

UROGENITAL TRAUMA

High-grade renal injuries in children - is conservative management possible?

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Urology. 2004; 64: 574-9

Objectives: To review our experience with the management of high-grade (grade IV and V) renal injuries to clarify the role of conservative management.

Methods: From 1991 to 2003, 79 consecutive patients (age range 2 to 14 years) with renal injuries were treated in an urban level I pediatric trauma center. Twenty children were identified as having high-grade renal injury (grade IV, 10 children and grade V, 10 children). The mechanism of injury was blunt trauma in 17 patients (85%) and penetrating trauma in 3 (15%).

Results: Of the 10 patients with grade IV injury, 8 (80%) were successfully treated conservatively with bedrest and catheter drainage. Two patients with persistent urine leaks required ureteral stenting, and one subsequently required open operative repair. The initial radiographic findings in both patients demonstrated complete renal fracture with retained vasculature to both renal segments. All 10 patients with grade V injury required open operative management and only 3 (30%) achieved long-term renal salvage.

Conclusions: Most children with grade IV renal injury can be treated conservatively. Patients with complete renal fracture or significant urinary extravasation on initial radiographic imaging may be less likely to undergo spontaneous resolution. Patients with a persistent urinary leak can be successfully treated with internal drainage. Grade V injuries are associated with an increased risk of requiring open operative intervention, and the renal preservation rates are low.

Editorial Comment

Information on pediatric renal trauma has lagged behind information reported about adults. Now several excellent papers have been published which attempt to establish the "proper" amount of surgery for children with renal trauma.

The paper by Rogers et al. attempted conservative management even for Grade IV injury. Only 1 of their 10 patients required a stent and 1 required open repair. All 10 Grade V injury patients required surgery, and this was a nephrectomy in 7/10 patients. (It is not clear to me that the remaining 3 patients truly had a Grade V injury by the description of the injuries provided in the paper). Conservative management was not without its problems. Patients had to stay at bed rest an average of 13 days, and required urinary catheterization an average of 9 days, although significant complications such as death or iatrogenic nephrectomy was avoided. Interestingly, 3 out of 3 cases of attempted vascular repair failed, further bolstering the opinion of most experts that significant unilateral renal vessel injury should be treated with nephrectomy (as repair never seems to work).

The conclusions from this study are:

- 1) Conservative management of even high-grade renal injuries (Grade IV) in children can be attempted.
- 2) Conservative management will fail only in a small percentage of the population.
- 3) Ureteral stents will need to be used in a small percentage.
- 4) Even severe penetrating renal injury might be treated nonoperatively in children.
- 5) Grade V renal injuries will likely still need surgery, and that surgery will likely be a nephrectomy.

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Pediatric renal injuries: management guidelines from a 25-year experience

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J Urol. 2004; 172: 687-90; discussion 690

Purpose: We defined the mechanism and cause of pediatric renal trauma, and developed guidelines for management based on the outcome analysis of operative vs. nonoperative management.

Materials and Methods: We retrospectively reviewed 374 pediatric renal injuries at San Francisco General Hospital, comparing operative vs. nonoperative management based on clinical presentation, type of renal injury, hemodynamic stability, associated injuries and the results of radiographic imaging.

Results: Blunt trauma accounted for 89% of pediatric renal trauma with a renal exploration rate of less than 2%. Penetrating trauma represented the remaining 11% with a renal exploration rate of 76%. Of grade IV renal injuries 41% were successfully managed nonoperatively based on computerized tomography and staging in hemodynamically stable children. Our overall renal salvage rate was greater than 99%.

Conclusions: Pediatric renal trauma is often minor and observation poses no significant danger to the child. In serious pediatric renal injuries early detection and staging based on clinical presentation and computerized tomography are critical for determining operative vs. nonoperative management. Regardless of the type of management the standard of care is renal preservation (less than 1% nephrectomy rate in this series).

Editorial Comment

The study by Buckley & McAninch is the largest pediatric renal trauma series ever reported. Although this center is now devoted to conservative management when appropriate, some of this series is 25 years old, and predates the time when conservative management was used widely by anyone. Interestingly, even though this series reports 374 patients, they had fewer Grade IV and V injuries than that reported in Roger's et al. smaller series of 79 patients (*Urology. 2004; 64: 574-9*)! In this series, 8/9 blunt Grade IV renal trauma patients were managed nonoperatively. The overall rate of exploration was higher than that seen now, however, because of the policy of exploring all penetrating trauma patients with gross hematuria, and all patients who are taken immediately to the operating room "in whom renal staging (imaging) was incomplete". To the credit of this group, only 1 patient (1%) got a nephrectomy.

The conclusions from this study are:

- 1) As has been reported elsewhere, blunt renal trauma patients can probably be imaged just like adults (that is, CT only with gross hematuria, major associated injuries, hypotension or deceleration).
- 2) Most pediatric renal injuries are minor and can be observed.
- 3) Major blunt renal injuries can be managed nonoperatively.
- 4) Nonoperative management of renal trauma may require a long hospitalization (average 14 days in McAninch and 13 days in Rogers).

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