Title: PEDIATRIC NONOPERATIVE MANAGEMENT (NOM) OF BLUNT RENAL INJURY

Scope:

1. Condition: Isolated renal injury from blunt abdominal trauma
2. Guideline category: Non-operative treatment
3. Guideline objective: To provide consistency in non-operative management of isolated solid organ injuries.
4. Target population: Children with blunt abdominal trauma

Policy Statement:

This is an evaluation and management guideline. It was adapted from the professional literature searches of peer-reviewed medical journal. The major applicable articles are identified in Attachment B.

Special Instructions:

1. Please refer to Organ Grading System for Trauma (Attachment A).

Procedure:

I. Identify CT Grade (American Association for Surgery of Trauma (AAST) organ severity scale).

II. Follow treatment recommendation in table below:

Treatment	CT Grade (AAST organ injury severity scale)					
	I	II	III (without extravasation)	IV	V	VI (devascularized Kidney)
ICU Stay	If hemodynamically unstable					
Hemogram monitoring	Q8 hours until plateau					
Bedrest with bathroom privileges	After resolution of gross hematuria					
Activity restriction*	Avoid strenuous activity for at least one (1) month and contact sports for two (2) months					
Follow-up Visit	Within one (1) month					

AAST (American Association for Surgery of Trauma)

III. Follow-Up:

A. *Return to school and normal childhood activities when no longer requiring narcotic pain medication. Avoid gym class, rough play and contact sports until cleared at follow up visit.

B. Follow up blood pressure with primary care physician in six (6) months and at one (1) year post discharge (there is no standard recommendation for this in the pediatric age-group).

	C. Need for Pediatric Urology consultation is to be determined jointly between the admitting service and Pediatric Surgery on a case-by-case basis. **IV. Other** A. Follow up imaging to document the resolution of urinary extravasation in grade IV injuries has not been standardized and some experts recommend little or no imaging unless the patient's condition deteriorates. Unexplained fever, flank pain, flank mass, or bleeding are indications for follow-up imaging. (Renal Trauma Subcommitte, 2002). B. Limit narcotic prescription to maximum of 5 – 7 days to be taken with stool softener.
	Attachments: Attachment A: Organ Grading System for Trauma Attachment B: Articles Reviewed
	Point of Contact: Pediatric Trauma Program Manager 403-4417

Approval By:	***Date of Approval:***
MB Pediatric Trauma Multidisciplinary Committee	***5/11***
MB Pediatric General Surgery Committee	***5/11***
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Revision Dates:	*none*
Reviewed with no Changes Dates:	*none*

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Attachment A ORGAN GRADING SYSTEM FOR TRAUMA

GRADE	SPLEEN	LIVER	KIDNEY	PANCREAS
I	**Hematoma:** <10% surface area subcapsular, non-expanding (2) **Laceration**: Capsular tear <1 cm deep, non-bleeding (2)	**Hematoma**: <10% surface area subcapsular, non-expanding (2) **Laceration**: Capsular tear <1 cm deep, non-bleeding (2)	**Contusion**: Microscopic or gross hematuria with normal urologic studies (2) **Hematoma**: Subcapsular, non- expanding hematoma without parenchymal laceration (2)	**Hematoma**: minor contusion without duct injury (2) **Laceration**: Superficial laceration without duct injury (2)
II	**Hematoma**: 10-50% subcapsular surface area; <1 cm intraparenchymal hematoma (2) **Laceration**: Capsular tear 1-3 cm deep without trabecular vessel involvement; active bleeding (3)	**Hematoma**:10-50% subcapsular surface area; <1cm intraparenchymal hematoma(2) **Laceration**: Capsular tear 1-3 cm deep without trabecular vessel involvement; active bleeding (3)	**Hematoma**: non-expanding perirenal hematoma confined to retroperitoneum (2) **Laceration**:<1.0cm deep without collecting system rupture or urinary extravasation (2)	**Hematoma**: Major contusion without duct injury or tissue loss (2) **Laceration**: Major laceration without duct injury or tissue loss (2)
III	**Hematoma**: >50% expanding subcapsular, ruptured subcapsular hematoma with active bleeding; intraparenchymal hematoma > or = 2 cm or expanding (3) **Laceration**: >3 cm deep or involving trabecular vessels (3)	**Hematoma**: >50% expanding subcapsular, ruptured subcapsular hematoma with active bleeding; intraparenchymal hematoma > or = 2 cm or expanding (3) **Laceration**: >3 cm deep (3)	**Laceration**: >1 cm deep without collecting system rupture or urinary extravasation (3)	**Laceration**: Distal transection or parenchymal injury with duct injury (3)
IV	**Hematoma**: Ruptured parenchyma with active bleeding (4) **Laceration**: hilar vessel with major (>25%) devascularization (4)	**Hematoma**: Ruptured parenchyma with active bleeding (4) **Laceration**: 25-50% hepatic lobe parenchymal disruption (4)	**Laceration**: Laceration extending through the cortex, medulla and collecting system (4) **Vascular**: Main arterial or venous injury with contained hemorrhage (4)	**Laceration**: proximal (to the right of the SMV) transection or parenchymal injury involving the papilla (4)
V	**Laceration**: Completely shattered spleen (5) **Vascular**: Hilar vascular injury with total devascularization (5)	**Laceration**: >50% hepatic lobe parenchymal disruption (5) **Vascular**: Retrohepatic vena cava/juxtahepatic venous injuries (5)	**Laceration**: Completely shattered kidney (5) **Vascular**: Avulsion of renal hilum with devascularized kidney (5)	**Laceration**: Massive disruption of the pancreatic head (5)
VI		**Vascular**: Hepatic avulsion (4)		

Attachment B
Articles Reviewed

First Author	Year	Reference Title	Class	Conclusion
Henderson Children's National	2007	Management of High Grade Renal Trauma: 20-Year Experience at a Pediatric Level I Trauma Center	Retrospec. 131 total 39 grade I 17 grade II 24 grade III 36 grade IV 15 grade V	Initial nonsurgical mgmt of high grade blunt renal trauma in children is effective and is recommended for the hemodynamically stable child. When a child has persistent symptomatic urinary extravasation delayed retroperitoneal drainage may become necessary. Only 8 pts (16.3%) of high grade injury (IV&V) required surgical intervention specifically for renal injuries.
Alishikafi Mt Sinai Med Ctr, Univ. of Chicago, San Francisco General and Univ. of California	2006	Nonoperative management Outcomes of Isolated Urinary Extravasation Following Renal Laceration Due to External Trauma	Retrospec. 34 pts	NOM of urinary extravasation in patients sustaining traumatic injury to the kidney without associated abd or vascular injury is safe and results in resolution in more than 90%. In patients with persistent urinary leakage endoscopic ureteral stent placement may be needed and is successful. NOM protocol included bladder drainage, broad spectrum abx, serial hematocrit and bed rest until gross hematuria resolved.
EAST Work Group	2004	Practice Management Guidelines for the Management of Genitourinary Trauma	III	The success of NOM may be enhance by the use of angiographic embolization
			III	NOM of renal laceration from blunt trauma associated with extravasation is associated with few complications, which can usually be treated with endourological or percutaneous methods.
			III	Conservative management of major renal laceration associated with devascularized segments is associated with a high rate of urologic morbidity (38 – 82%). In pts with devascularized segments, conservative mgmt is feasible in those who are clinically stable.
			III	Operative mgmt should be considered in pts with a devascularized segment in association with fecal spillage or pancreatic injury.
Nance CHOP	2004	Blunt Renal Injuries in Children Can Be Managed	95 22 grade I	A NOM strategy was advantageous and successful in pediatric blunt renal injuries (94.7% successful

Attachment B

Articles Reviewed (Con't)

First Author	Year	Reference Title	Class	Conclusion
		Nonoperatively: Outcome in a Consecutive Series of Patients	40 grade II 20 grade III 11 grade IV 2 grade V	nonoperative rate, 98.9% renal salvage rate. Overall five required laparotomy, including 1 nephrectomy. Of the 48 with isolated renal injuries, only one required laparotomy and seven required adjunctive urologic procedures. Pts were managed according to " the rule of 3s protocol" includes 3 shifts in ICU, 3 days on ward, with a gradual advancement of activity before dischart. On discharge pts were place on house arrest for 3 weeks with 3 week and 3 month followup.
Keller Glennon Children's Hosp. , MI, and Fletcher Allen Health Care, VT.	2004	Functional Outcome of Nonoperatively Managed Renal Injuries in Children	Retrospective	The functional outcome fro children with NOM kidney injuries is good and correlates with injury grade. Children with grades II – IV injures retain near normal function. The with grade V have a loss of function attributable to scarring and parenchymal volume loss.
Buckley San Fran. General	2004	Pediatric Renal Injuries: Management Guideline From a 25-Year Experience	Retrospec. 333 total 308 grade I 9 grade II 4 grade III 11 grade IV 1 grade V	Of grade IV injuries 42% were successfully NOM. The overall renal salvage rate was 99%.
Renal Trauma Subcommittee of WHO/SIU	2002	Consensus on Genitourinary Trauma: Evaluation and Management of Renal Injuries		