Gunshot-caused Facial Injury Combined with Lower Cervical Spine Injury

A Case Report

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ABSTRACT

A 32-year old male patient was wounded by a pistol. As shown in computed tomography (CT) scanning images, there was comminuted fracture of the left mandible and the bullet was found in the left side behind the sixth cervical vertebra. After the patient was hospitalized, the debridement was done in the emergency room and the operation of open reduction and internal fixation for comminuted fracture of left mandible was performed successfully. Eighteen days later, the patient was taken to surgery for anterior cervical decompression and fusion with autogenous iliac bone grafting for the sixth cervical vertebra. Postoperative follow-up of the patient over two years indicated that the left biceps muscle strength was recovered to level 4. Gunshot wound to the face associated with injury of the low cervical spine has the possibility of survival. It is safe to treat facial wounds early in the patient's treatment course, even if the bullet remains in the cervical vertebral body and there is neurological function damage.

Keywords: Face, gunshot injury, lower cervical spine, treatment

Herida Facial por Arma de Fuego Combinada con una Lesión en la Columna Cervical Inferior: Reporte de un Caso

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RESUMEN

Un paciente masculino de 32 años fue herido por un disparo de pistola. Como se muestra en las imágenes escaneadas de la tomografía computarizada (CT), se produjo una fractura conminuta de la mandíbula izquierda, y la bala fue encontrada en el lado izquierdo detrás de la sexta vértebra cervical. Después de que el paciente fuera hospitalizado, se realizó un desbridamiento en la sala de urgencias, y se llevó a cabo con éxito la operación de reducción abierta y la fijación interna de la fractura conminuta de la mandíbula izquierda. Dieciocho días más tarde, el paciente fue llevado a cirugía para una descompresión cervical anterior y una fusión con injerto óseo autógeno del ilíaco para la sexta vértebra cervical. El seguimiento postoperatorio del paciente durante dos años, indicó que la fuerza muscular del bíceps izquierdo del paciente se recuperó hasta el nivel 4. Una herida de bala en la cara asociada con una lesión de la columna cervical inferior tiene posibilidad de supervivencia. Es seguro tratar las heridas faciales temprano en el curso del tratamiento del paciente, incluso si la bala aún permanece en el cuerpo vertebral cervical y hay daño de la función neurológica.

Palabras claves: Cara, herida con arma de fuego, columna cervical inferior, tratamiento

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INTRODUCTION

The increase in social violence has given rise to an increase in the incidence of cervical spine injuries. In China, reports of shootings are rare because private ownership of firearms is banned. Whereas incidence of facial (1–3) and cervical spine injuries (4–6) is well documented in the literature, research on facial or cervical spondylosis caused by shooting is rare.

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Bumbasirević *et al* (7) reported the case of combined injuries of the face and upper cervical spine but there are no reports on the combined injuries of the face and lower cervical spine. Judgment of the ballistic, vascular and visceral injury assessment and location of shrapnel could determine the priorities of patients for clinical treatment.

CASE REPORT

On October 8, 2007, a 32-year old male patient was sent to the emergency room in a conscious state with normal blood pressure of 110/80 mmHg. The patient was reported to have been wounded by a bullet shot from a pistol at a distance of about three metres. On examination, he was found to sustain a bleeding round wound with a diameter of about 1 cm to the left side of his face. The muscle strength of his left biceps was level 3 and there were no symptoms of respiratory distress, swollen pharynx or oesophagus, or spinal canal haematoma. The computed tomography (CT) scan images (Fig. 1) showed that the bullet was found in the left side

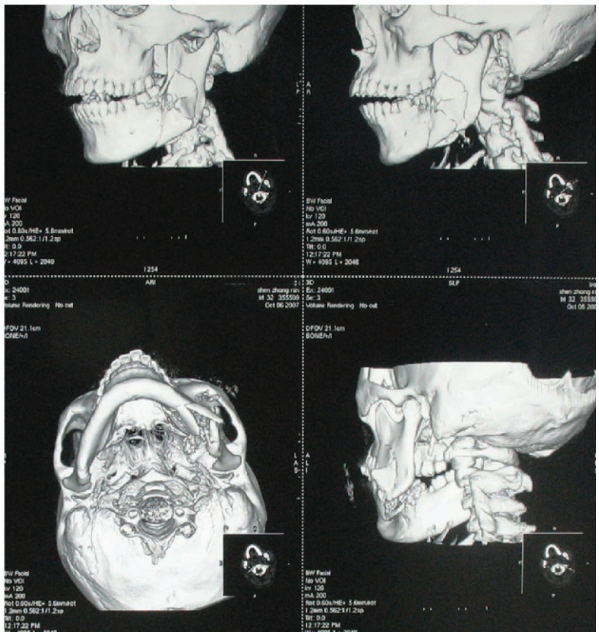

Fig. 1: Computed tomography (CT) scanning images (3D reconstruction): comminuted fracture of the left mandible.

behind the sixth cervical vertebrae, which protruded into the spinal canal and caused fracture of part of the left vertebral pedicle (Fig. 2).

After the patient was hospitalized, debridement was done in the emergency room and the operation of open reduction and internal fixation for comminuted fracture of left mandible was performed successfully without postoperative infections and further decline of neurological function. The analysis of postoperative oesophageal angiography found no significant injury of the oesophagus, and the bullet was about 14 mm from the posterior border of the oesophagus (Fig. 3).

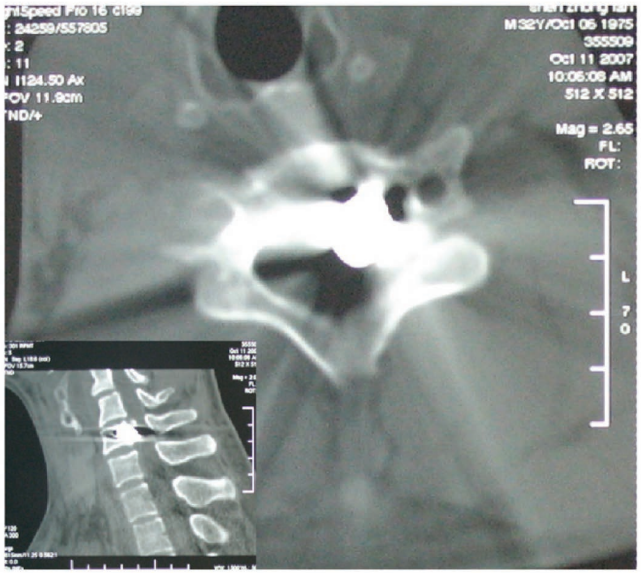

Fig. 2: Computed tomography (CT) scanning: the bullet was found in the left side behind the sixth cervical vertebrae, part of which protruded into the spinal canal and caused fracture to part of the left pedicle.

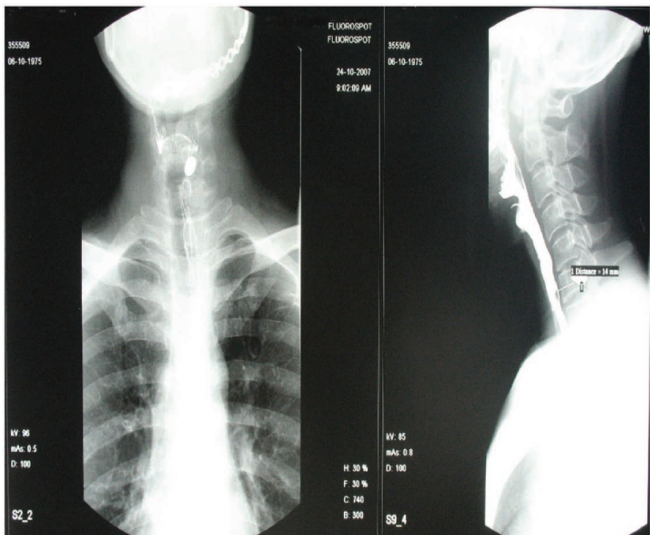

Fig. 3: Debridement and open reduction and internal fixation for the left mandible were performed successfully. The oesophageal angiography found no significant injury to the oesophagus, and the bullet was about 14 mm from the posterior border of the oesophagus.

On October 26, 2007, the patient was transferred to the Department of Orthopaedics for the surgery of anterior cervical decompression and fusion with autogenous iliac bone grafting for the sixth cervical vertebra (Fig. 4). During the surgery, the bullet was found in the left side behind the sixth cervical vertebrae and part of the bullet had fragmented inside the spinal canal without any rupture of the epidural. After the removal of the bullet and fragments (Fig. 5), iliac bone was used for grafting with anterior cervical plate

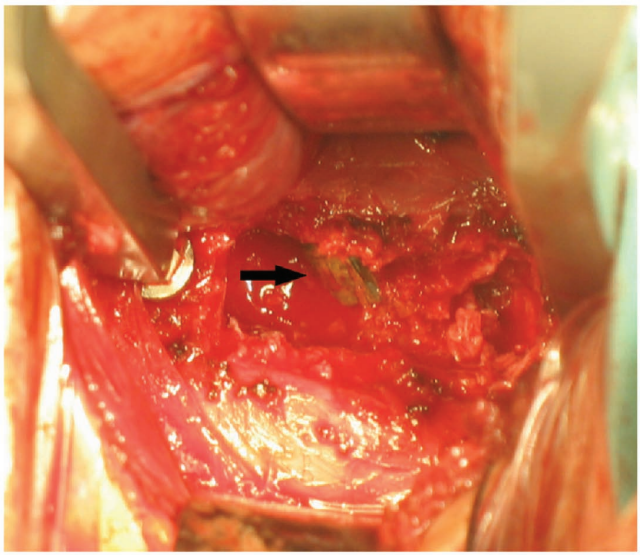

Fig. 4: The patient had surgery for anterior cervical decompression. Black arrow indicates the position of the bullet.

Fig. 5: The bullet after it was removed.

fixation. Routine postoperative anti-infective precau-tion was taken and the wound healed well without infection. Postoperative follow-up of the patient over two years indicated that the left biceps muscle strength recovered to level 4.

DISCUSSION

The incidence of simultaneous damage to the face and cervical vertebrae resulting from shooting is rare. The degree of damage caused by gunshot injury is closely related to the calibre of the gun, the speed of the bullet and the distance between the gun and the injured person (8, 9). The injured in this case was very lucky because there were no injuries to important tissues and organs of his body as the bullet hit his mandible from the left, passed through diagonally before stopping at the back of the 6th cervical vertebra, without damaging the carotid sheath, oesophagus or trachea.

Facial treatment of gunshot injury could be divided into four steps which are meant to (a) maintain airway patency, (b) keep bleeding under control, (c) assess whether or not the injury is accompanied by any damage of large blood vessels or vital organs and (d) correct/fix the facial deformity (10). Treatments of spinal injury by gunshot focus on the stability of spinal reconstruction, recovery of neural function, prevention of the occurrence of complications and so on.

In general, the stability of the spine is not compromised if gunshot wounds do not severely damage the vertebral body, arch root or facet joint. Therefore, it is very important to determine the integrity of the aforementioned structures by CT scan. If there was any potentially unstable structure, the internal fixation should be performed to re-establish the spinal stability in order to help patients in early functional exercise (11). However, for simultaneous injuries to the face and cervical spine, there is controversy in the order and timing of treatments.

Progressive decline of neural function was considered as the surgical indication for emergency extraction of de-compression. In this case, there was open facial injury but no significant cervical spine instability or progressive decline of neural functions. Therefore, the facial trauma was treated first, followed by the removal of the bullet after two weeks. Due to the compression to the nerve root, the bullet was removed by anterior cervical decompression, then bone graft fusion and internal fixation were performed with no postoperative complications. Postoperative follow-up of the patient over two years indicated that cervical vertebral fusion was good and left brachial biceps muscle strength was recovered to level 4.

CONCLUSION

The report showed the possibility of survival from facial gunshot wound with associated injury to the low cervical spine. Early treatment of facial wounds and removal of bullet fragments from the cervical vertebral body is safe and could restore and prevent further damage to neurological functions.

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