



Queensland
Trauma Education

ABDOMINAL TRAUMA

Blunt renal trauma assessment

Case discussion

Facilitator resource kit

CSDS



Clinical Skills Development Service

Metro North
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Queensland Trauma Education**Abdominal Trauma - Blunt renal trauma assessment: Case discussion - Facilitator resource kit****Version 1.0**

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Queensland Trauma Education

The resources developed for Queensland Trauma Education are designed for use in any Queensland Health facility that cares for patients who have been injured as a result of trauma. Each resource can be modified by the facilitator and scaled to the learners needs as well as the environment in which the education is being delivered, from tertiary to rural and remote facilities.

National Safety and Quality Health Service (NSQHS) Standards



About this training resource kit

This resource kit provides healthcare workers with the knowledge of how to effectively perform an assessment on a patient with blunt renal trauma injury.

Target audience

Emergency department medical and nursing clinicians.

Duration

30 minutes.

Group size

Small group participation (4-6 participants).

Learning objectives

By the end of this session the participant will be able to:

- Understand the approach to the assessment of a patient with blunt renal trauma.
- Identify blunt traumatic renal injury using severity grading and classification and understand the management strategies for patients with renal injury.

Facilitator guide

1. Facilitator to provide participant resource kit to learner.
2. Facilitator to deliver case discussion and utilise question and answer guide to promote discussion.
3. Incorporate the use of the American Association for the Surgery of Trauma (AAST) Renal trauma classification to reinforce diagnostic methods for renal injury classification.

Participant resource kit

- Learning objectives.
- Overview of blunt renal trauma.
- Further reading.

Overview of blunt renal trauma

Renal trauma accounts for up to 3.25% of all trauma and is prevalent amongst males aged between 31 to 38 years. ¹ The most common mechanism of injury of blunt renal trauma in the adult population is motor vehicle accidents (63%), followed by falls (43%) and is typically caused by rapid deceleration and acceleration forces. ¹

Renal trauma assessment and diagnosis requires knowledge of key predictors of renal injury and gold standard classification tools to aid in the stratification of both grade severity and predictor of patient morbidity and mortality to guide management.

Further reading

Cabrera Castillo PM, Martínez-Piñeiro L, Maestro MÁ, De la Peña JJ.(2006). Evaluation and treatment of kidney penetrating wounds. *Ann Urol (Paris)*, 40, 297–308. <https://doi.org/10.1016/j.anuro.2006.06.002>

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Erlich, T., & Kitrey, N. D. (2018). Renal trauma: the current best practice. *Therapeutic advances in urology*, 10(10), 295–303. <https://doi.org/10.1177/1756287218785828>

Case discussion

Case study

65yr old female is brought to your emergency department following a fall from a horse. She was wearing a helmet and did not hit her head when she fell. She was able to walk back to her property and called the ambulance.

She is otherwise healthy with no past medical history, no regular medications and no known allergies.

Her vital signs were within normal limits en route, with the ambulance crew administering 15mg IV Morphine, and 8mg IV Ondansetron.

On arrival to your ED, 3 hours post-injury:

- She is alert, GCS 15 with no neurological deficits. Her vital signs are: HR 90, BP 120/60mmHg, saturations 99% RA, respiratory rate 20, temp 36.7.
- She complains of pain in her R flank with a minor abrasion overlaying the area. The ambulance officers have not administered IV fluids.

Question and answer guide

1. What clinical features constitute 'haemodynamic instability' in an adult patient? What are the clinical and diagnostic features of 'shock'?

- a. Systolic blood pressure < 90mmHg
- b. Vasoconstriction: cool, clammy, decreased capillary refill
- c. Altered conscious state
- d. Shortness of breath (SOB)
- e. Ongoing vasopressor/inotropic requirement
- f. Ongoing transfusion requirement > 4-6units Packed Red Blood Cells/24 hours
- g. Base Excess > -5mmol/l
- h. Shock index > 1

2. What does the term 'transient responder' mean?

The patient will show an initial clinical response to adequate fluid resuscitation; Then subsequent signs of ongoing blood loss and perfusion deficits.

3. What clinical signs or injuries suggest a potential urogenital injury as a result of blunt trauma?

- a. Haematuria - present in 88-94% of renal tract injury. However the presence of haematuria does not predict the grade of injury.
- b. Macroscopic-haematuria more frequently associated with high grade injuries.
- c. In the haemodynamically stable patient with microscopic-haematuria 0.1-0.5% of patients will have an associated significant renal. ¹⁻⁴
- d. Flank/abdominal pain/contusion.
- e. Rib fractures.
- f. Presence of pelvic injury.

4. What are the most common mechanisms of injury that lead to renal trauma? ⁵

- a. Falls from height.
- b. Assault.
- c. Skiing/snowboarding events.
- d. Horse riding.
- e. PBC/MBC.

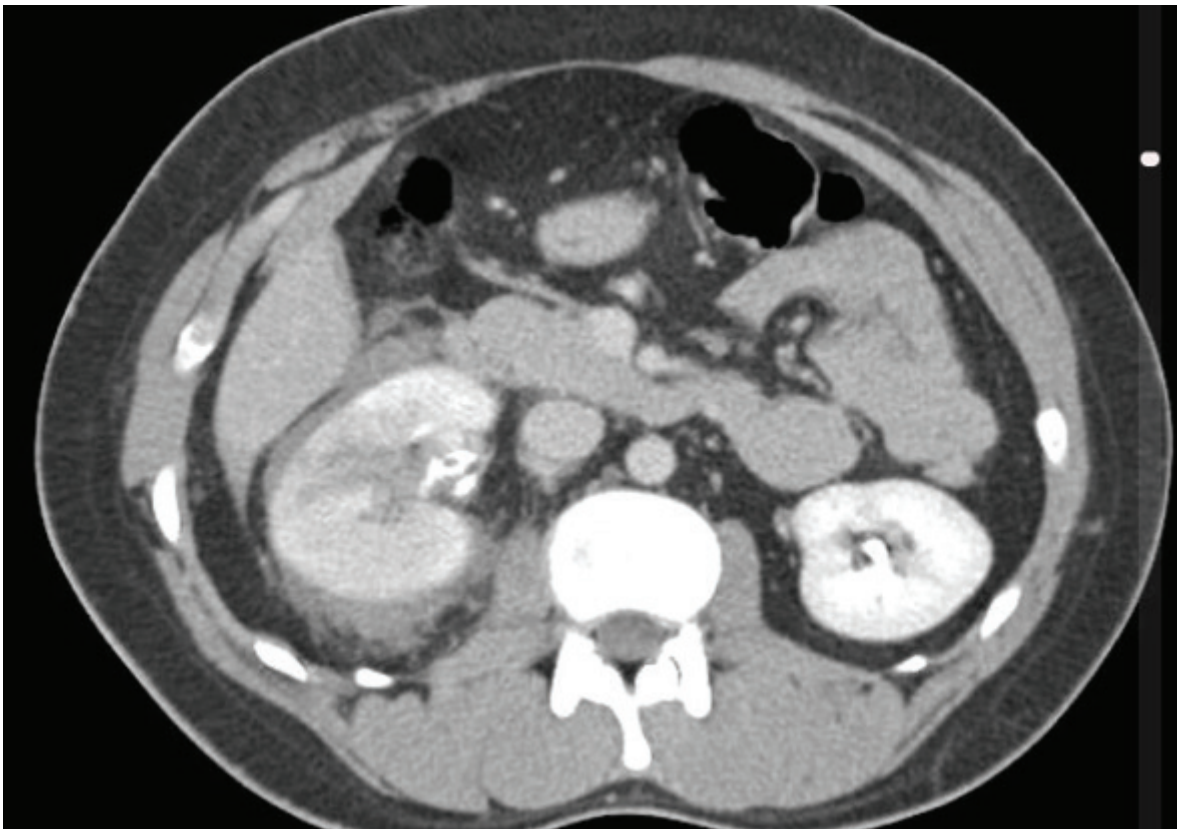
5. What information can an EFAST provide in suspected renal trauma?

- a. EFAST is effective and rapid to detect intra-abdominal free fluid.
- b. EFAST has low specificity and sensitivity in renal trauma (due to retroperitoneal location).

6. What type of imaging scans should be performed in suspected blunt renal trauma? ⁶

- a. Contrast-enhanced CT scan associated with delayed urographic phase is the gold standard in hemodynamic stable or stabilized adults after blunt trauma when kidney or urinary tract injury is suspected. (GoR 1A)

- b. In blunt trauma, contrast-enhanced CT scan associated with delayed urographic phase must be performed in cases of macro- or microhematuria with hypotension and after high-energy deceleration trauma regardless of the presence of hematuria. (GoR 2B)
 - c. Ultrasound, contrast-enhanced US and eco-Doppler (E-FAST excluded) are generally not recommended as diagnostic tools during the initial evaluation of adult patients with high energy trauma when multiple injuries and/or injury to the urinary tract and collecting system are suspected. (GoR 1C)
 - d. Ultrasound, contrast-enhanced US, and echodoppler can be used in pregnant women and in the paediatric population as an alternative to CTscan in the presence of hemodynamic stability during the immediate assessment and in follow-up evaluations. (GoR 1C)
 - e. Intravenous urography may be useful in unstable patients during surgery when a kidney injury is found intraoperatively or when CT-scanning is not available and a urinary tract injury is suspected. (GoR 2C)
7. A CT is performed on this patient. Using the attached grading system (AAST), what severity of injury has she sustained?



Case courtesy of Dr Dayu Gai, Radiopaedia.org, rID: 31574.

CT Findings: 1. Right kidney lacerations (fractures) through the cortex and medulla, with likely involvement of the collecting system; associated with the moderate surrounding haematoma. This is compatible with a grade 4 traumatic renal injury. No definite active bleeding identified.

A delayed CT is useful in this scenario as it can identify extravasation of contrast suggesting a collecting system injury.

Supporting documents

The following supporting documents are provided for this case discussion:

1. American Association for the Surgery of Trauma (AAST) - Renal trauma classification.
2. Renal trauma grading diagrams
3. Shock index calculator.

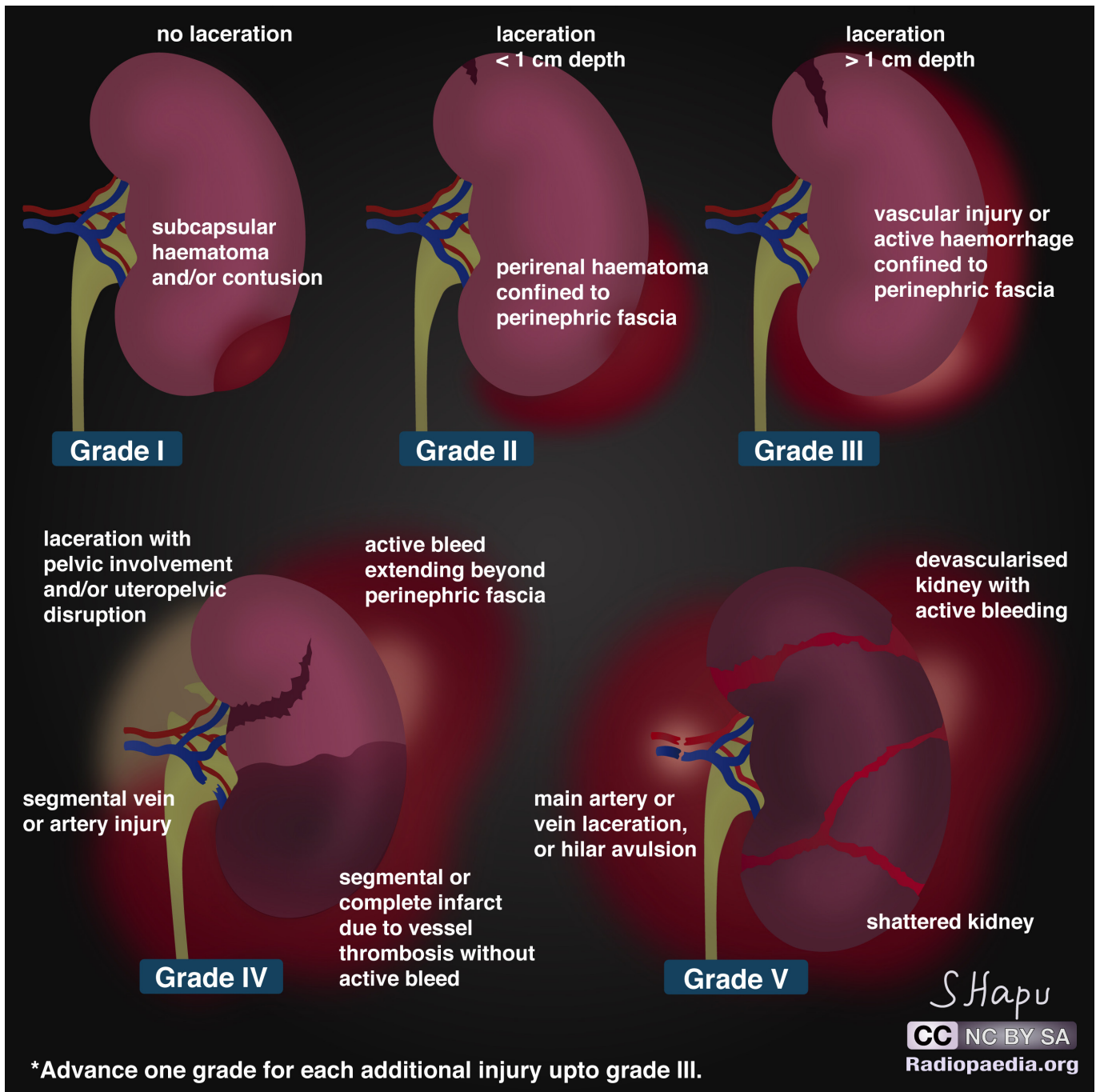
American Association for the Surgery of Trauma (AAST) Renal trauma classification

Grade*	Type of injury	Description of injury
I	Contusion	Microscopic or gross hematuria, urologic studies normal
	Hematoma	Subcapsular, nonexpanding without parenchymal laceration
II	Hematoma	Nonexpanding perirenal hematoma confirmed to renal retroperitoneum
	Laceration	<1.0 cm parenchymal depth of renal cortex without urinary extravagation
III	Laceration	>1.0 cm parenchymal depth of renal cortex without collecting system rupture or urinary extravagation
IV	Laceration	Parenchymal laceration extending through renal cortex, medulla, and collecting system
	Vascular	Main renal artery or vein injury with contained hemorrhage
V	Laceration	Completely shattered kidney
	Vascular	Avulsion of renal hilum which devascularizes kidney

Renal trauma classification by the American Association for the Surgery of Trauma (AAST).

*Advance one grade for bilateral injuries up to grade III.

Renal trauma grading diagram



Case courtesy of Dr Sachintha Hapugoda, Radiopaedia.org, rID: 70451

Shock index calculator

<https://www.mdcalc.com/shock-index#why-use>



A screenshot of the MD Calc website's Shock Index calculator. The page has a green header with the MD Calc logo and a search bar. The main content area is titled "Shock Index" and includes a brief description: "May be a more sensitive indicator of occult shock, especially in trauma or acute hemorrhage." Below this, there are three tabs: "When to Use", "Pearls/Pitfalls", and "Why Use", with "Why Use" selected. The "Why Use" section contains three bullet points: "Blood pressure and heart rate, when used individually, fail to accurately predict the severity of hypovolemia and shock in major trauma.", "Massive transfusion of blood products can be associated with significant risk if initiated on the wrong patient. Identifying patients at risk for massive transfusion can be difficult, and objective measures like the Shock Index can help.", and "Shock may be more sensitive than the ABCs (Airway, Breathing, Circulation) in identifying occult shock." Below the text are input fields for "Heart Rate/Pulse" (Norm: 60 - 100 beats/min) and "Systolic BP" (Norm: 100 - 120 mm Hg). A "Result:" section is present with a note "Please fill out required fields." and buttons for "Next Steps", "Evidence", and "Creator Insights". The right sidebar contains "About the Creator" (Dr. Manuel Mutschler), "Also from MD Calc..." (e.g., "SIRS index, 'qSOFA' age-adjusted (SII)", "TASH Score", "CRP Prediction Rule"), "Partner Content" (e.g., "Calculated Decisions: Shock Index Emergency Medicine Practice"), and "Content Contributors" (e.g., "Kamal Mehta, MD").

Acronyms and abbreviations

EFAST	Extended focused assessment with sonography in trauma
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1. Erlich, T., & Kitrey, N. D. (2018). Renal trauma: the current best practice. *Therapeutic advances in urology*, 10(10), 295–303. <https://doi.org/10.1177/1756287218785828>
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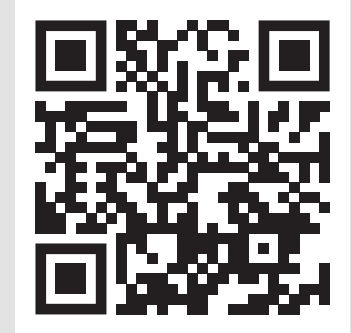
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