CASE REPORT

A rare injury to a rear seat passenger: bilateral fracture dislocation of the shoulders

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SUMMARY

Injury prevention measures in automobiles are mainly focused on the front seat passengers and driver. In the event of a head-on collision, rear seat passengers usually escape with minimal injuries. Most commonly observed injuries to rear passengers are to the head, chest wall or lower extremities. We report a case of bilateral anterior dislocation of the shoulders with asymmetrical fractures of the greater tuberosities in a 42-year-old man who was apparently injured in a head-on collision while travelling in a car as an unstrapped rear seat passenger. This kind of injury pattern in an unrestrained rear seat passenger is very unusual and has not been previously described.

BACKGROUND

Simultaneous bilateral anterior dislocation of the shoulders is a rare clinical entity as compared to bilateral posterior dislocations, with only 30 cases described in the literature, of which 15 were associated with fractures of the proximal humerus.¹ Typical mechanisms for this injury pattern are road traffic accidents or falls from a height, which primarily involve decelerating forces acting on outstretched abducted extremities. Other circumstances that comprise of sudden violent muscular contractions, such as during seizures, epileptic attacks and electrocution, have also been well described² and are more common mechanisms for posterior dislocations. Recently, in developing nations, strict law enforcement and increased awareness towards the practice of wearing seat belts by front seat passengers has considerably reduced the mortality and morbidity in road traffic accidents. However, a similar attitude and approach towards protective measures for rear seat passengers is lacking. We report an atypical scenario of an unrestrained rear seat passenger in a car who sustained isolated asymmetrical bilateral fractures of the greater tuberosities with anterior dislocation of the shoulders in a head-on collision accident.

CASE PRESENTATION

A 42-year-old man was referred to our hospital with a history of bilateral shoulder pain following a road traffic accident. According to the patient, he was travelling in a car that met with a head-on collision with another car while travelling at 80–90 kmph. The patient, being a rear seat passenger and unstrapped, was thrown off his seat, hitting the front seat with an abducted outstretched hand. Owing to the decelerating force of the injury and ample leg room space, he suffered only bilateral fracture dislocations of the shoulders and a small

Figure 1 X-ray of the right shoulder before reduction of dislocation (after injury).

laceration (3×2 cm) on the forehead. He was immediately shifted to a nearby hospital where X-rays revealed bilateral subglenoid type anterior dislocation of the shoulders with asymmetrical greater tuberosity fractures (figures 1 and 2). Both dislocations were reduced under general anaesthesia, with strapped in shoulder immobiliser, and the patient was referred to our hospital for further management. Repeat X-rays (figures 3 and 4) and three-dimensional CT scan (figure 5) at our hospital revealed bilateral reduced shoulder joints with displaced and comminuted fractures of the greater tuberosities (right > left). There was no distal motor, sensory or vascular deficit.

TREATMENT

On the following day, the patient was taken up under general anaesthesia, and both fractured tuberosities were addressed in the same sitting. The

Figure 2 X-ray of the left shoulder before reduction of dislocation (after injury).

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Figure 3 X-ray of the right shoulder joint after closed reduction of the dislocation (joint congruent but fracture comminuted).

Figure 4 X-ray of the left shoulder joint after closed reduction of the dislocation (joint congruent but fracture still displaced).

patient was placed in a beach chair position. First, on the left, open reduction through a split deltoid approach was performed and the fracture was fixed with two 4.0 mm cannulated 16 mm threaded cancellous lag screws with washers (Synthes, USA) under fluoroscopy (figure 6). On the right, open reduction through split deltoid approach was performed. It was observed that the greater tuberosity fracture was thin and comminuted. Hence, a double row repair of avulsion fracture was performed using an anchor in the crater of the fracture along with a footprint anchor (figure 7). Both wounds were closed layer by layer over a drain, and the patient was shifted out in bilateral arm slings.

Figure 5 Three-dimensional reconstruction CT of the shoulder joints (defining displacement and fracture geometry).

Figure 6 Postoperative X-ray of the left shoulder (with 4.0 mm cannulated cancellous screws with washers used).

OUTCOME AND FOLLOW-UP

Postoperatively, on day 1, the patient was encouraged to perform a gentle range of mobilisation motions of bilateral shoulders, elbows, wrists and fingers. He was discharged on the third postoperative day after wound inspection and was advised to continue mobilisation exercises as taught and to use arm slings. The arm slings were discontinued at the fourth week follow-up and the range of motion exercises were increased to 90° of abduction and flexion. The fractures showed good union at the third month follow-up. The patient has returned to his previous clerical job and goes through his day-to-day activities without much difficulty. At the final follow-up at 6 months (figures 8 and 9), Constant score of the right shoulder was 94 and left shoulder 88.

DISCUSSION

High-velocity head-on crashes can be fatal to front seat passengers. Thus, the focus of injury prevention is to have safety measures in the form of seat belts or air bags. Although rear seats are also provided with conventional lap belts or seat belts, these are essentially under-utilised. The practice of wearing them is almost non-existent, especially in developing countries, which are witnessing accidents in epidemic proportions. For rear seat passengers, it is reported that the frequency of injuries are high for the head and lower extremities due to contact with the back

Figure 7 Postoperative X-ray of the right shoulder (with suture anchors used).

of the front seat in addition to whiplash injuries.³ Accordingly, rear seat passengers are as vulnerable as front seat passengers. In most crash tests, dummies are strapped to the seats and the impact of the collision to various body parts are analysed. However, in the real event of a head-on collision, the human body, as a reflex mechanism, projects outstretched arms to protect itself from the impact. Consequently, the risk of injuries to upper extremities is perhaps underestimated in these crash tests. Further, the speed of the vehicles, and position and morphology of the passenger are other crucial factors that determine the type of injury pattern. In the present case, an unbelted rear passenger reflexively attempted to protect himself by projecting both arms outwards. His outstretched abducted arms hit the front seat first followed by his body as a result of inertia,

and the force got transmitted to the upper limbs resulting in bilateral fracture dislocation of the shoulders. Management of such complex injury patterns is predominantly based on the fracture characteristics. A fracture of the greater tuberosity occurs in approximately 10% of dislocations and is usually associated with the humeral head in a subglenoid, low subcoracoid, or subclavicular position.⁴ This tuberosity is *displaced* in approximately 15% of all anterior dislocations.⁵ Minor to moderately displaced *unilateral* greater tuberosity fractures are treated successfully without surgery with reasonably good functional outcomes.⁶ However, in cases of bilateral injuries, early surgical fixation is recommended in order to initiate prompt rehabilitation, facilitating easier personal care and hygiene. Likewise, in the index case, we preferred to carry out surgical fixation of both fractures and initiated early mobilisation of the

Figure 8 X-ray of the right shoulder: last follow-up.

Figure 9 X-ray of the left shoulder last follow-up.

shoulder joints. Otherwise, the risk of stiffness of all joints of the upper limbs in bilateral affection can result in suboptimal functional outcomes.

Learning points

- ▶ This case highlights a very uncommon circumstance resulting in complex injury to bilateral shoulder joints.
- ▶ The advocacy and practice of wearing seat belts by rear seat passengers should be given priority equal to that given to front seat occupants in order to prevent such avoidable injuries.
- ▶ Bilateral fracture dislocation is an indication for surgical fixation of the fractured tuberosities to facilitate timely rehabilitation.

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