



POSNA

The Core Curriculum

Monteggia fractures

Objectives

1. Define Monteggia fracture; Monteggia equivalent fracture
2. Discuss a useful classification for analysis of Monteggia fractures
3. Describe the pathologic anatomy of a Monteggia fracture
4. Describe treatment of acute Monteggia and Monteggia equivalent fractures
5. Discuss treatment of a fracture with an (unrecognized or redisplaced) unreduced radial head seen at one week after injury. At one month after injury. At six months after injury

Discussion point

1. In what position should the elbow be casted after closed reduction of a Monteggia fracture?

Discussion

The nomenclature of Monteggia fractures has been obfuscated throughout the century and other classification systems for radial head fractures accompanied by ulnar injuries have been proposed from time to time. For better or worse, the term "Monteggia fracture" appears embedded in the literature, so it makes sense to live with it. Basically, dislocation of the radial head accompanied by ulnar fractures or plastic deformation qualify as Monteggia fractures. Virtually all discussions of pediatric Monteggia fractures mention the "Monteggia equivalents" described first by Bado in mid-century. I will admit at the outset to a preference for the simple classification proposed separately by Wiley and Ring, of describing the displaced position of the radial head which reduces the list to 3 - anterior, lateral, and posterior. The posteriorly displaced radial head is rare in children. The proximal radioulnar ligaments are, by definition, ruptured in a Monteggia fracture. The transolecranon fracture with displacement of the radial head with the distal ulnar fragment is more accurately classified as a fracture-dislocation of the elbow if the definition is to stick. One can find many additional classifications in standard pediatric fracture texts.

The elbow is extended at injury, with at least some pronation included in the injuring force, as the ulnar displacement increases, the radial head is levered out of joint. Generally, a good inspection of 2 radiographs of the entire forearm, truly made with 90 degrees of rotation between the two studies, will make the mechanism of injury to the radial head quite obvious, and also make obvious the manipulation of the ulna necessary to allow reduction of the radial head. In greenstick fractures or plastic deformation of the ulna, closed reduction followed by maintaining the elbow in flexion and some supination will suffice. More difficulty can follow when the ulnar fracture is complete and unstable. A closed reduction with immobilization that maintains ulnar alignment and length is perfectly satisfactory. The surgeon must decide if he/she is capable of achieving that; if not, either percutaneous or open reduction of the ulna fracture with intramedullary or open reduction is

indicated. Short oblique fractures are more amenable to closed reduction and intramedullary fixation, short plate fixation is presently favored for long oblique fractures. If ulnar length and alignment is achieved and maintained, reduction of the radial head is not much of a problem.

Complications include loss of reduction of the ulna, loss of reduction of the radial head, and late diagnosis in addition to the expected small incidence of wound problems related to open surgery or intramedullary pins. Treatment of the late dislocation remains somewhat unsettled. It is probably fair to say that the primary emphasis should still be on maintaining length and alignment of the ulna. Several procedures have been described for reconstruction of the annular ligament, with varying rates of success. In a child, it would seem reasonable to assume that accurate reduction would be a primary goal, and ligamentous reconstruction a secondary goal. Open reduction is essentially always necessary to achieve after a period of 2-4 weeks have elapsed since injury.

References

1. Best TN. Management of old unreduced Monteggia fracture dislocations of the elbow in children. *Journal of Pediatric Orthopedics* 1994;14(2):193-9.
2. Devnani AS. Missed Monteggia fracture dislocation in children. *Injury* 1997;28(2):131-3.
3. Dormans JP, Rang M. The problem of Monteggia fracture-dislocations in children. *Orthopedic Clinics of North America* 1990;21(2):251-6.
4. Fowles JV, Sliman N, Kassab MT. The Monteggia lesion in children. Fracture of the ulna and dislocation of the radial head. *Journal of Bone & Joint Surgery - American Volume* 1983;65(9):1276-82.
5. Givon U, Pritsch M, Yosepovich A. Monteggia lesion in a child: variant of a Bado type-IV lesion. A case report [letter; comment]. *Journal of Bone & Joint Surgery - American Volume* 1997;79(11):1753-4.
6. Letts M, Loch R, Wiens J. Monteggia fracture-dislocations in children. *Journal of Bone & Joint Surgery - British Volume* 1985;67(5):724-7.
7. Olney BW, Menelaus MB. Monteggia and equivalent lesions in childhood. *Journal of Pediatric Orthopedics* 1989;9(2):219-23.
8. Papavasiliou VA, Nenopoulos SP. Monteggia-type elbow fractures in childhood. *Clinical Orthopaedics & Related Research* 1988(233):230-3.
9. Pugh DM, Galpin RD, Carey TP. Intramedullary Steinmann pin fixation of forearm fractures in children. Long-term results. *Clinical Orthopaedics & Related Research* 2000(376):39-48.
10. Ring D, Waters PM. Operative fixation of Monteggia fractures in children. *Journal of Bone & Joint Surgery - British Volume* 1996;78(5):734-9.
11. Ring D, Jupiter JB, Waters PM. Monteggia fractures in children and adults. *Journal of the American Academy of Orthopaedic Surgeons* 1998;6(4):215-24.
12. Rodgers WB, Waters PM, Hall JE. Chronic Monteggia lesions in children. Complications and results of reconstruction. *Journal of Bone & Joint Surgery - American Volume* 1996;78(9):1322-9.

13. Seel MJ, Peterson HA. Management of chronic posttraumatic radial head dislocation in children. *Journal of Pediatric Orthopedics* 1999;19(3):306-12.
14. Stoll TM, Willis RB, Paterson DC. Treatment of the missed Monteggia fracture in the child [see comments]. *Journal of Bone & Joint Surgery - British Volume* 1992;74(3):436-40.
15. Weisman DS, Rang M, Cole WG. Tardy displacement of traumatic radial head dislocation in childhood. *Journal of Pediatric Orthopedics* 1999;19(4):523-6.
16. Wiley JJ, Galey JP. Monteggia injuries in children. *Journal of Bone & Joint Surgery - British Volume* 1985;67(5):728-31.