



CASE REPORT

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# A Cervical Spine Gunshot Injury without Bone or Neurological Deficits

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## ABSTRACT

Missile injuries of the spine have been reported in the literature. The neurosurgical concern in such injuries is the degree of damage sustained as a result of the bullet traversing through the bone and neural tissues, and their effect on long-term follow-up. This report describes a case of gunshot traversing the cervical vertebral body, the spinal cord and the posterior element without any bone destruction or neurological deficit. The patient was managed conservatively with long-term follow-up clinically and radiologically, with excellent recovery. Surgery should be served for specific cases according to the severity of the trauma and its effect.

**Keywords:** Gunshot injury, Cervical spine, Neurosurgery, Yemen

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## 1. Introduction

Gunshot wounds are one of the principal causes of spinal cord injuries (1). These types of wounds show higher incidence of complete spinal cord injury than those following blunt traumas (2). Damage to the spinal cord can be due to contusion, transection, vascular injury and subsequent ischemia after disrupting the soft tissue and bone by projectiles. Such damage is related to the distance of firing and the bullet trajectory, size, shape and velocity (3–5). Military weapons create injury from shock wave and cavitation, which damages the tissue surrounding the trajectory of the bullet. Surgery conveys no significant improvement over conservative management and may increase the risk of complications (6). The present case report is about a patient with a bullet injury to the cervical spine traversing the bony elements and the thecal sac without bone destruction or neurological deficit. Written informed consent was obtained from the patient for publication of this report and its accompanying figures.

## 2. Presentation of the case

A 19-year-old male patient was admitted to the Emergency Department of the University of Science and Technology Hospital after a gunshot injury to the neck during a military operation. The bullet passed from the midline of the anterior aspect of the neck to about 1 cm right the paramedian posterior aspect of the cervicodorsal region (Figure1).



Figure 1. Front and back views of the gunshot injury

The bullet was fired from a distance of about 8 m by an assault rifle.

The general condition of the patient was stable. However, there was a minimal leak of the cerebrospinal fluid (CSF) from the exit of the bullet, which stopped after a few days of conservative management. The patient was paraplegic with bilateral upper limbs paresis and a C4 sensory level at the root of the neck.

Magnetic resonance imaging (MRI) showed the trajectory of the bullet through the body of the seventh cervical vertebra, traversing the thecal sac and the right ligamentum flavum of the corresponding level. The spinal cord showed edema extending from C5 to T1 (Figure 2).



Figure 2. MRI scans of the affected cervical area

The patient underwent conservative treatment in the form of supportive medication and physiotherapy. The CSF leak stopped three days after conservative treatment. In addition, the patient started to move his upper limbs after one week and the left foot after four months with concomitant improvement of the sensations. Follow-up continued for three years until restoring the normal function of the upper limbs, normal sphincter control and normal function of the lower limbs, except for minimal spasticity of the right lower limb during walking that improved with baclofen medication. Follow-up MRI showed severe myelopathic changes and near normal bone structures (Figure 3).



**Figure 3.** Follow-up MRI scans showing severe myelopathic changes and normal bone structure



### 3. Discussion

Most gunshot injuries to the spine are restricted to the thoracic region, followed by cervical and lumbar-sacral region injuries (7). Cervical region injuries can lead to a sudden death, Brown-Sequard syndrome or cruciate paralysis (8). Spinal cord injuries from civilian gunshots are primary due to direct injury from the bullet, unlike military weapons that may create injury from shock wave and cavitation (7). The present patient case was shot by a military weapon traversing through the thecal sac without cord contusion or vascular injury (hematoma or ischemia).

Up to the best of my knowledge, only three cases of a bullet lodged within the spinal canal without any damage to the osseous structures have been reported, two of which affected the thoracic region (11–12) while one case affected the cervical region (9). The injury of the present case was at the level of the seventh cervical spine. The bullet traversed through the body and the lower intervertebral disk space as well as the posterior elements without affecting the contour of the vertebral body, the end plate or the bony posterior elements.

Clinical evaluation in the ER showed that all penetrating injuries were within the borders of the “cardiac box”. Classic cardiac tamponade with Beck’s triad (muffled heart sounds, increased jugular vein distention and hypoten-

sion) was noted in two patients (Figure1). Management in the ER was carried out according to the hemodynamic states and consciousness level of the patients (Table1).

### 4. Conclusions

Patients with gunshot wounds to the spine should have a trial of conservative treatment because it gives a satisfactory outcome and avoids the risks of surgery, except if there was progressive clinical deterioration. Knowledge about the type of weapon and bullet, distance of firing and trajectory of the injury help choose the proper line of management for each individual case.

### Competing interests

The author declares that he has no competing interests associated with this article.

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