxone and metronidazole for 2 weeks, and tetanus prophylaxis was administered. The patient had no further complications and was discharged regularly;

Fig. 4. The tip of the knife.

however, mild paresthesia persisted on left T11 sensory dermatome. It may be due to damage of left T11 nerve root.

DISCUSSION

Spinal stab injuries are very rare and most are caused by assault from the rear^{5,16}. The vast majority of such injuries present with acute neurologic symptoms. Acute neurologic symptoms can be due to direct penetration of spinal cord neural elements, spinal cord infarction, and epidural hematoma. When direct penetrating injury occurs, the patient may present with typical Brown-Sequard variants^{6,12}. Artery of Adamkiewicz injury can cause spinal cord infarction, which can be exacerbated by systemic hypotension¹². Epidural hematoma was a very rare complication of spinal stab injury⁹. Some patients present with delayed neurologic symptoms. Remaining fragments in the spinal canal may cause slow, progressive damage^{6,8}.

When the diagnosis of remote spinal stab injury is considered, the initial work-up consists of plain radiographs for identification of any remaining knife fragments. As further imaging study, CT scan may be helpful¹³. However, in some cases, significant metallic artifact was created by the remaining knife fragment. Magnetic resonance imaging (MRI) has great benefit in ruling out space-occupying lesions. However, performance of MRI in the presence of a remaining fragment could be dangerous, because movement of the fragment in a strong magnetic field could result in worsening of neurologic symptoms⁸.

Management of a spinal stab injury must be individualized, and must be undertaken with utmost care in order to avoid undue injury during surgery. In particular, movement of the fragment must be minimized, and electrocautery must not be used⁸. Moreover dura around the spinal cord must be closed watertightly in order to avoid CSF leakage. Accepted management of patients with incomplete neurological deficits after spinal stab injury involves removal of metallic foreign material, due to the risk of late complications, such as myelopathy, pro

gressive neurological deficit, intramedullary abscess, and symptomatic pseudomeningocele^{6,8,10,18}. These delayed complications are the result of inflammation and scar tissue that have been shown to develop around retained fragments with arachnoid adhesions and extensive spinal cord gliosis⁶. After spinal stab injury, infection was a rare but serious complication. To prevent infection, intravenous broad spectrum antibiotics and tetanus prophylaxis are required. In our case, we did tetanus prophylaxis and used intravenous ceftriaxone and metronidazole for 2 weeks. Despite neurological symptoms, use of steroids is not recommended due to a lack of definite evidence and its detrimental effects on wound healing¹⁷.

Additionally, lumbar drainage could be installed to prevent CSF leakage. There are several indications for lumbar drainage including improvement of surgical exposure in neurosurgical procedures, protection of the spinal cord during repair of thoracic aorta, short-term treatment of hydrocephalus and treatment of CSF fistula¹. In our case, lumbar drainage was installed for the prevention of CSF fistula. If no CSF leakage was confirmed by absence of additional subcutaneous accumulation of fluid at the operative site, postural headaches, clinical signs of pseudomeningocele formation and cutaneous leakage of CSF at increased level of lumbar drainage⁷, it should be removed as soon as possible for the prevention of catheter related infection^{2,14,15}. Also we confirmed no CSF leakage at elevated height of lumbar drainage and removed lumbar drainage catheter carefully.

Prognosis for spinal stab injury is generally better than that for blunt spinal cord injury. Most patients present with incomplete spinal cord injuries, and up to 66% show good recovery¹⁷. She also had no further complications except mild paresthesia persisted. Three months after the surgery, she had mild improvement of paresthesia without other complications.

CONCLUSION

We report a very rare case of spinal stab injury with remaining fragment. Management of spinal stab injury is controversial. However, to avoid delayed complication, surgical removal and use of prophylactic antibiotics should be considered.

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