

**Compartment Syndrome in Pediatric Monteggia Fractures and Equivalents**

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**Purpose:** Diagnosing compartment syndrome (CS) requires providers to have appropriate clinical suspicion. In the current literature, CS is not commonly associated with Monteggia fractures (MFs) or Monteggia equivalents (MEs). The aim of this study was twofold: (1) to determine the incidence of CS among patients with MF/ME, comparing this to the incidence of CS in Type 3 supracondylar humerus (T3-SCH) fractures; and (2) to determine which patients with MF/ME are at a higher risk for CS.

**Methods:** A retrospective review was performed on children ages 2-12 years with MF/ME requiring operative management at a single academic institution over a 14-year period (January 1, 2003 to May 29, 2017). These injuries were characterized using the Bado classification. Similarly, all patients with T3-SCH fractures operatively managed over the same time period were identified. Medical record review of both groups identified which patients developed CS. Further review included demographic, procedural, and radiographic information. Statistical analysis compared the rates of CS in both groups and determined risk factors associated with developing CS.

**Results:** The rate of CS in operatively managed MF/ME was 9/61 (14.8%), which was significantly greater than the rate of CS in T3-SCH fractures (2/230 [0.9%];  $P = 0.001$ ). Among the 9 MF/ME cases with CS, 5 were diagnosed prior to surgical stabilization, and 4 were diagnosed intraoperatively post-fixation. Comparing MF/ME with CS to those without; there was no difference in gender ( $P = 0.7$ ), Bado type ( $P = 1.0$ ), or fracture pattern (MF vs ME) ( $P = 0.7$ ). Patients with CS tended to be older (8.0 years compared to 6.9 years) ( $P = 0.082$ ). Patients with CS had a higher incidence of preoperative vascular (22.2%) or neurologic (33.3%) deficits than those without CS (0 and 7.7%;  $P = 0.02$  and  $P = 0.06$ , respectively). Children managed with intramedullary (IM) fixation of the radius had higher rates of CS ( $P = 0.013$ ).

**Conclusion:** Patients with MF/ME had a significantly increased rate of CS compared to patients with T3-SCH fractures (an injury classically associated with CS). With no predisposition based on Bado classification or Monteggia equivalent status, all forms of MF/ME appear to have increased risk for CS. Older patients and those with preoperative neurovascular deficits are at higher risk for CS. Intraoperatively, we detected CS after fixation in 4 patients, many of whom required management with a radial IM rod. Careful assessment of the forearm, even after fixation, is required to detect CS in pediatric patients with Monteggia fractures or Monteggia equivalents.