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TITLE

The effect of screening sonography on the positive rate of enemas for intussusception

AUTHORS

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CLINICAL QUESTION

For newborns and young infants with suspected intussusception, are ultrasounds a better screening option than enemas?

P - intussusception in young children 0-3 years of age
I - ultrasound
C - enemas
O - less radiation exposure for children, less invasive and better positive findings

SEARCH STRATEGY

(intussusception diagnosis) AND ultrasound[MeSH Terms]) AND
enemas[MeSH Terms]
Database(s): PubMed
Keyword: Diagnosis
MeSH: Ultrasound, enemas

METHODS DESCRIPTION

The study was conducted at the Department of Radiology, University of Michigan Health System. The investigators evaluated children who had a request for an enema to be preformed to exclude the possibility of an intussusception diagnosis from October 1995 to January 2002. From October 1995 and December 2000 184 children participated in the study, and from January 2001 until January 2002 40 more joined for a total of 224 children. Emergency room physicians, pediatricians, or pediatric surgeons identified patients with a clinical suspicion of intussusception based on their symptoms. Two children were straight for an enema examination with no screening beforehand. The study being evaluated was a cohort study.

METHOD INTERPRETATION

A) The study was non-blinded. All children received an ultrasound and if the ultrasound was positive they then received an enema (air or barium) for comparison. Ultrasound screening plus an enema if US was positive was compared with use of only an enema procedure, which had been the reference standard in diagnosing intussusceptions.

B) The sample included 40 children with intussusceptions with a mean age of 2.2 years. This coincides with the incidences of pediatric intussusceptions usually occurring below 2 years of age. However, the US screen was not tested in older patients who could have rectal intussusceptions. The article also seemed to focus on ileocolic intussusceptions and did not adequately address if the ultrasound screen could be used on atypical intussusceptions.

C) The physicians at first were not immediately trusting of ultrasound as a screening tool despite the well documentation of ultrasound as an excellent screening test. So, ultrasound screening at first, required the use of enemas in patients suspected of having intussusception. They wanted to show the physicians that ultrasound is sufficient in itself as a screening tool for intussusception, without the use of enemas. Sooner than expected, the physicians became comfortable with the use of screening sonography after the initial six cases. Following these results, the physicians no longer asked for enemas following sonography. Lastly, the study was also able to demonstrate that a change in ordering practice by clinicians can be successfully introduced.

D) The screening test, in this case, is performing an Ultrasound on patients with suspected intussusception. If a patient has signs and symptoms which makes the clinician suspicious of intussusception, they would undergo initial screening sonography. The article indicated in sufficient detail how someone who is trained in sonography should use the ultrasound to look for a positive finding of intussusception. This finding would consist of a "donut sign with a hypoechoic outer ring and echogenic center and/or concentric rings." Also, the article provided a figure of a typical lesion one would find in a patient with a positive ultrasound finding of intussusception.

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RESULTS

Between 1995-2000, the main diagnostic test for suspected intussusception was enema. In that time, 184 children were sent for an enema, and 40 (22%) of those cases reported positive for intussusception. From 2001-2002, 40 more children with suspected intussusception were seen. Out of these children, two went straight for an enema study due to neglect of US performance by a resident. One was positive, one was negative. For the remaining 38 children, an US was performed first. Within this group, 26 of 38 were found negative and 7 of these 26 children underwent a subsequent enema that confirmed the US diagnosis. The remaining 12 children had positive findings on the ultrasound, and 11 of the 12 had an enema that confirmed the positive finding. If clinicians had only ordered enemas for positive patients during the entirety of the study, the price would have dropped from $25,422 to $20,760. In addition, an 820 mR dose of radiation would have been saved in each child with a negative US if they had not undergone an enema after the US diagnosis. After seeing these results, referring physicians at the hospital decided to cancel enemas in 19 out of 22 children with a negative US. The three of these children with negative US that still had an enema all had negative enemas.

Comments-

In the study, all enemas that were performed after the ultrasound confirmed the US findings. Ultimately, the results of this study along with the subsequent actions of the physicians at the hospital establish that US is a great, less invasive screening test for intussusception. Furthermore, the use of US reduces costs as well as radiation exposure. However, morbidity and mortality associated with an intussusception diagnosis is high, and at the time of the study many physicians preferred to be more cautious and use the enema as a diagnostic test.

TRANSLATIONAL APPLICATIONS

Overall, this study covered a 13-month period and looked at data collected from over 200 pediatric patients. Given that the study cites a high degree of sensitivity with the use of ultrasound screening in intussusception, it seems that the results are very reproducible. Of the population that was studied, the study reports no intussusception cases missed by ultrasound screening which lends much confidence in the interpretation of the study's results. Since our clinical question refers mainly to a pediatric patient population, this study and its results are very applicable since pediatric radiologists mainly led the study. The results from this study should change the way physicians practice as it addresses the increasing costs of healthcare and unnecessary pediatric exposure to radiation. Ultrasound screening is a more affordable method of intussusception detection and can eliminate unnecessary enemas, which bring radiation exposure. If technicians, residents, attendings, and essentially anyone else that is responsible for the care of the pediatric population facing a possible diagnosis of intussusception is given the proper training and resources for the use of the ultrasound screening, this method of detection becomes very practical, especially for emergent cases. Thus, pediatric patients will be better off. By eliminating the needs for enemas via ultrasound screening, these pediatric patients and their families are able to avoid the stress that accompanies an enema procedure, and the emergency rooms that these patients usually present to are better able to address the needs of these patients without calling in a pediatric radiologist.

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