

# Ipsilateral Combination of Galeazzi and Monteggia Fractures in a Ten-year-old Patient. Case Report

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## SUMMARY

Galeazzi fractures represent approximately 3 to 6 percent of forearm fractures, whereas Monteggia fractures represent 1 to 2 percent. The combination of these injuries in the same extremity is an exceedingly rare occurrence. We report a case of ipsilateral combination of Galeazzi and Monteggia fractures in a ten-year-old patient. The patient was treated with closed reduction and internal fixation with Kirschner pins. The distal radioulnar and radiocapitellar joint relationships were restored and the fractures healed. The patient proceeded to obtain a satisfactory functional result three years later. Internal fixation is a safe method for such complex forearm fractures in older children and allows post-operative rehabilitation with the advantage of early mobilization.

**Key words:** Forearm fractures, Monteggia, Galeazzi, combination fractures

## BACKGROUND

In any isolated fracture of the radius, disruption of the DRUJ should be suspected. Galeazzi fractures represent approximately 3 to 6 percent of forearm fractures, whereas Monteggia fractures represent 1 to 2 percent. The combination of these injuries in the same extremity is an exceedingly rare occurrence and an Essex-Lopresti fracture is also reported [1]. The results of operative treatment are much better. The Galeazzi injuries involving a fracture of the shaft of the radius complicated by dislocation of the distal radioulnar joint are rare injuries and are unstable in the same way that Monteggia lesions are [2,3]. In addition, the forces of the brachioradialis, pronator quadratus, and extensor of the thumb tend to shorten the radius and rotate it toward the ulna [4]. The stabilizing influence of the distal radioulnar joint is lost [3]. Anatomic reduction and rigid internal fixation of the radius with or without stabilization of the distal radioulnar joint is the accepted standard of treatment [2,3,4,5].

Monteggia fracture-dislocation is an elbow trauma that constitutes less than 5% of upper extremity fractures. It is described as a radio-humeral dislocation associated with a diaphyseal ulnar fracture. It is seen more commonly in children compared to adults [6]. The standard treatment is anatomic reduction and rigid fixation of the ulna with anatomic reduction of the radial head [7,8].

Ipsilateral combination of Galeazzi and Monteggia fractures is an exceedingly rare occurrence. We report a case of ipsilateral combination of Galeazzi and Monteggia fractures in a ten-year-old patient. The patient was treated with closed reduction and internal fixation with Kirschner pins. The distal radioulnar and radiocapitellar joint relationships were restored and the fractures healed. The patient proceeded to obtain a satisfactory functional result three years later.

## CASE REPORT

The patient was a ten-year-old schoolboy who sustained an injury to his left extremity after falling approximately five meters from a wall onto his outstretched left upper extremity. He was examined in the emergency department, where an evident deformity of the extremity was noted. In addition to discomfort and swelling at the fracture sites, he also had localized tenderness at the distal radioulnar joint and forearm. His vascular pulse was palpable and there was no neurological deficit.

Radiographs showed a displaced fracture at the proximal third of the ulnar shaft with a displaced radial neck fracture (Monteggia fracture equivalent). In addition, there was a fracture of the distal radius associated with disruption of the distal radioulnar joint (Galeazzi fracture) (Fig. 1,2,3).

The patient was taken to the operating room as an emergency. We performed the operation under the guidance of C arm fluoroscopy. The ulnar shaft fracture was reduced in a closed manner and fixed by K wire. Then we attempted to reduce the radial neck in a closed manner too, but we did not achieve enough alignment. Therefore, we carried out a mini open procedure to reduce and fix the radial neck. The distal radial fracture was reduced and fixed by K wire in a closed manner. Finally, the distal radioulnar joint was reduced with the limb in full supination (Fig. 4).

After the surgery, the upper extremity was placed in a splint with the elbow at 90 degrees of flexion and the forearm in full supination. The patient was discharged from the hospital two days later. He came to the department ten days later for suture removal. The patient and his parents were encouraged to start active and passive rehabilitation. Radiographs showed maintenance of the reduction of the distal radioulnar joint and a normal radiocapitellar relationship. The K wires were removed four weeks later. He started physical therapy. A short arm brace was then

Fig. 1. Preoperative antero-posterior X-ray. Ipsilateral Monteggia and Galeazzi fractures

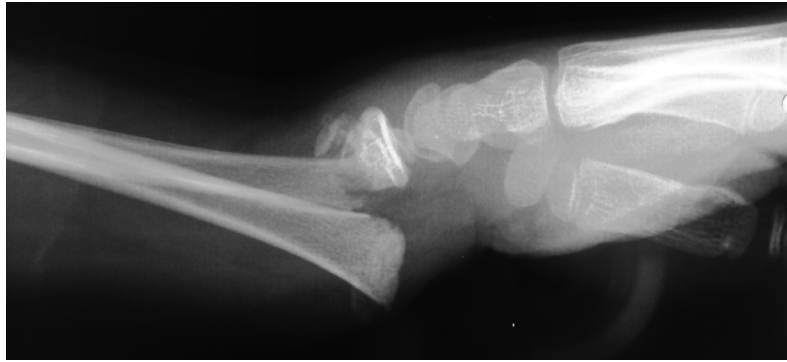


Fig. 2. Preoperative lateral X-ray of wrist



Fig. 3. Preoperative lateral X-ray of elbow

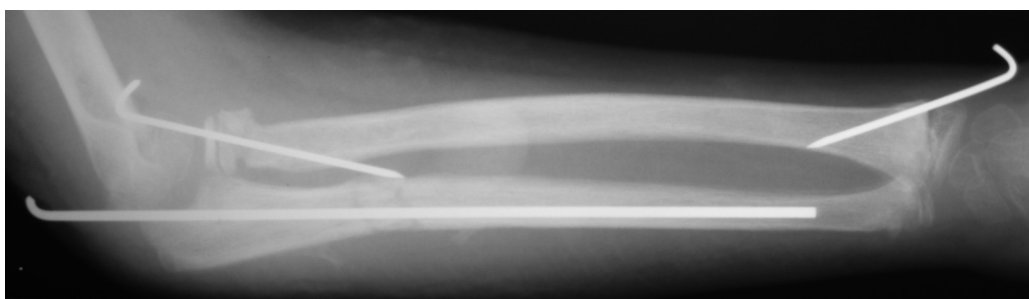


Fig. 4. Postoperative view of forearm

used to support the forearm for two weeks. After four months of follow-up, the patient regained full flexion and extension of the elbow, and regained full supination and pronation of the forearm (Fig. 5).

## DISCUSSION

The relation of the forearm bones is similar to the relation of the pelvic rings. Thus, isolated fractures of radius and ulna are rare. Especially, the distal radioulnar joints should be carefully inspected in a distal radius fracture [9]. The fractures in our case

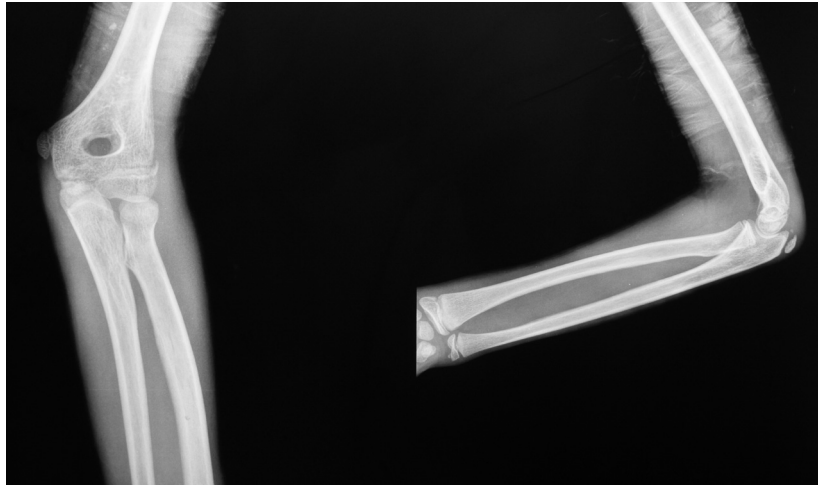


Fig. 5. Postoperative X-ray 4 months later

support this view: there was a fracture of the distal radius associated with disruption of the distal radio-ulnar joint (Galeazzi Fracture), and a radial neck fracture at proximal, disrupted radiocapitellar relation and an ulnar fracture (Monteggia fracture equivalent) with a change in the length of ulna and radius ratio. Association of these two fracture patterns is also uncommon. A literature search for Monteggia and isolated Galeazzi fractures will reveal different rates among children and adults [2,10,11]. However, being even rarer, an ipsilateral combination of Monteggia and Galeazzi fractures is seen in older children and adults [12,13,14,15]. Likewise, in our case, our patient with an ipsilateral combined Monteggia and Galeazzi fracture was a 10-year-old pre-adolescent.

The occurrence of these fractures is the result of falls that outstretch upper extremity and cause extreme forearm pronation, as was the case with our patient [3,12]. Giangarra and Chandler reported that a Galeazzi fracture occurs when the forearm is forced to supinate with an axial trauma after a fall on a fully extended elbow [16]. Yet, the occurrence of Monteggia and Galeazzi fractures both in the same extremity and at the same time is only possible in severe traumas like ours [2,12,17]. It is reported that in severe traumas, an axial force acting on the forearm in mid-pronation causes a Galeazzi fracture and the same force reaches the fully extended elbow in proximity, leading to a fracture or displacement of the radial head. Moreover, an ulnar fracture is caused by the force in the interosseous membrane.

It is stated that posterior interosseous nerve compression is observed in 11% of Monteggia fractures and most of the patients recover within six months [18]. We did not experience such a problem in our case.

In forearm fractures, especially unstable fractures resulting from a high-energy trauma, compartment

syndrome is very common [19]. In such cases, limb elevation happens to be the fundamental rule to be obeyed [15]. In a Philadelphia based study, it was found that after the surgical treatment of forearm fractures in 149 older children, compartment syndrome was seen in 14.6%, and delayed fracture union and undesirable outcomes were observed [20]. Our patient was followed closely due to the possibility of compartment syndrome. Elevation and cold therapy, which are our routine treatments for limb traumas in our department, were applied in this case as well. In addition, a combination of Rheomacrodex (250 ml) and Trental (pentoxifylline) (100mg/5ml) was intravenously applied to improve circulation in 24 hours since this was our routine protocol for such injuries involving a swollen and sensitive forearm.

Conservative treatment methods are preferred in children while surgical procedures are still the choice in older patients [8,10]. However, conservative methods in older children include closed reduction, percutaneous fixation, open reduction, internal fixation and their combinations in the literature [2,3,15]. Some authors strongly recommend anatomic reduction and internal fixation for Monteggia and Galeazzi fractures [15]. In our case, the radial neck fracture was reduced by an open mini-incision and fixed by percutaneous fixation. The distal radial and ulnar fracture was fixed by closed reduction percutaneous fixation. The radioulnar dislocation was closed-reduced in full supination.

## CONCLUSION

Internal fixation is a safe method for such complex forearm fractures in older children and allows post-operative rehabilitation with the advantage of early mobilization.

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