



Case report

Bilateral symmetrical pronation type of Galeazzi fracture following high-speed motor traffic crash: A case report

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ABSTRACT

Introduction and importance: Bilateral Galeazzi fracture is a rare occurrence following trauma. Anatomical reduction of the fracture and the distal radioulnar joint is mandatory for a good outcome.

Case presentation: We present a 24-year-old patient with bilateral Galeazzi fracture following a high-velocity motorbike accident.

Clinical discussion: A motorcyclist presented with bilateral painful deformed forearms following a motor traffic crash. Radiographs of bilateral forearms showed bilateral symmetrical supination type (Type II) Galeazzi fractures. He has undergone open reduction and internal fixation of the bilateral radii. Bilateral distal radioulnar joints reduced spontaneously when the fracture of the radius reduced anatomically. The reduction of the fracture and the distal radioulnar joints was confirmed by postoperative radiographs.

Conclusion: Bilateral Galeazzi fracture is a rare entity following high-velocity injury. Disruption of the distal radial ulnar joint needs to address to achieve a good outcome. An awareness of this entity, early detection, and intervention of this condition may help to regain the full function of the forearm.

1. Introduction

Galeazzi fracture is defined as a distal radius fracture associated with disruption of the distal radioulnar joint. Galeazzi's fracture was initially described by Sir Ashely copper in 1833. But it is named after Ricardo Galeazzi, an Italian surgeon, who published a case series report with 18 cases in 1934 [1]. It is an uncommon injury according to 3% and 7% of forearm fractures in children and adults respectively [2]. Mechanism of injury is axial compression at the wrist with a rotated forearm result in fracture and disruption of the distal radioulnar joint. Most commonly it is an underdiagnosed fracture because of the nature of the injury. In adults, this fracture needs surgical fixation to neutralize deforming forces acting around it. We shared our experience in managing bilateral Galeazzi fractures which had been managed with fixation simultaneously.

This case report has been written according to the SCARE 2020

guideline [3].

2. Case history

24-year-old, previously healthy male presented to the accident and emergency department with a history of road traffic accidents. He was a motorbike rider knocked down by a speeding motor car from behind and thrown on the road. He landed on outstretched hands. He was complaining of both forearm pain, swelling, and deformity. He was hemodynamically stable, and his neurovascular status of both limbs was normal. Initial orthogonal radiographs of both forearms with wrist joint revealed bilateral pronation type Galeazzi fractures. His forearm was splinted, and subcutaneous morphine was instituted to alleviate pain. He was planned to undergo open reduction and internal fixation on the same day.

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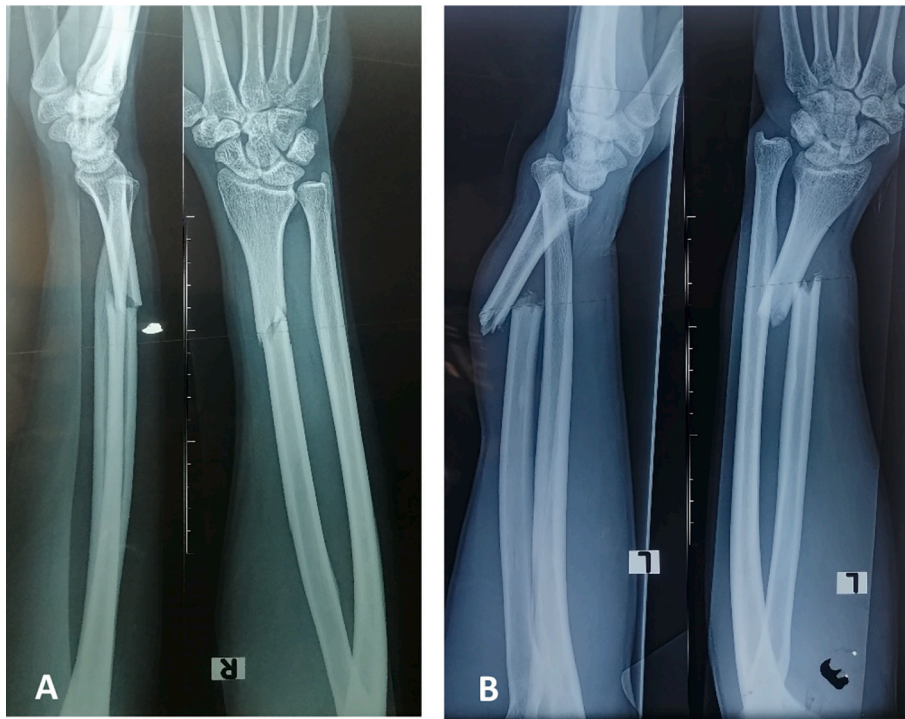
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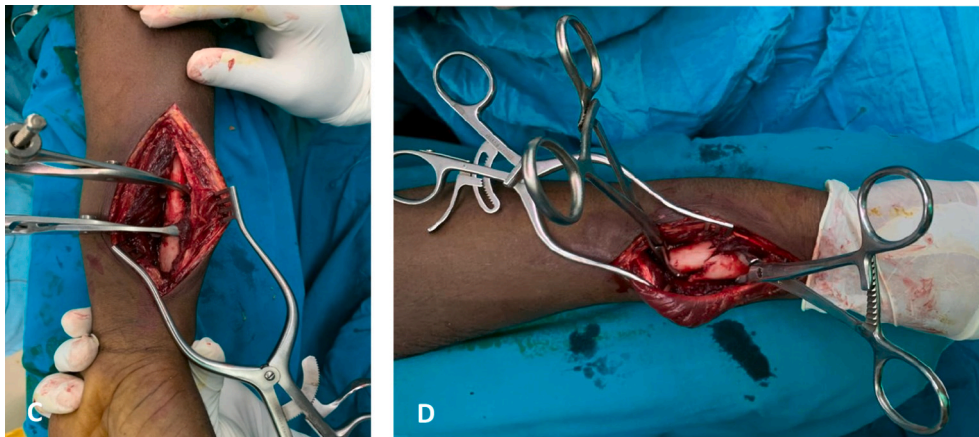
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Figs. A and B. shows right and left dorsal Galeazzi fractures of bilateral forearms. The left side fracture and distal radio ulnar joint are displaced more than the contralateral side denote the severity.

Surgeries were performed simultaneously under general anesthesia by four experienced specialty registrars. The fracture sites reached through standard Hendry's approach.

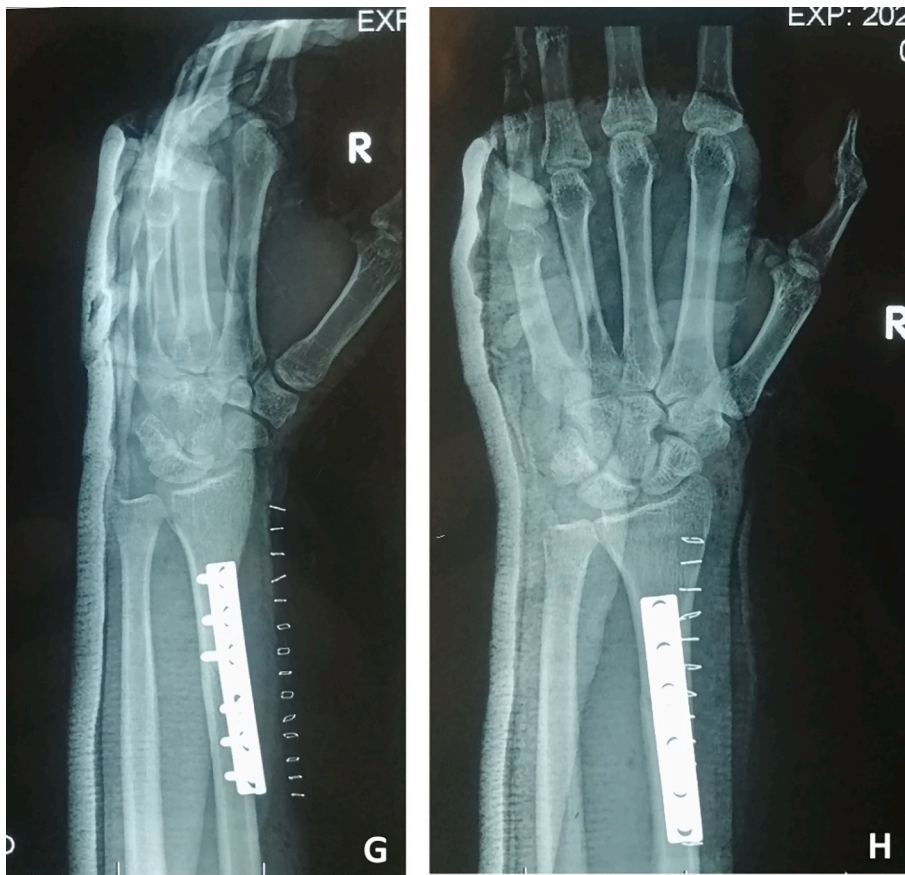
Fractures anatomically reduced and fixed with 6-holed and 7-holed Dynamic compression plates (Synthes®) on right and left sides respectively. Reduction of the fractures and distal radioulnar fractures confirmed by intraoperative fluoroscopic assessment and post-operative radiographs.



Figs. C and D. are showing intra operative views of left and right radii during reduction of the fractures.



Figs. E and F. are showing post-operative radiographs of left forearm showing good reduction of both radius fracture and the distal radio ulnar joint,



Figs. G and H. are post-operative radiographs of right forearm showing good reduction of both fracture of the radius and the distal-radioulnar joint.

The bilateral above-elbow back slab was applied for 3 weeks duration and then a range of motion exercises of elbow, wrist, and shoulder was initiated. The patient was followed up in the clinic monthly with repeated orthogonal radiographs that showed radiological evidence of healing. The patient achieved a full range of movement and radiological evidence of healing on his 10th-week post-operative review.



Above clinical pictures were taken during clinic visit at 10th week after surgery. Patient has gained full range of pronation and supination movements.

3. Discussion

Galeazzi fracture is an uncommon injury among forearm fractures. It is also described as a reverse Monteggia fracture in literature [4]. It has a bimodal distribution among children (3%) and adult populations (7%) [2]. Bilateral Galeazzi fractures can be associated with high-velocity motor vehicle accidents, which warrants exclusion of life-threatening and limb-threatening injuries according to the ATLS protocol.

Both proximal and distal radio-ulna joints move together as radius and ulna bones are tightly bound together by interosseous membrane ligament complex [4]. The distal radio-ulna joint is stabilized mainly by the triangular fibrocartilage [5]. Length variation following fracture of one of these bones may cause instability of both joints. The distal radius fracture with a high-velocity injury disturbed the triangular fibrocartilage and dislocate the distal radioulnar joint. The junction between the middle and distal third of the radius is more vulnerable to fracture because of peculiar characteristics of cross-sectional properties of cortical bone and the distribution of mineral contents at this site [5].

Galeazzi fractures are classified initially by the mechanism of injury and position of distal radius by Walsh [6].

Type 1	Dorsal displaced distal radial fragment with a volar dislocation of the distal ulna
Type 2	Volar displaced distal radial fragment with dorsal dislocation of the distal ulna

Type 1 fractures typically result from an axial force at the extended wrist with maximum supinated arm whereas Type 2 injuries occur following axial compression on a pronated forearm. Type II fractures are commoner in pediatric populations.

Rettig and Raskin classified these fractures based on the site and the

intraoperative stability of the distal radio-ulna joint [7].

Type 1	Fracture of the radius is within 7.5 cm from the midpoint of the articular surface of the distal radius; Unstable distal radio ulna joint in intraoperative assessment.
Type 2	Fracture of the radius occurred beyond 7.5 cm from the midpoint of the articular surface of the distal radius and the distal radioulnar joint is mostly stable when checked intraoperatively.

The presentation may vary according to the age of the patient. Children and elders will present with simple falls, adults will present

following a history of high-speed motor vehicle accidents or sports injuries. The initial evaluation should include ATLS protocol in suspected patients to exclude other life-threatening injuries. In addition, initial management also includes splinting and providing adequate analgesia. The definitive management varies again with the age of the patient. In children, manipulation under anesthesia and above the elbow, cast immobilization provides successful results whereas, in adults, an open reduction and internal fixation are required to achieve good results [8].

After osteosynthesis, an intraoperative examination of the distal radial ulna joint should be performed to assess the stability of the joint. Stable distal radio ulna joint can be immobilized with a long arm cast for three weeks. Irreducible distal radioulnar joint needs open reduction and fixation through the dorsal approach. Ulnar styloid fracture and triangular fibrocartilage complex injuries are the commonest problems associate with the unstable distal radio ulna joint which also need to be addressed during surgery [8].

Complications like median nerve neuropathy, Nonunion, malunion, infection are rare [9]. Malunion with a chronic instability to the distal radioulnar joint is often due to missed diagnosis or inappropriate treatment [4]. Patients with chronic malunited radius with the instability of distal radio ulna joint presented with chronic pain, swelling, instability, limited rotational movement at the wrist, and loss of grip strength [10]. Salvage techniques such as sauve-kapandji, darrach procedures have been described in the literature for chronic unstable distal radioulnar joint [11].

Campbell describes this injury as a fracture of necessity because of the complex nature of the injury that required surgical fixation in the adult population to achieve a good functional outcome [13]. According to Walsh, outcomes following nonoperative management for pediatric Galeazzi fractures are good. But 80% of the adults with Galeazzi fracture produced unsatisfactory results following nonoperative management [12]. Contrary, open reduction and internal fixation had shown excellent results in 95% of the adults with this type of fracture [7].

4. Conclusion

The Galeazzi fracture comprises two-component, the radial shaft fracture and the dislocation of the distal radio ulna joint. Bilateral symmetrical Galeazzi fracture can be a challenge to the orthopaedic surgeon as it can be easily missed. So, careful clinical assessment, appropriate radiological examination, and precise surgery will reproduce this good functional outcome.

Informed consent

Informed written consent was obtained from the patient for publication of the data and clinical images. A copy of the written consent is available for review by the Editor-In-Chief of this journal on request.

CRedit authorship contribution statement

Dishanth Sivakumaran, Kalaventhath Pathinathan, SR. Madushanger, WHD. Dimantha, PMP. Gunawardena and Dilshan Munidasa (Clinical supervisor) have equally contributed to the concept, design, data collection, and writing of this case report.

Declaration of competing interest

All authors disclose any financial and personal relationships with other people or organizations that could inappropriately influence their work.

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Guarantor

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