



Considerations During Management of High Grade Renal Trauma.

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Genitourinary injuries are commonly encountered in traumatically injured patients. Approximately 10% of injuries involve the genitourinary system, with renal injuries being the most common. Renal injuries comprise 24% of intra-abdominal solid organ injuries with most being secondary to blunt force such as motor vehicle accidents and falls.¹ Although penetrating causes, such as gunshot and stab wounds, are less common, they are more likely to be high-grade injuries. It is important for the treating surgeon or intensivist to have a high suspicion for renal injuries in traumatically injured patients. Obtaining the appropriate work up to define the severity of injury and direct the next steps in care is paramount to prevent unnecessary renal loss, morbidity and possibly mortality.

The American Association for the Surgery of Trauma (AAST) organ injury grading scale is commonly used to classify renal injuries and has been validated to predict the need for surgical intervention in high grade injuries.² Based on CT imaging, a grade (I-V) is assigned to renal injuries, with grades III-V being considered high-grade injuries. There is some ambiguity regarding the staging of grade IV and V injuries, as there is overlap of vascular, parenchymal, and collecting system injuries within both.³ Even with its imperfections, the AAST organ injury grading scale has helped to standardize renal injury classifications and determine prognosis.

Non-operative management of low-grade renal injuries and most blunt renal injuries has become standard, but debate continues in regard to the optimal management of high-grade injuries. Operative management in the hemodynamically unstable patient can be life saving, but in the hemodynamically stable patient without other indications for surgery, operative exploration leads to a significant increase in iatrogenic nephrectomy. In one multi-institutional study, 142 (68.9%) patients out of 206 with grade IV-V renal injuries were managed successfully with non-operative management.⁴ Although renal preservation is a priority, there are many other considerations to take into account with conservative management, such as the need for delayed operative intervention for hematoma or urinoma, prolonged recovery, increased radiation exposure from surveillance imaging, and possible delayed nephrectomy for a nonfunctional renal unit.³

With the pendulum swing in high-grade renal trauma to more non-operative management, surgical intensivists have become increasingly responsible for managing these patients and recognizing when conservative therapies are no longer appropriate. Patients are deemed appropriate for conservative management of high grade renal injuries (AAST III-V) based on hemodynamic stability. Several key findings early in the posttraumatic period allow the continuation of conservative management. These indicators include continued hemodynamic stability, absence of new or worsening hydronephrosis, stability of any urinary extravasation without expanding urinoma, and absence of urinary infection.

Initial conservative management within the first 48 hours is critical. Van der Wilden et al demonstrated the majority of conservative management failures happened within this time frame at an average of 17 hours after admission. Early management should include renal function and electrolyte checks, serial hemoglobin checks, appropriate fluid resuscitation, monitoring of intake and output, pain management, bed rest, and

NPO status. Diet advancement is generally held until the patient has been stable for at least 48 hours in case a patient should need operative management. In some situations, nasogastric drainage may be necessary until bowel function returns. In patients demonstrating stability, we generally advocate repeat cross sectional imaging with a delayed or urinary phase if renal function permits at 48 hours post trauma to ensure appropriate staging and to monitor for findings that may warrant intervention.

The need for operative intervention may include several of the afore mentioned findings. Hemodynamic instability is the most common situation that leads to operative intervention.⁵ In the scenario of hemodynamic stability with dropping hemoglobin, we advocate transfusion with repeat arterial phase cross sectional imaging or angiography to identify and treat a possible active arterial bleed. Worsening urinary extravasation or urinary infection is another leading source of conservative management failure. If urinary extravasation is present, the decision to drain the upper collecting system with stenting must be made. Stenting is only necessary in situations of expanding urinoma or urinary infection. This judicious use of stenting is due to the concern that manipulating the upper collecting system may increase the risk for pyelonephritis with subsequent development of perinephric abscess formation, thus requiring further delayed intervention. Although the risk of conservative management failure outside of 48 hours decreases, there still exist the need for possible delayed intervention. Reese et al found that 44% of pediatric patients with non vascular grade IV renal injuries managed conservatively required delayed intervention at an average of 11 days post admission. Therefore, patients require close monitoring even after they are outside the window of major bleeding.

Once patients are deemed stable, diet and mobility advancement can be initiated. Care is taken with slow diet advancement as patients may experience a non-obstructive ileus and tolerate rapid diet advancement poorly. Patients are allowed to ambulate to the restroom after 48 hours, but activity is kept at a minimum. Often, other traumatic injuries limit their mobility and must also be taken into account. Patients should have close monitoring of vital signs, laboratory values, and intake/outputs during the remainder of their admission.

Conservative management of high-grade renal injuries has been shown to be an effective management strategy that decreases the risk of iatrogenic nephrectomy. Although non-operative management has many benefits, convalescence can be lengthy and requires close monitoring.

References

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