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Athlete Safety: Inappropriately Sized Gear is Not Worth a Hill of Beans

Timothy Jelsema
Henry Ford Health System, tjelsem1@hfhs.org

Bradley Jaskulka
Henry Ford Health System, BJASKUL1@hfhs.org

James Moeller
Henry Ford Health System, JMoelle1@hfhs.org

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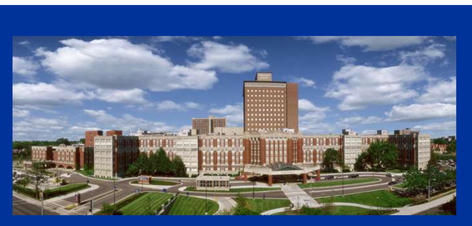
Timothy Jelsema, MD, MPH; Brad Jaskulka, MD; James Moeller, MD
Henry Ford Health System, Detroit, MI



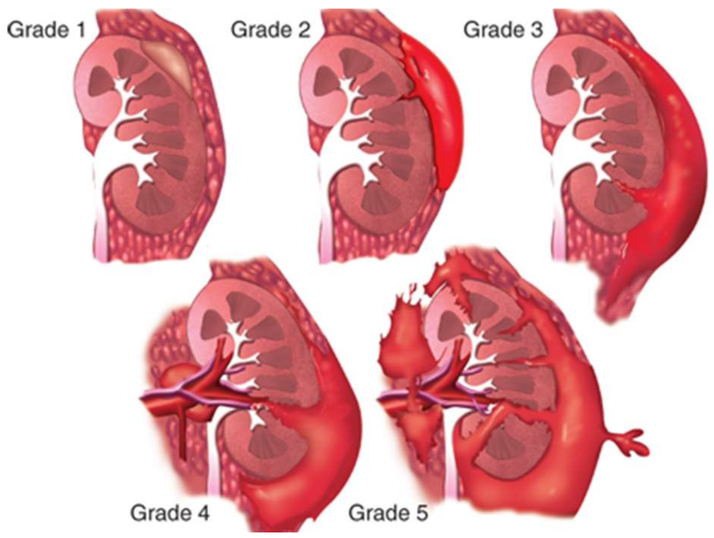
History

On 8/24, an 18 year-old male football running back was tackled just beneath the pads on an option play when a defender went unblocked off the edge. He immediately got to one knee, placed a hand on his side, slowly stood up, and jogged to the sideline where he was evaluated. He noted pain along his left flank, but denied any dyspnea. He stated he had the “wind knocked out of him” and was eager to return to play. After a focused exam yielded no “red flags” or concerning findings, and proving he could protect himself (sideline cutting, side bends to brace for impact, etc), he was allowed to return to play.

He returned to the game and did not have any issues other than “cramping” and “soreness” along his flank. He was reassessed at half time and the end of the game. Both exams were benign. Due to patient still experiencing “cramping” symptoms in the left flank after the game, parents were met with and educated to look out for flank bruising, bruising around the naval, and hematuria. The next morning, he had frank hematuria and his parents brought him to the Emergency Department at an OSH.

Physical Exam

General: No acute distress. Well developed.
Psych: Calm and cooperative with exam
Cardiovascular: Radial, 2+, even bilaterally. No rubs or murmurs.
Respiratory: Even/unlabored. Breath sounds heard diffusely. CTAB.
Skin: No bruising or swelling near area of interest. Mildly tender to palpation along left flank, below the ribs.
MSK: Negative rib compression test. Able to sprint and cut on the sidelines without anything more the “soreness.”



Grade	Description
I	Hematuria with normal anatomic studies (contusion) or subcapsular, nonexpanding hematoma; no laceration
II	Perirenal, nonexpanding hematoma or <1 cm renal cortex laceration with no urinary extravasation
III	>1 cm renal cortex laceration with no collecting system involvement or urinary extravasation
IV	Laceration through cortex and medulla and into collecting system or segmental renal artery or vein injury with hematoma
V	Shattered kidney or vascular injury to renal pedicle or avulsed kidney

Figure 1. AAST Renal Injury Scale

Results Review

The patient had an PT/INR, CBC with differential, CMP, urinalysis, and CT with contrast performed in the ED. All blood work was unremarkable outside of a mild anemia (Hb 13.4 g/dL, reference range 14.0-18.0 g/dL). Urinalysis was unremarkable aside from 6 RBCs per HPF.

CT with contrast imaging showed a 2.6 cm renal laceration, extending from anterior to posterior, in the left hilum. This was graded as an AAST Grade III injury by the radiologist. There was no extravasation of blood or urine noted. All blood vessels were patent and intact. A “centrally located” perinephric hematoma was noted.

The liver, bladder, ureters, spleen, pancreas, peritoneum, and major blood vessels were normal. There were no fractured ribs.

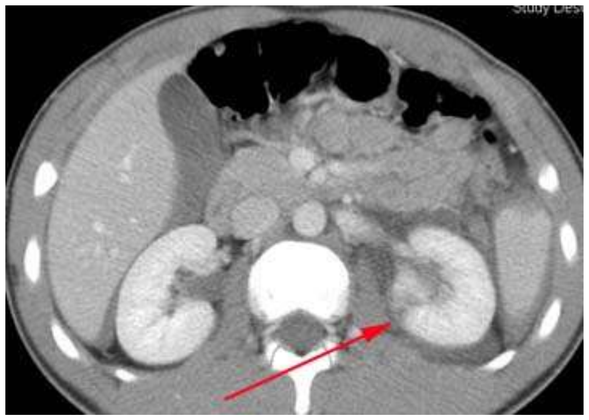


Figure 2. CT with contrast showing an AAST Grade III renal injury. This is an educational photo, obtained from the University of Virgina School of Medicine, as a digital copy of the patient’s CT was unable to be obtained (CT performed at OSH).
https://www.med-ed.virginia.edu/courses/rad/gu/kidneys/contusion.html

Working Diagnosis

Flank contusion. Lumbar strain. Splenic injury. Renal injury. Rib fracture. Intercostal injury. Duodenal injury. Pancreatic injury.

Management/Outcome

After initial evaluation and imaging in the ED, he was diagnosed with an AAST Grade III renal laceration and was evaluated by the trauma team due to the injury. Because he was hemodynamically stable and not in pain, he was discharged home with outpatient urology follow up. Urology recommended conservative management and rest. He was held out of all activities for 2 weeks. He was advised after 2 weeks that if hematuria had resolved and he was not experiencing pain, he could begin resuming cardiovascular exercise on a stationary bike with gradual increase in activity.

At 6 weeks he had a repeat CT scan which indicated good interval healing of the renal laceration. He did not have a repeat urinalysis or blood work completed. He was evaluated by urology at the same OSH after the CT and was cleared for play with a flak-jacket (extra kidney/rib padding below typical football pads). He was able to return for the final game of his senior season.

Discussion

Renal injuries have been observed in upwards of 10% of all abdominal traumas. Of these, 80-90% are believed to be caused from blunt trauma. Sports account for 25% of all pediatric renal injuries and 18% of injuries in those older than 17 years old. Findings can vary, but typically they include hematuria plus any of the following: rib fractures, transverse process fractures, and flank bruising (Grey-Turner Sign).

Physical exam of these athletes should include removing pads and examining the skin along the abdomen and thorax as well as palpation over those regions. Vitals should be taken, if able. Muscular contusion can be difficult to discern from internal organ derangement. It is suspected that upwards of 50% of injuries will present with a benign initial exam, stressing the importance of education and follow up.

The vast majority of blunt force renal traumas are AAST grade I or II and can be managed conservatively, without need for surgical intervention. Debate surrounds whether or not conservative management is appropriate for higher grade injuries (III-V) and injuries presenting in patients with one functioning kidney, or trauma to both kidneys. While not all renal injuries are preventable, education on appropriately sized gear has the potential to reduce those overall numbers.

Prevention starts at the level of the provider and trainers as athletes will frequently find ways to increase their competitive advantage within the rules. In this particular scenario, the athlete noted wearing equipment that last fit appropriately 4 years prior as he felt it allowed him less restricted movement. Proper education on selecting appropriately sized gear, and stressing the importance of this to trainers - those around the athletes more often - could help reduce unnecessary injuries such as this.

Figure 3: Multiple commercially available rib/kidney pads available for return to play protection.

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