Pediatric Pelvic Ring Injuries: How Benign Are They?

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Purpose: Pediatric pelvic ring fractures are rare, with scant outcomes in the literature. The etiology is usually high-energy trauma with associated major injuries that require multidisciplinary trauma team intervention. Historically, conservative treatment was mainly performed, but has changed to more operative treatment of unstable fractures. Leg-length discrepancy (LLD) and pain are reported. The purpose of this study was to determine clinical and radiographic outcome following pediatric pelvic ring injuries.

Methods: Between 2002 and 2011, 33 pediatric pelvic ring fractures were retrospectively analyzed. Fractures were classified according to AO/OTA classification as 2 A2, 3 B1, 16 B2, 10 B3, and 2 C2 fractures. Mechanism of injury, associated injuries, transfusion requirement, Glasgow Coma Scale (GCS), Injury Severity Score (ISS), and length of hospital stay were recorded. Treatment of the pelvis injury, infection, and nonunion rates were determined. Deformity, low back/sacroiliac (SI) joint pain, LLD, and hip range of motion were evaluated on final follow-up.

Results: Age averaged 12.6 years (range, 4-16). 91% (30) injuries were caused by traffic accidents. GCS averaged 13.6 (range, 3-15) and ISS averaged 26 (range, 4-66). Length of hospital stay averaged 6 days (range, 1-39). 10 (30%) children required blood transfusion. 30 (91%) children had associated injuries, of whom 11 (33%) required surgery. Two (6%) required interventional embolization for intrapelvic bleeding. Clinically unstable fractures were treated operatively in 16 children and conservatively in clinically stable fractures in 17 children. Follow-up averaged 25.6 months (range, 6-84). One superficial wound infection and in one case repeat debridement for Morel Lavallée lesion was documented. No nonunion was recorded. 20 (74%) children had a sacral or ischial height difference of 5-10 mm on follow-up (outlet). 18 (67%) children had a sacral or iliac height difference of 5-10 mm (inlet). 67% complex, unstable fractures had a permanent ischial height difference >5 mm versus 42% less complex, stable fractures. Unstable, operatively treated fractures had a higher permanent pelvic asymmetry (12.3 mm vs. 6.6 mm) ($P = 0.15$) and ring width difference (6.9 mm vs. 3.9 mm) as compared to stable, nonoperatively treated fractures. All children returned to full, unrestricted activity. 13 children (39%) had low back or SI joint pain on their final follow up, which was significantly higher in the operatively treated group ($P = 0.008$), and in children with 5-10 mm sacral height difference (inlet) compared to children with 0-4 mm ($P = 0.034$). 3 (9%) children had an LLD of 5-15 mm. One child had persistent neurological symptoms. One (3%) demonstrated rotational limitation on final follow-up.

Conclusion: The majority of pediatric pelvic ring fractures are caused by traffic accidents, with associated major injuries. Radiographic deformity persisted without remodeling. De-

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formity occurs more commonly with complex unstable ring injuries, which may plastically deform the ring, are mostly operatively treated, and have continued associated low back or SI joint pain, but no limitations.

See pages 99 - 147 for financial disclosure information.