

Long-Term Follow-Up of the Monteggia Lesions recent in Children: An 11-Year Experience

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ABSTRACT

Introduction: Monteggia' lesions account for 1.5 to 3% of elbow fractures in children. The aim of this study was to describe the management and evolution of recent Monteggia' lesions in children, based on 11 years of experience.

Patients and Method: This was a descriptive and retrospective study over 11 years covering the children admitted and managed for a recent Monteggia' lesion. We collected and analysed the clinical, radiological and therapeutic data of the patients, and monitored their progress with an average follow-up of 6 years.

Results: 23 children were included. The mean age was 7 years, with a predominance of boys. The mechanism was indirect in 78.27%, involving the left upper limb in 73.92%. There were 18 pure Monteggia' lesions and 5 Monteggia' like. Our management was surgical in 16 cases. In the long term, the complaint reported was residual pain on prolonged use of the limb. One patient had limited extension to 140° and supination to 60°, a residual subluxation in an and, two residual angulation deformities of the ulna. There was no long-term recurrence of dislocation or necrosis of the radial head. The final result was good.

Conclusion: Although the Monteggia' lesion and its equivalents are specific and potentially serious fractures in children, early and appropriate management offers good results.

INTRODUCTION

Monteggia lesions account for 1.5 to 3% of elbow fractures in children [1]. In 1814, the first injury described was a fracture of the proximal 1/3 of the ulna associated with anterior dislocation of the radial head [2]. Malgaigne [3] reported 40 years later that this ulnar fracture in any of its segments could be associated with dislocation of the radial head. It is thus accepted that the Monteggia' lesion is not an isolated lesion but rather a group of lesions associating a dislocation of the radial head with an ulnar fracture. In 1967, J.L. Bado [4] classified this group of lesions according to the direction of dislocation of the radial head and angulation of the ulnar fracture into 4 groups of basic lesions. Then another group of lesions with similar characteristics which he called the Monteggia' like lesion such as the fracture of the radial head associated with a fracture of the ulna. Currently, proximal fractures of the ulna or olecranon associated with dislocation or subluxation of the radio-humeral joint are considered to be equivalent to the Monteggia' lesion [5].

Although widely debated in the literature, their diagnosis is still a challenge, especially when dislocation of the radial head and/or displacements are not obvious. 77% of errors in the management of fractures in children are found in fractures of the elbow region [6].

The aim of this study was to describe the management and evolution of the recent Monteggia' lesions in children over an 11-year period.

PATIENTS AND METHOD

This was a descriptive, retrospective study covering 11 years (2010-2021). We included all children admitted and managed for a Monteggia' lesions in our training. We excluded neglected Monteggia' lesions. We collected and analysed the patients' socio-demographic, clinical, radiological and therapeutic data. All patients underwent frontal and sagittal Xplane radiograph. We used the classification of J.L. Bado [4] to classify the Monteggia' lesion and that of Judet [7] for fractures of the radial head. Treatment was divided into 3 types depending on the type of fracture and the degree of displacement.

- Non surgical: Orthopaedic (external reduction + cast),
- Surgical: reduction + plate,
- surgical: reduction + Elastic stable intramedullary nailing.

We monitored the clinical and radiological evolution with a mean follow-up of 6 years. We used the Bruce criteria modified by Letts [8] to assess the final result. The overall result was considered excellent for a score of 100, good between 95 and 99, fair between 80 and 94 and poor < 80 .

The data were entered and analysed using Epi Info 7.2.2. Quantitative variables were represented as means with extremes, and qualitative variables as percentage proportions. The Student's t test was used to look for a possible association between the type of fracture (variable of interest) and the age and sex of the patients.

Ethical considerations: We respected ethical principles and none of the images allowed patients to be identified.

RESULTS

23 children met our criteria. We excluded 3 neglected Monteggia lesions and 4 incomplete files. The mean age was 7 years [2-14 years] and boys represented 60.87% of the series. The mechanism was indirect in 78.27% of cases, involving the left upper limb in 73.92%. High-energy trauma

(fall from a height of more than 2 metres, public air way) was encountered in 16.67%. We found 18 pure Monteggia' lesions, of which type I represented 66.67%, type III 33.33%, and 5 Monteggia' like. These latter ones were characterised by 4 fractures of the radial head associated with a fracture of the ulna and one radio-humeral dislocation associated with a fracture of the olecranon. One of the radial head fractures was stage 2, one was stage 3, and two cases were very unusual in that the radial head remained in place and the distal part of the radius was very displaced (Figure 1 a,b). One patient had another fracture of the distal 1/4 of the radius.



Figure 1: Two particular cases of lesions equivalent to the Monteggia lesion with the radial head remaining in place and the distal segment highly displaced on standard radiography (face and profile). Patient 1 (a) and Patient 2 (b).

Comparing the type of fracture with age, sex and mechanism, we found a difference in the mean age between the three groups. For Monteggia type I lesions and Monteggia' like 7.3 years versus 6.8 years for Monteggia type III lesions. However, this difference was not significant (P-value 1.03).

16 patients underwent uneventful surgical treatment and, 7 patients non surgical treatment. Surgical treatment consisted of 11 plate osteosynthesis of the ulnar fractures, 4 Elastic stable intramedullary nailing of the two bones of the forearm and,

one Elastic stable intramedullary nailing of the ulna. The average time to removal of the osteosynthesis material was 6 months.

For associated injuries, an Elastic stable intramedullary nailing was performed for the tibia fracture and a Kapenji-type reduction for the fracture of the distal 1/4 of the radius. The early course was marked by an infection at the surgical site, exposing the osteosynthesis material (Figure 2), which led to its removal at 22 days after surgery and, the insertion of a posterior splint. The patient had a good outcome with no

After a mean follow-up of 6 years, there was no recurrence of dislocation or necrosis of the radial head.



Figure 2: Clinical image of a postoperative complication. with infection of the surgical site and exposure of the osteosynthesis material. Very good radiological evolution with control radiographs at 6 months (e).

In the medium term, a patient who had a type III Monteggia' lesion treated orthopaedically presented with a recurrence of the Monteggia' lesion with an iterative fracture of the ulna 3 months later. A plate was fitted and orthopaedic reduction of the dislocation. Very good radiological evolution (Figures 3a,b,c,d,e). In the long term, she developed an extension deficit of the 4th and 5th fingers with good improvement under physiotherapy (Figures 4).

According to Letts' criteria [8], 78.26 % of our patients had a good to excellent score. Only 5 patients (21.74%) reported complications. The complaint reported was residual pain on prolonged use of the limb. One patient had limited extension to 140° with limited supination to 60°, a residual subluxation in an old Type III lesion (Figure 5), and two residual angulation deformities of the ulna.

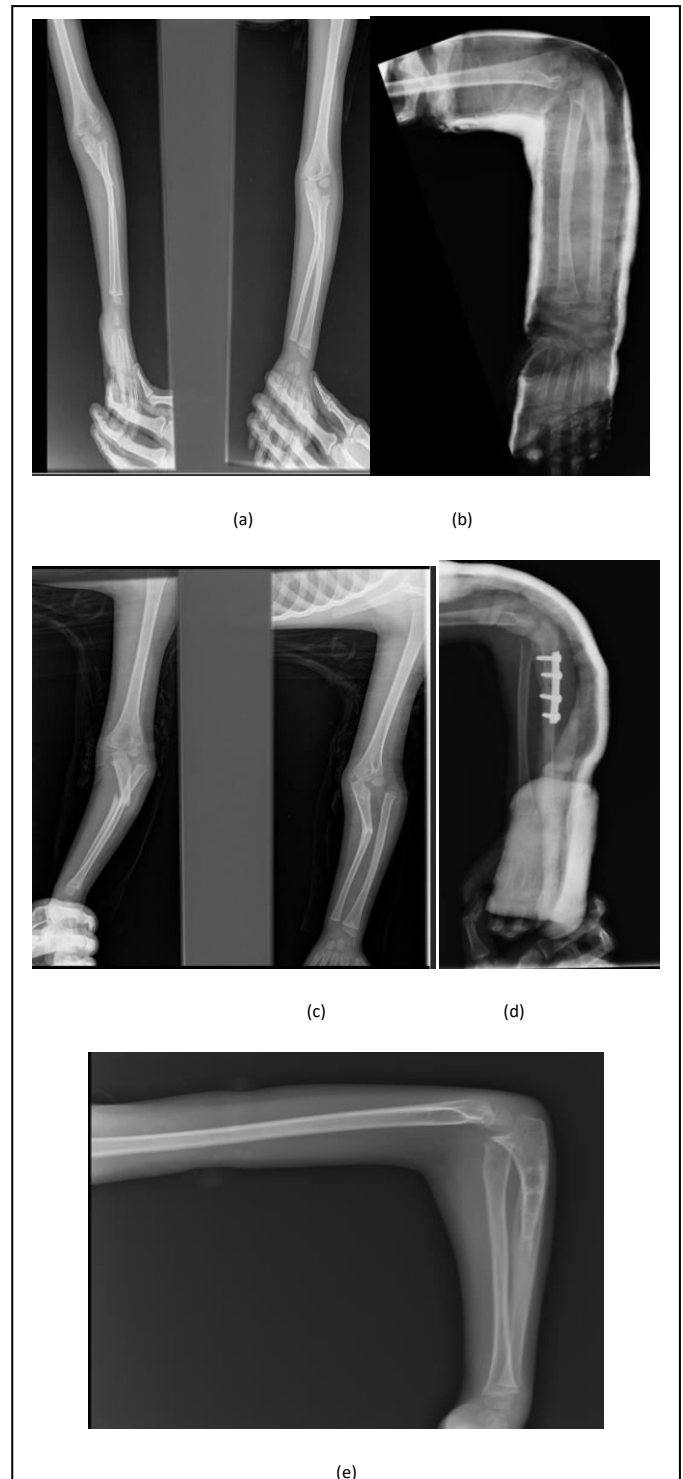


Figure 3(a, b, c, d, e) : a patient who had a type III Monteggia' lesion (a) treated orthopaedically presented with a recurrence of the Monteggia' lesion with an iterative fracture of the ulna (b) 3 months later. A plate was fitted and orthopaedic reduction of the dislocation (c). Very good radiological evolution (d).

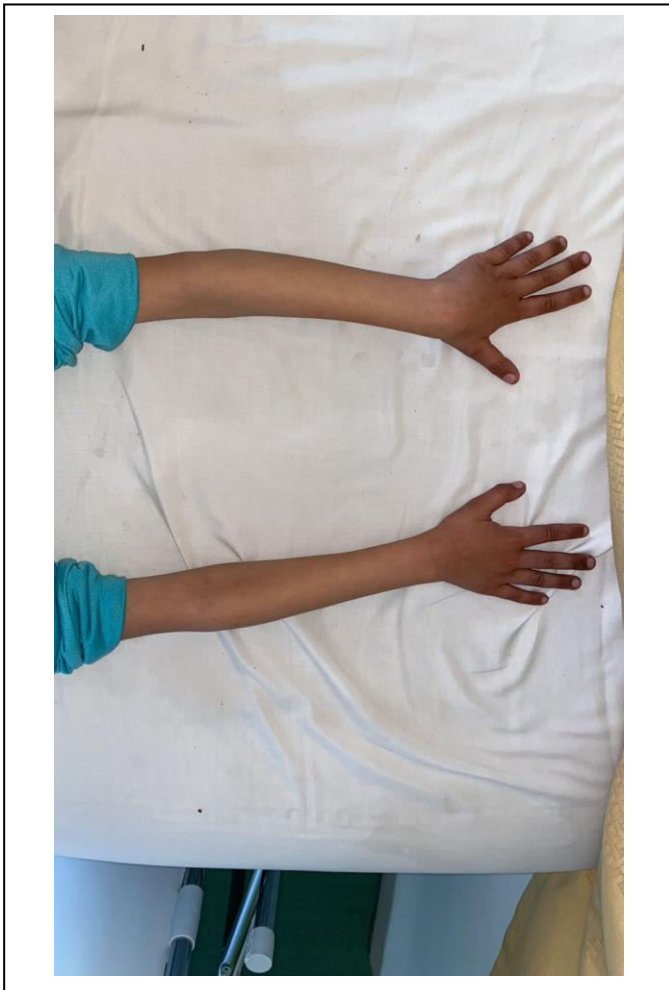


Figure 4: Clinical picture of the same patient as in figure 3: In the long term, she developed an extension deficit of the 4th and 5th fingers, which progressed well with physiotherapy.

DISCUSSION

The Monteggia' lesions are rare in children, with a peak in frequency between the ages of 4 and 10 years [9-11]. The average age of our patients was within this range, and the predominance of males is unanimously acknowledged, as in all paediatric traumatology [11]. Initially, Monteggia' lesions were thought to be the result of direct trauma. However, in the light of the work of Evans (1948) and Bado (1962), this idea has been revised and it is unanimously accepted that the majority of these injuries result from an indirect mechanism involving torsion of the forearm [2,5]. In our series, 78.27% of fractures were secondary to an indirect mechanism.

Bado type I [4] was found in more than half the cases. This result corroborates the data in the literature [10]. However, no type II or IV fractures were reported in our series. Type III fractures accounted for 33.33% in our series, compared with

1/18 cases in the series by H. B. Çevik et al [11]. Monteggia' like lesion include a non-exhaustive list of specific and sometimes exceptional lesions, such as the case of 2 of our patients where the radial head remained in place and the distal part of the radius was very displaced. The proportion of Monteggia' like lesion was 5/23 in our series, compared with 2/23 in that of J.R. Hetthéssy et al [10] and 14/18 in that of H.B. Çevik et al [11].



Figure 5: Standard radiological image showing subluxation of the radial head with residual angulation of the ulna for an old Monteggia type III lesion: initial at 2 years later.

The non-negligible frequency of unstable or even impossible reduction and the increased risk of recurrence mean that surgical treatment is the preferred option. It has the advantage of offering a stable anatomical reduction and avoiding the need for too close monitoring with multiple plane radiograph to check the orthopaedic treatment. The surgical attitude is over

50% in series: 16/23 in our series compared with 13/23 in that of J. R. Hetthéssy et al [10] and 28/40 in that of Nizar Sahnoun et al [12].

Complications in our series were infection of the surgical site exposing the osteosynthesis material (1/23), medium-term recurrence (1/23), extension deficit of the 4th and 5th fingers (1/23), residual pain (8/23), and limitation of extension and supination (1/23), Residual subluxation (1/23), residual ulnar angulation (2/23).

Residual subluxation with ulnar angulation was observed in a Monteggia lesion treated by external reduction followed by plaster cast. The second ulnar angulation was observed in a fracture treated with Elastic stable intramedullary nailing. Complications reported by Čepelik M [13] included compartment syndrome, radial nerve damage, delayed consolidation and ulna valgus. The long-term outcome is very favourable in Monteggia' lesions and its recent equivalents. As in the literature [13], we found an overall satisfactory outcome with a score of good to excellent in 87.33% of cases.

CONCLUSION

The Monteggia' lesions are unusual, rare and potentially serious fractures in children. Although the overall result is generally satisfactory, there are significant complications which must be prevented and investigated throughout the follow-up. Early and appropriate management offers good results.

AUTHORS' CONTRIBUTIONS

All the authors contributed to the work.

CONFLICTS OF INTEREST

None

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