

Sideswipes Injuries of Upper Limbs: A Case Series Report and Review of Literature

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ABSTRACT

BACKGROUND: Sideswipe injuries are consequent to object striking an elbow on the window edge of a moving vehicle. It often results in severe soft tissue and bony injuries or partial amputation of the upper limb. Functional outcome in most patients is poor. The aim is to highlight the occurrence and functional outcome of these injuries.

METHOD: In our series we report three cases which presented to us in succession within four weeks.

RESULTS: Two of the patients were passengers of commercial buses while one patient is the driver of a private car. Two were males. All were protruding their arm from the open vehicle window at the time of impact. All presented within five hours of injury. All sustained open fracture-dislocations. All were managed with external fixation and soft tissue cover. They all had poor outcome as evidenced by joint stiffness.

CONCLUSION: The functional outcome of such injuries is usually poor especially if the dominant limb is involved. Therefore the need for prevention cannot be overemphasized. Simple measures like ensuring that no part of the limb is sticking outside a moving vehicle, winding up glass up to mid window level etc will greatly reduce the occurrence of these injuries.

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INTRODUCTION

Sideswipe injuries are consequent to object striking an elbow on the window edge of a moving vehicle¹. The striking force can be another moving vehicle or objects protruding from it¹. Drivers and passengers resting their elbow on the car window or protruding their arm from an open window can sustain severe sideswipe injuries. Although rarely fatal, sideswipe accidents result in severe soft tissue injuries combined with open fracture or partial amputation of the upper limb often complicated by neurovascular injuries². Such injuries occur where roads are narrow and cars are wide². Management involves multiple operations and long rehabilitation periods². Early intervention, stable fixation and repair would provide sufficient stability to allow motion at 7-10 days postoperatively and enhance functional outcome³. Despite a prolonged rehabilitation period, residual deformity and impairment can be expected in most patients and this can prevent return to pre-accident occupation and result in financial

difficulties and reliance on welfare system². Alcohol is a significant contributing factor in sideswipe injury². Few studies have been carried out on this topic⁴. The aim of this case series report is to highlight the occurrence of this frequently devastating but easily prevented injury. Increased awareness of this problem and further recommendations to keep arms within the vehicle, winding up glass mid window level and maintaining safe distance between moving vehicles will greatly reduce the occurrence of these devastating and life changing injuries. In our series we had 3 cases within a period of about 4 weeks.

REVIEW OF LITERATURE

A sideswipe injury usually consists of multiple and a combination of fractures^{5, 6}. They are often open fractures distal to the olecranon¹. It can cause Monteggia fracture dislocation which is fracture of proximal ulna and dislocation of the proximal radioulna joint in the same arm¹. Drivers and passengers resting their elbow on the car window or protruding their arm from an open window can sustain severe sideswipe injuries of the arm either from a collision with a passing vehicle or from the exposed arm striking a fixed object². They included open fractures of the olecranon, the radius and ulna, the ulna and humerus, the humerus and traumatic amputation of the arm⁷. In 30-50% of cases, elbow dislocation is accompanied by concomitant bony injuries⁸. Reported concomitant injury included radial nerve palsies, injuries to the median nerve, ulna nerve and brachial artery⁷. Treatment included irrigation, debridement (repeated if necessary), open reduction and internal fixation, external fixation and delayed amputation⁷. An average of 130° and -10° elbow flexion/extension and 60° and 60° supination/pronation was obtained with reconstruction⁷. The ulna coronoid process and the radial head are particularly crucial to the stability of the elbow joint⁸. Elbow dislocations with involvement of ulnar coronoid process and radial head are complex injury⁸. Their surgical treatment and aftercare need to be handled by a skilled and experienced traumatologist⁸. The precondition for regaining a stable joint with good function is above all early exercise, stable fixation and or reconstruction of the coronoid process and early functional mobilization of the joint⁸. The presence of comminuted fractures associated bone and ligament injuries and post traumatic arthritis affect outcome adversely⁹. The results of elbow dislocations with associated radial head and coronoid fracture are often poor because of recurrent instability and stiffness from

prolong immobilization³. The outcome of concomitant ipsilateral multiple injuries and dislocations of the upper limb is related both to the severity of initial trauma and the treatment¹⁰. Appropriate educational programs, legislation and improvements in traffic conditions, especially rural areas as well as changes in current car design could contribute to preventing these devastating and complex injuries². Divided highways, wider roads, air conditioning and heightened public awareness have decreased the number of patents presenting with sideswipe injuries but overall these changes have failed to finally prevent these injuries in western Australia². The western Australian Road traffic code 2000 regulation 242 classifies a limb protruding from a motor vehicle as an offence that a penalty to the driver and /or passenger of 3 demerits points towards loss of licence². Increased awareness of this problem and further recommendations to keep arms within the vehicle as well as improved car design, legislation and road conditions are factors most likely to decrease the incidence of this frequently devastating but easily prevented injury².

METHODOLOGY

Case series report

Case 1

Mrs. O.U, a 49year old secondary school teacher presented with 5 hour history of crush injury to the left upper limb following RTA. She was hit from the side by an on-coming trailer while driving a Sport Utility Vehicle with her elbow region protruding out of the window of the Vehicle. She then sustained above injury with associated extensive open wound around the elbow region, profuse bleeding, localized pain and swelling and deformity with inability to use the left upper limb. No other symptoms. Examination showed an overweight middle aged woman in painful distress with extensive crush and avulsion injury involving the medial and posterior aspects of the distal arm and proximal forearm. Extensive crushing of the bones of the distal humerus, proximal radius and ulna, and elbow joint disruption with multiple bone fragments. There is intact radial pulse but equivocal ulnar pulse. There is patchy sensation over the hand. There is good capillary refill of the digits. She could move the digits and minimally make a fist.

X-ray of left upper limb showed extensive comminuted fracture of the distal 4th of the humerus, proximal 3rd of the radius and ulna and complete disruption of the elbow joint.

She had examination under general anaesthesia, wound debridement and application of external fixator. She subsequently had a second look debridement and dressings of the wound in the ward. The wound granulated well and was covered with split skin grafting

by co-managing plastic team.

Figure 1: The injury at presentation.



Figure 2: The injury after external fixation.



Case 2

Mr. U.O, a 34year old pharmacist presented with five hour-history of crush injury to the right lower forearm, wrist and back of the hand following road traffic accident. He was a second row passenger of a commercial bus with his forearm and hand placed out of the window of the vehicle. The vehicle had a head- to side collision with another vehicle and lost control somersaulting severally. His right forearm was entrapped by the body of the vehicle thus sustaining the above injury. He had open wound over the posterior aspect of the lower forearm, wrist and dorsum of the hand with associated deformity and moderate bleeding, numbness and inability to use the limb.

Examination showed a young man conscious and alert in painful distress with extensive crush injury over the hand and distal forearm 12cm x12cm. There is complete avulsion of the soft tissue of the dorsum extending from the distal 1/3 of the forearm to the base of the fingers. The extensor tendons were completely crushed and devitalized. There are fractures of the distal ends of the radius and ulna and dislocation of the wrist joint. There is a lot of debris including broken glasses, stone within

the wound.

X- ray of the right hand, wrist and forearm showed comminuted fracture distal 1/3 of the radius and ulna with complete disruption of the wrist joint.

He then had serial wound debridement, groin flap and split Skin graft coverage of the wound. He also had micro external fixator applied to the distal forearm and hand.

Figure 3: The injury at presentation.



Figure 4: The injury after flap cover.



Figure 6: The injury at presentation



Case 3

Mr. M. E, a 60years old farmer presented with about 6 hour history of open wound and deformity of the right elbow and forearm following road traffic accident. He was a front row passenger of a minibus with his right arm resting on the window. The bus had a head-on collision with a saloon car thus his sustaining above injury. There is associated profuse bleeding from the open wound, severe localized pain, abnormal movement of the forearm and inability to use the right upper limb. No loss of consciousness or injury on any other part of the body. Examination showed a middle aged man in painful distress, pale with extensive crush injury of the right forearm exposing fractured radius and ulna with associated equivocal distal radial pulses. The digits were however well perfused, warm and have intact sensation all over .X-ray of the forearm done showed comminuted fracture of the mid shaft of the radius and ulna. He then had examination under general anaesthesia and wound debridement done. This revealed extensive partial avulsion injury of the forearm about 40cm x 30cm extending over the entire distal half of the forearm exposing the crushed flexor and extensor muscles as well as comminuted fractures of the right radius and ulna. He subsequently had serial debridement of the wound with application of external fixator on the radius. The wound is being planned to be covered with split skin graft after adequate granulation tissue formation by the managing plastic surgery team. The fractures will eventually be fixed with intramedullary k-wires for definitive treatment.

Figure 5:x-ray of the distal forearm/wrist



DISCUSSION

The three cases in our series were typically sideswipe injuries. Two were passengers of commercial buses with their arms and forearms protruding from the vehicle window while one is the driver of the vehicle with her arm also protruding from the vehicle window at the time of collision with another vehicle. Two are male and one is a female. They all sustained much comminuted open fracture with severe soft tissue injury including crushing of extensor and flexor tendons and disruption of the adjacent joints (elbow joint in two cases and wrist joint in one case). This agrees with earlier studies reviewed^{2,5,6}. They all presented to our centre within an average of five hours from the time of the incident. They were immediately taken to theatre by the combined team of orthopedic and plastic surgery teams on call for wound debridement and stabilization of the fractured bones with application of external fixators. The open wounds were subsequently covered with flaps and split skin grafts. These timely interventions lead to salvage of the affected limbs. They have been followed up in the outpatient clinic for eight months. However, two of the patients had poor functional outcome with limited range of motion across the elbow joint of less than 30°. These injuries are fairly common in our environment because of several factors like disobedience of traffic laws by drivers and passengers, bad roads, poor state of many commercial vehicles e t c. Several intervention have been shown to decrease the incidence of opposing direction sideswipe crashes in Australia including centerline rumble strips, barriers to separate opposing traffic flow and warning sign². Surveillance cameras, road sensors, variable message sign, ramp meters and traffic operation centers have been found to reduce the incidence of rear end crashes and sideswipe accident in Australia². Other measures include those relating to the interior design of cars, like ergonomic armrests, ratio of door height to window height and window lowering restriction². Although, most of these afore mentioned gadgets and measures are not available in our environment but utmost caution on the part of the drivers, strict adherence to traffic laws by both drivers and passengers as well as proper

legislation/enforcement by the government and public enlightenment by Federal Road Safety Corps (FRSC) and other stakeholders will greatly reduce the occurrence of these devastating and life changing injuries. The need for prevention cannot be overemphasized.

REFERENCES

1. Abdullahi A. Monteggia fracture-dislocation: a case report, its initial management and review of bado's classification. *Africa Health sciences* 2006; 6(4) 252-254.
2. Vera K, Allan P, Micheal N, Rene Z. Sideswipe injuries to the elbow in Western Australia. *Med J Aust*, 2006.184 (9) 447-450.
3. McKee MD, Pugh DM, Wild LM, Schemitsch EA, King GJ. Standard surgical protocol to treat elbow dislocations with radial head and coronoid fractures. Surgical technique. *J Bone joint surg Am*.2005, 87(pt1) 22-32.
4. . Visna P, Kalvachi. J, Beiti E, Pilny J, Gzmar I. Open posterior dislocation of the elbow with fracture of the radial head and coronoid process and multiple diaphyseal fractures of the ulna. *Unfallchirurg*, 2008 Mar, 111(3) 193-6.
5. Crenshaw Jr AH. Sideswipe fracture In: Canale ST ed. *Campbell's Operative Orthopedics*. London: Mosby Inc. 1992;2317-19
6. Mc Rac practical fracture treatment London: Churhill Livingstone, 1981.
7. Raab MG, Lapid MA, Adair D. Sideswipe elbow fractures. *Contemp Orthop*, 1995 30(3) 199-205.
8. Kalicle T, Muhr G, Frangen TM. Dislocation of the elbow with fractures of the coronoid process and radial head. *Arch orthop trauma sury*, 2007; 127(10)925-31.
9. Nalbantoghi U, Gereli A, Kocaghi B, Haklar U, Turkmen M. Surgical treatment of acent coronoid process fractures. *Acta orthop Traumatol Ture*, 2008, 42(2) 112-8.
10. Rogers JF .Bennett JB, Tullous HS. Management of concomitant ipsilateral fractures of humerus and forearm. *J Bone Joint surg* 1984; 66:552-6.