

Tips from Other Journals

Children's Medicine

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Sports Present Small Risk to Those with a Single Kidney

Background: It is estimated that one in 1,500 persons is born with a single kidney. Student athletes with a single, normally functioning kidney are often discouraged from participating in contact or collision sports because of the risk of kidney injury. Surveys of physicians show that most would recommend against participation, especially for contact sports. Although the American Academy of Pediatrics gives a “qualified yes” to participation in contact sports, it does not provide specific guidelines for assessment. Because there are few published data describing the risk of kidney injury, Grinsell and colleagues quantified the incidence of sport-related kidney injury among high school athletes.

The Study: The authors used data from the prospectively collected National Athletic Trainers' Association Injury Surveillance Study. Between the academic years 1995 and 1997, certified trainers at 240 U.S. high schools reported athlete-exposures and injuries among varsity athletes in football, wrestling, baseball, field hockey, softball, girls' volleyball, boys' and girls' basketball, and boys' and girls' soccer. Reportable injuries included any fracture or dental injury, and any other injury that prevented return to play that session or the following day. The type of sport, affected body part, and severity of injury were recorded, as well as whether the injury occurred during a practice or competition, the type of medical management

required, and return-to-play timelines. Catastrophic kidney injury was defined as an irreversible injury or one requiring surgical removal of the kidney. Athlete-exposures were defined as one student athlete playing any portion of one competition or practice.

Results: During the study, more than 4.4 million athlete-exposures and 23,666 injuries were reported. Injury rates, expressed as per million athlete-exposures, were recorded for kidney, head/neck/spine, neurotrauma (including concussion), knee, eye, and testicle. Of the 18 kidney injuries, three were lacerations and 15 were contusions; most kidney injuries (12) occurred during football. None required surgery or resulted in permanent dysfunction. To put kidney injury rates into perspective, football players had the highest rate of kidney injury (9.2 per million athlete-exposures), but also the highest rate of knee injuries (1,225.7 per million athlete-exposures).

Conclusion: Sports-related kidney trauma is rare. This small risk should not limit participation for student athletes with a single functioning kidney.

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Source: Grinsell MM, et al. Sport-related kidney injury among high school athletes. *Pediatrics*. July 2012;130(1):e40-e45.

CT Imaging for Appendicitis: Is Less Radiation Just as Good?

Background: Computed tomography (CT) is increasingly used to evaluate suspected appendicitis in adults because of its accuracy. Because it involves greater radiation exposure than traditional radiography, there is growing concern about its potential carcinogenicity, particularly in children and young adults. Preliminary studies have shown that reducing the radiation dose by 50 to 80 percent does not significantly affect the diagnosis of appendicitis, although concerns about degraded image quality with low-dose techniques have limited its widespread use. Kim ►

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and colleagues conducted a randomized noninferiority trial examining the ability of low-dose CT to detect appendicitis.

The Study: Eligible participants were emergency department patients 15 to 44 years of age in whom the examining physician had a clinical concern for appendicitis. Patients were randomized to receive low-dose or standard-dose abdominal CT with intended effective radiation doses of 2 mSv and 8 mSv, respectively, although the actual dose was automatically adjusted for body size. Patients were excluded if they had a previous appendectomy, prior cross-sectional imaging to evaluate their current symptoms, or contraindications to intravenous contrast material. If the diagnosis of appendicitis remained unclear after the initial clinical observation and CT scan, further ultrasonography or standard-dose CT could be performed at the managing physician's discretion.

For patients undergoing abdominal surgery, the final diagnosis was made based on surgical and pathologic findings. Patients in whom surgery was not performed were monitored for three months following their initial presentation. The primary outcome was the rate of negative appendectomy (i.e., the percentage of appendectomies in which the appendix was not inflamed). Secondary outcomes included the rate of appendiceal perforation, proportion of patients requiring additional imaging, the interval between initial imaging and surgery (or hospital discharge without surgery), and the length of the hospital stay associated with the appendectomy.

Results: Of the 879 patients included in the final outcome analyses, 438 received low-dose CT and 441 received standard-dose CT. Baseline characteristics were similar between groups, including age, body habitus, duration and location of symptoms, temperature, and white blood cell count. The median dose-length product was 116 mGy per cm and 521 mGy per cm for the low-dose and standard-dose groups, respectively. The rate of negative appendectomy was similar between groups (six of 172 appendectomies [3.5 percent] in the low-dose group versus six of 186 [3.2 percent] in the standard-dose group). Although the low-dose group had a longer interval between CT and appendectomy (median = 7.1 hours versus 5.6 hours; $P = .02$), there was no significant difference between groups in the likelihood of need for additional imaging (3.2 percent in the low-dose group versus 1.6 percent in the standard-dose group; $P = .09$), appendiceal perforation rate (26.5 percent in the low-dose

group versus 23.3 percent in the standard-dose group; $P = .46$), or hospital stay for appendectomy (median = 3.4 days for the low-dose group versus 3.2 days for the standard-dose group; $P = .54$).

Conclusion: Low-dose CT was noninferior to standard-dose CT as the first-line imaging test for young adults with suspected appendicitis.

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Source: Kim K, et al. Low-dose abdominal CT for evaluating suspected appendicitis. *N Engl J Med*. April 26, 2012;366(17):1596-1605.

EDITOR'S NOTE: Although this study offers important evidence that acute appendicitis can be diagnosed effectively with less radiation than what is traditionally used, several caveats should be emphasized. First, this study primarily focused on younger adults, with a median age of 29 years in the low-dose CT group and 30 years in the standard-dose CT group. Second, the participants generally had normal body habitus, with only 13 out of 891 persons having a body mass index of 30 kg per m² or greater. Whether low-dose CT imaging would be as useful for diagnosing appendicitis in older or obese patients remains unclear. Third, although the negative appendectomy rates were similar, the authors estimate that the difference (0.3 percentage points) would lead to one additional negative appendectomy for every 330 patients who received low-dose CT. If the goal is to minimize the risk of unnecessary surgery, then the traditional approach would still be recommended. However, considering that the estimated lifetime cancer risk from a single abdominal and pelvic CT scan for a 20-year-old woman is one in 470,¹ many physicians would argue that this is a reasonable trade-off. This brings us to the most important unanswered question that this study raises: will reducing the radiation dose from CT scanning for appendicitis actually result in a lower cancer risk? Unfortunately, no controlled studies have examined this question. Additional trials comparing the relative long-term effects of different imaging modalities need to be performed, although it seems that any reduction in unnecessary radiation exposure would ultimately be good for our patients.—K.T.M.

REFERENCE

1. Smith-Bindman R, Lipson J, Marcus R, et al. Radiation dose associated with common computed tomography examinations and the associated lifetime attributable risk of cancer. *Arch Intern Med*. 2009;169(22):2078-2086. ■