Ultrasound Aids Pediatric Appendicitis Diagnosis

A new classification eases surgical decision making by elevating the importance of secondary signs.

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CHICAGO — A new ultrasound classification facilitates surgical decision making in the diagnosis or exclusion of appendicitis in children by elevating the importance of secondary signs, according to a study presented at the annual meeting of the Radiological Society of North America.

"This ultrasound classification improves sensitivity in children with suspected acute appendicitis. The presence of secondary signs makes acute appendicitis most likely, and the absence of these signs can safely rule out acute appendicitis in children," said Dr. Fraukje Wiersma.

This evaluation of a new classification for diagnosing pediatric appendicitis comes at a time of increasing concern over the widespread use of computed tomography (CT) and the radiation risk it poses to children.

"Furthermore, the lack of abdominal fat in children makes them less suitable for CT," said Dr. Wiersma, of The Hague (the Netherlands) Medical Center.

'This classification ... prevents a high rate of negative appendectomies and [also prevents] complications of unrecognized appendicitis.'

In the standing literature, the abdominal ultrasound is considered positive only when an inflamed appendix is depicted by the sonogram.

"Although secondary signs such as inflamed fat or fluid are described, they are considered to be nonspecific findings and are excluded in the calculation of sensitivity, specificity, and predictive values," Dr. Wiersma said in an interview.

Between May 2005 and June 2006, Dr. Wiersma and her colleagues conducted ultrasound examinations of 212 consecutive pediatric patients aged 2-15 years with suspected appendicitis. Their mean age was 10 years, and 129 of the children were boys.

Depiction of the appendix was classified into four groups: in group 1, the appendix was normal; in group 2, the appendix was not depicted and no secondary signs of appendicitis were present; in group 3, the appendix was not depicted, but secondary signs of appendicitis (inflamed fat or fluid) were present; in group 4, an inflamed appendix was depicted. Patients in the first two groups had negative ultrasounds for appendicitis, whereas those in the latter two groups were considered positive and were treated surgically, she explained.

Ultrasonographic diagnoses were correlated with histopathological results or clinical follow-up.

In addition, the investigators calculated the negative appendectomy rate, the perforation rate, and predictive values of this four-part classification scheme.

Among the 96 patients in group 1, there was one false-negative, a patient who subsequently developed acute appendicitis.

Among the 41 patients in group 2 (those with no secondary signs), none had acute appendicitis at follow-up.

In group 3 (those with secondary signs, including local dilated small-bowel loop, local fluid collections, and/or increased echogenicity of mesenteric fat), 8 of the 10 patients had acute appendicitis, whereas 2 patients had negative appendectomies (1 had primary peritonitis and the other had a necrotic lymph node resected).

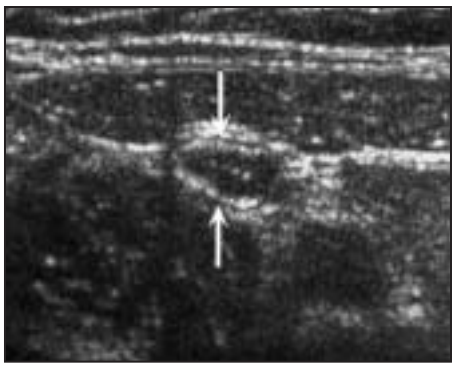
Of the 65 patients in group 4 in whom ultrasound had detected an inflamed appendix, 62 had acute appendicitis. Of the remainder, one patient had chronic inflammatory signs on pathological evaluation, one had a negative appendectomy (a true false-positive), and one was not operated on because of a "miscommunication" and left the hospital without further complaint.

"The prevalence of acute appendicitis in this study population was 34%, and the negative appendix read rate was comparable to that of other ultrasonographic and CT studies," Dr. Wiersma said.

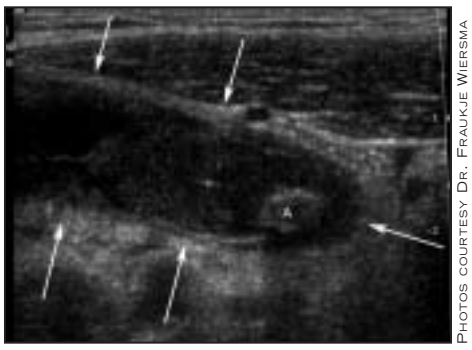
The classification developed by these Dutch researchers, under the direction of Dr. Herma C. Holscher, had a sensitivity of 99%, a specificity of 96%, a positive predictive value of 93%, a negative predictive value of 99%, and an accuracy of 97%, she reported.

Dr. Wiersma added that the sensitivity—but not specificity—is significantly higher than that of the standard method (87%) described in the literature, when applied to this study population.

"This classification of the ultrasonographic depiction of the appendix and surrounding area has high predictive values in children with suspected appendicitis, and prevents a high rate of negative appendectomies and complications of unrecognized appendicitis," Dr. Wiersma concluded. ■



This ultrasound image shows a transverse section of a normal appendix with compression (white arrows).



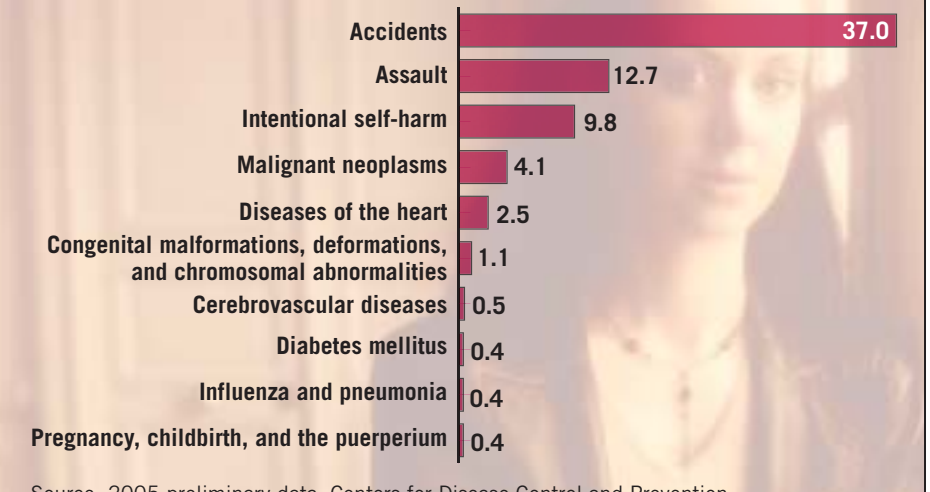
This ultrasound image shows a longitudinal section of an inflamed appendix (white arrows) with increased echogenicity of mesenteric fat (A = appendicolith).

PHOTOS COURTESY DR. FRAUKJE WIERSMA

DATA WATCH

Top 10 Causes of Death for People Aged 15-24 Years

(mortality rate per 100,000 population)



Source: 2005 preliminary data, Centers for Disease Control and Prevention

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