

## Case Report

# Paraplegia in young female after stab injury: a rare injury with heavy socioeconomic burden and its impact

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### ABSTRACT

Thoracic spinal cord stab injuries are rare lesions. We report a 32 years old young married female, of a lower middle class, who was stabbed on her back with a sickle by her neighbor after a quarrel. She presented with complete paraplegia with muscle power of zero on all muscle groups, complete sensory loss from thoracic dermatome level 4 and below, acute urinary retention, and a 3-centimeter vertically placed wound on the posterior thoracic region from which cerebrospinal fluid mixed with blood was oozing out. A high-dose methylprednisolone protocol was started (30 mg/kg in one hour and then 5.4 mg/kg over next 23 hours), urinary catheter placed and sterile cleaning and dressing was done. Antibiotics and analgesics were also administered. The Magnetic Resonance Imaging scan was done urgently and scanning revealed thoracic spinal cord contusion at D5 vertebral level with cord oedema at D4 to D6 vertebral level and fracture spinous process of T4 vertebral body. The case is managed conservatively and she is under follow up. As patient is a young married female, wedge worker by occupation, having lower middle class of socioeconomic status, this condition has high impact considering the socioeconomic issues.

**Keywords:** Female, Paraplegia, Spinal cord injury, Socioeconomic burden, Stab injury, Thoracic spine

## INTRODUCTION

Spinal cord stab injuries are rare traumatic lesions and its incidence varies according to the country. In the United States, only 1% of the spinal cord injuries result from stabbing.<sup>1</sup> Generally patients present with weakness in lower limb with varying grades of power according to severity of injury to the spinal cord. Further evaluation with Magnetic Resonance Imaging is necessary for further management and treatment of such cases.

The initial management of SCI is crucial for protecting undamaged spinal cord from secondary insults. In spite of scientific progresses, it is still not possible yet to repair a damaged spinal cord.<sup>2</sup> We are reporting a case of thoracic spinal cord stab injury in a 32-year-female, with paraplegia, who was managed conservatively.

## CASE REPORT

32-year-old female was presented to the Emergency Department of our hospital after she was stabbed on the back by her neighbor after a quarrel between them. The moment she was assaulted, suddenly she became unable to move her both lower limbs. At the scene, the patient was found to be awake and alert without any acute distress. She was taken to the nearby government hospital and the stab wound was sutured primarily. Then she was referred to our hospital. She presented with the inability to move lower limbs, she was having back pain and cerebrospinal fluid (CSF) mixed with blood was leaking from the wound. Physical examination revealed: a 3-centimeter wound, vertically placed, near midline at the thoracic area on her back, there was complete flaccid paraplegia with muscle strength of zero on all muscle groups, abolished deep and superficial tendon reflexes on

lower limbs, complete anaesthesia from level T4 and below, urinary retention, and hypotonic anal sphincter with abolished bulbo-cavernosus reflex. In the emergency Ward, sterile dressing of the wound was done, an intravenous line was inserted, blood samples were collected, and antibiotics were started along with high dose methylprednisolone (Houde laboratories, Paris, France), protocol (30 mg/kg IV infusion in one hour and then 5.4 mg/kg given over 23 hours). After that, a MRI scan of whole spine was done. It revealed: thoracic spinal cord contusion at D5 vertebral level and cord oedema at D4 to D6 vertebral level and fracture spinous process of T4 vertebral body. Case was managed conservatively.

## DISCUSSION

Spinal cord stab injuries are rare and its incidence varies. In the United States, only 1% of the spinal cord injuries result from stabbing.<sup>1</sup> In spite of scientific progresses, it is still not possible yet to repair a damaged spinal cord.<sup>2</sup> Spinal cord injury (SCI) is a devastating condition which occurs with an annual incidence of 12.1-57.8 cases per million.<sup>3</sup> In a large series from South Africa, 25% of spinal cord injuries were reported to result from sharp injuries and 84.2% of these sharp injuries resulted from stabbing.<sup>4</sup> There are not enough studies on the prevalence of traumatic spinal cord injuries (SCI) for a global estimation.<sup>5</sup> One third of SCI patients are tetraplegic and half have complete spinal cord transection. The mean age of these patients is 33 years and there is a net male predominance with 3.8/1 sex ratio. Most publications on spinal cord stab injury are based on case reports or limited case series.<sup>5,6</sup> In USA, out of 1736 cases of traumatic spinal cord injury (SCI), 810 were caused by voluntary violence with 760 (43.77%) caused by gunshots, and only 50 (2.88%) caused by stabbing. Again, of the 16,024 cases of traumatic SCI recorded by the National spinal cord injury Statistical Centre (NSCISC), only 1.1% resulted from stab injury.<sup>7</sup> In Cameroon, there is not a published study on the frequency of SCI due to gunshots or stabbing. Spinal cord stab injuries (SCSI) are most often located in the thoracic spine as in this case, followed by cervical and lumbar areas. Nevertheless, some authors do recommend surgery in such cases because surgery has shown benefit on associated lesions which are infection, cerebrospinal fluid (CSF) leakage and arachnoiditis.<sup>4,6,8</sup> The usual clinical presentation of SCSI is incomplete paraplegia manifesting most often as Brown-Séquard syndrome.<sup>4,7,9</sup> Nevertheless, spinal cord stab injuries (SCSI) remain rare and their frequency diversely estimated (7)(8)(9)(10)(11). Their frequency was estimated at 26% by Velmahos cited by Yeung and 25% by Peacock. Only two studies from South Africa concerned hundreds of cases, 450 cases in the series from Peacock and 259 cases in the series of Lipschitz.<sup>4,12</sup> Lipschitz postulated three mechanisms of SCIs by penetrating injuries:

- The weapon may damage the cord directly. Bone fragments may occasionally be driven into the spinal

cord to produce damage. In this category of injury, the neurological deficits are supposed to be irreversible.

- The vascular supply of the spinal cord may be damaged with resulting oedema. The neurological disabilities associated with this type of injury will usually improve with the mitigation of oedema.
- Countercoup spinal contusions or concussions may injure the cord. The penetrating knife blade causes local damage to the cord at the site of impact and, in addition, the force of the blow pushes the cord forward to impinge on the wall of the bony spinal canal.

In the case reported here, paraplegia was complete. The majority of patients with SCSI have sphincter disturbances most often urinary. Complete spinal cord transection is rarer. Present observation has revealed that part of the neurologic symptoms can be provoked by hematoma within or around the spinal cord or post traumatic edema. One can explain acute neurological deficits in patients with SCI are

- Transection of nervous elements,
- Spinal cord infarct due to blood vessels' injury or compression, and
- More rarely spinal cord epidural hematoma.<sup>9</sup>

The radiological assessment of SCSI comprises: plain X-rays, computed tomography (CT) and magnetic resonance imaging (MRI). MRI is the gold standard in the absence of metal incarceration. It assesses the extent and evolution of SCI.<sup>8,10</sup> The usefulness of magnetic resonance (MR) imaging for the detection of spinal cord abnormalities is well described, especially in the acutely injured spine. The appearance of intraspinal haemorrhage at MR image varies through several forms as the hematoma ages.<sup>13,14</sup> MR imaging can demonstrate several pathological features involving the spinal cord, including intraspinal haemorrhage, acute cord edema, and contusion of the spinal cord.<sup>15</sup> As with any less frequent neurological pathology, the optimal management of SCSI is still yet to be determined. Nevertheless, some authors do recommend surgery in such cases because surgery has shown benefit on associated lesions which are infection, cerebrospinal fluid (CSF) leakage and arachnoiditis, Injuries without incarceration of foreign bodies and without neurological deficits can be managed conservatively after assessment of spinal cord lesions by MRI.<sup>9</sup> Concerning prognosis, SCSI have a heavy impact on the victims, families and the entire society in terms of autonomy loss, working time loss, functional disability, the financial and human costs. Nevertheless, SCSI has a better prognosis (motor recovery and sphincter control) than other traumatic SCI, especially injuries due to guns.

Spinal cord injury (SCI) is a devastating condition which occurs with an annual incidence of 12.1-57.8 cases per million.<sup>16</sup> SCI is associated with permanent disability and decreased life expectancy.<sup>17</sup> According to the World

Health Organization (WHO), QOL is the perception of individuals concerning their position in life, cultural context, and system of values attributed to objectives, expectations, standards and concerns. This definition includes six main domains: physical health, psychological state, level of independence, social relationships, environmental characteristics, and spiritual pattern.<sup>18</sup>

Health-Related Quality of Life (HRQOL) has been used in the field to differentiate QOL in the generic sense. It is considered synonymous with the term "self-perceived health status", which contains three domains: the physical, psychological and social. The physical domain is related to aspects of functional capacity and work capacity. The psychological domain is related to satisfaction, well-being, self-esteem, anxiety and depression. The social domain includes aspects concerning rehabilitation for work, leisure, social and family interaction.<sup>19</sup>

Spinal cord injury may render a person dependent on caregivers. Caregiver burden was assessed using Caregiver Burden Inventory (CBI). It is a multi-dimensional instrument developed by Novak and Guest that measures the impact of burden on the caregivers.<sup>20</sup>

CBI consists of five subscales:

- Time-dependence burden (burden because of restriction on the caregiver's time).
- Developmental burden (feeling of being left behind in their development in respect to their peers).
- Physical burden (feelings of chronic fatigue and damage to physical health).
- Social burden (feelings of role conflict, resulting in arguments and time limitation).
- Emotional burden (negative feelings towards the care recipient).

Assistive technology is often required to facilitate mobility, communication, self-care or domestic activities. People with spinal cord injury show clinically significant signs of depression, which in turn has a negative impact on improvements in functioning and overall health. Misconceptions, negative attitudes and physical barriers to basic mobility result in the exclusion of many people from full participation in society.

In this case there was a young married female. People with spinal cord injury report a higher level of perceived stress than the general population and women with spinal cord injury tend to have a higher level of perceived stress than men with spinal cord injury. She has to cope with physical problems, with paralysis, bladder, bowel and sexual dysfunctions and also with the impact that the spinal cord lesion has on her social life. Spinal cord injury can happen to anyone, research suggests that there is a relationship between personality and aspects of adjustment after spinal cord injury, with optimism humor,

self-efficacy and practical, solution-focused coping strategies predicting good outcome, pre injury education level has also been noted to play a role in long term adjustment.

## CONCLUSION

Spinal cord injury (SCI) is a devastating condition, Spinal cord stab injuries are rare and its incidence varies. MRI of spine is the gold standard for evaluation and further management. Traumatic SCI have a heavy socio-economic impact. The disability resulting from spinal cord injuries (SCI) puts a heavy burden on victims and the whole society concerning quality of life, working time loss and financial cost. Medical aspects not only in the acute phase, but also during the upcoming years because of complications (urinary infections, pressure sores, and behavioural disturbances) and the need for home care. For the case of spinal cord stab injuries in particular, victims are most often young, around thirty who were taking care of their families. Women with spinal cord injury tend to have a higher level of perceived stress than men with spinal cord injury. In this case, woman was suddenly handicapped, almost for whole life, she has her husband, children with their future waiting for her but traumatic paraplegia will have left her becoming a burden for the society and their relatives.

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