

## Stabbed in the back?

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Compared to missile injuries, stab injuries and other non-missile penetrating injuries of the spine are rare. While there have been few reports from India<sup>1,2</sup>, reports from South Africa account for most of the large series reported<sup>3,4,5</sup>. Majority of these injuries are due to assault with knives (stabbing). Penetrating injuries however can occur due to fall on sharp objects, stabbing with screwdriver, bicycle spokes, scissors, garden forks, sickles etc have been reported<sup>5</sup>. In general, penetrating object or weapon is withdrawn after stabbing; rarely, the attacker breaks the blade at the handle. Most of the victims are young males, although such injuries are being often seen in women also<sup>6</sup>. Usually, the wound of entry is posterior thoracic (54-63%) or cervical (27-30%)<sup>2,5</sup>. In the latter instance, there may be injury to brachial plexus and carotid vessels.

Careful transportation to a trauma center is essential for optimum evaluation and assessment of the damage. A complete assessment is made to detect injury to major vascular structures, bronchi, aorta and other visceral organs. Volume replacement is made and chest tube insertion is carried out if indicated. No attempt should be made to remove an externally visible retained weapon in the emergency room and by the paramedics.

Spinal cord or root injury may occur immediately after the stabbing indicating physical damage by the weapon. Delayed deficit may result from retained weapon and formation of posttraumatic syrinx formation<sup>7</sup>. Infection causing meningitis or intraspinal suppuration too can result in delayed neurological deterioration<sup>7,8,9</sup>. Neurological deficit is in the form of Brown-Séquard syndrome in most of the cases, which may be typical or

incomplete; nearly 21% cases have complete spinal cord injury<sup>2,5,10</sup>. Nearly a third of the patients may not have any neurological deficit<sup>2</sup>. The injury can remain extradural and may cause deficits months after the injury<sup>11</sup>. Inflammatory reactions in the nervous tissue to retained metallic fragments can also result in delayed neurological deficits. Copper is associated with severe scarring and fibrosis, while nickel and lead excite less severe response<sup>12</sup>. Oxidation of metallic fragments can result in deposit of rust particles on the nervous tissue<sup>7</sup>.

Plain radiography is the initial investigation in all the cases. A retained metallic object will be shown along with other injuries like haemopneumothorax, emphysema, etc. Computerised tomography shows injury to the discocorporeal components, presence of haematomas and track of the injuring weapon. Streak artefact can be used to determine the tip of the blade<sup>13</sup>. MR imaging can be employed in those cases with no retained metallic fragment/weapon. Integrity of the spinal cord, presence of haematoma, disc herniation, etc can be shown with great accuracy.

An externally visible stuck weapon has to be removed in the operation theatre after preparing the operation theatre for thoracotomy/laparotomy/neck exploration. The externally visible portion of the weapon or its handle can be grasped and gently pulled in its long axis. The external wound is extended if required, debrided, irrigated with saline, hydrogen peroxide and antibiotic solution, and closed in layers. No definite guidelines exist for the management of stab injuries of the spine. Only twenty patients out of 450 managed by Peacock et al underwent laminectomy<sup>5</sup>. While Velmahos et al reported surgical exploration in 22 out of 143 patients<sup>14</sup>, Thakur et al explored nine of their 11 patients<sup>2</sup>. In a review of 16 patients with non-missile penetrating injuries, it was brought out that surgical intervention made no difference to the final outcome<sup>10</sup>. 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

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or bone fragment and persistent pain<sup>15</sup>. Although CSF leak may stop spontaneously, patient may develop meningitis and there may be formation of pseudomeningocoeles as these CSF fistulae heal. Hence, presence of CSF leak beyond 96 hours should be an indication for surgical intervention. Surgical intervention is also indicated in cases with delayed neurological deterioration, especially in the presence of a retained intraspinal foreign body<sup>11</sup>. Surgical procedure involves laminectomy, defining the normal dura cranial and caudal to the site of stab, and opening the dura with stay sutures. Conservative debridement is carried out and only the detached, non-viable neural tissue is debrided. Haematoma is evacuated and dura is closed, with a dural substitute if necessary. Lumbar subarachnoid CSF drain is inserted for 5-10 days and antibiotics in antimeningitic dosage are administered. Spinal stabilization is generally not required, since these injuries are stable.

All patients are closely monitored for delayed neurological deterioration, and deafferentation pain. Overall neurological recovery is better than that observed with missile injuries.

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