Are Classification Systems Predictive of Severity and Clinical Management in Pediatric Pelvic and Acetabular Fractures?

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Purpose: This study aims to assess whether existing classification systems to describe injury patterns are indicative of clinical management in pediatric pelvic ring and acetabular fractures.

Methods: This is a multicenter study that includes all pediatric and adolescent patients who were treated for pelvic ring and acetabular fractures at two Level I pediatric trauma centers between 2009 and 2024. We reviewed demographics, injury characteristics, and severity (measured using the pediatric trauma score), clinical management, and postoperative outcomes.

Results: In total, 177 patients with a mean age of 13.8 years were included and followed up for an average of 11 months (range: 1–91.7 months). Of these, 80 (45.2%) patients were Risser stage 4 (apophysis >75% of the iliac crest), and 116 (65.5%) had closure of their triradiate cartilage. An isolated pelvic ring injury was present in 111 (64.5%) patients, 52 (30.2%) had an isolated acetabular fracture, and 14 (8.1%) had combined pelvic ring and acetabular injuries. There was an even distribution of laterality (right: 35%, left: 35%, bilateral: 30%), and 18 (10.2%) had an open injury. The mean pediatric trauma score was 7.9 (range 1–11). Preoperative transfusion was given to 31 (17.5%) patients, and 143 (80.8%) underwent surgical fixation. In patients with pelvic ring injuries, a binary regression analysis demonstrated the pediatric trauma score (OR: 0.60, $p = 0.02$), Young and Burgess classification (OR: 2.10, $p = 0.010$) and Torode/Zieg classification (OR: 16.8, $p<0.001$) to be significant factors in determining surgical management. Similarly, the pediatric trauma score (OR: 0.38, $p = 0.004$) and the Young and Burgess classification (OR: 1.38, $p = 0.021$) were significant indicators of blood transfusion during the hospital course. The OTA classification was not predictive of either surgical management (OR: 3.2, $p = 0.095$) or blood transfusion (OR: 1.01, $p = 0.962$) in pelvic ring (OR: 0.99, $p = 0.631$) and acetabular injuries (OR: 11.5, $p = 0.196$).

Conclusion: Our study demonstrated that although Young and Burgess and Torode/Zieg classification may be indicative of severity and clinical management, the OTA's classification for skeletally mature patients may not be helpful in the pediatric and adolescent population.