Digital imaging by parents: an aid to the diagnosis of inguinal hernia in infants and children

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ABSTRACT

Introduction: The aim of the study is to see the feasibility of utilisation of digital imaging by parents in the diagnosis of inguinal hernia in children, and reduce the rate of occasional negative groin exploration.

Methods: During a two and a half year period, 155 inguinal hernias were diagnosed and operated on in our university teaching hospital. The diagnosis was based on the history and physical examinations of all patients. In 21 patients, the diagnosis was made based on the examination of history alone, as they did not demonstrate the hernia at presentation. In the last year, digital imaging by parents was utilised to aid in the diagnosis of difficult cases. There were ten cases, in addition to the history and physical examinations, that were confirmed by this method. All hernias were confirmed at exploration during surgery.

Results: Out of 155 inguinal hernias, 21 (13.5 percent) were diagnosed by history alone, of which four (2.5 percent) had negative exploration, eight (5.1 percent) were positive for hernia, supported with digital imaging by parents' pictures, and nine (5.8 percent) were positive at exploration, without any additional means of diagnosis.

Conclusion: History-taking and physical examinations are the mainstay of diagnosis of inguinal hernia in children. The capture of a digital image of the presenting complaint by the patients' parents, can be used as an additional aid in the diagnosis of difficult cases to demonstrate inguinal hernia, as demonstrated in a selected group of children.

Keywords: diagnosis of inguinal hernia, digital imaging, inguinal hernia, parents

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INTRODUCTION

Currently, no accurate method exists for the diagnosis of inguinal hernia, especially in young infants. History-taking and physical examinations remain the mainstay in the diagnosis of inguinal hernia in children. Unless the hernia is out or incarcerated, causing a bulge, or obvious asymmetry of the groin, diagnosis relies on history alone. The most accurate way of diagnosis is to visualise it out and to reduce it during physical examination, especially in young infants. Few methods have been used over the years with various success rates. The contralateral side has been the focus of attention and study. The purpose of this study is to raise awareness of digital imaging that may be employed for diagnosing inguinal hernia, and to encourage readers and medical personnel to further utilise it.

METHODS

During the past two and a half years, from July 2004 to December 2006, 155 inguinal hernias in 137 children were diagnosed and operated on in our university teaching hospital. There were 115 (83.9%) males and 22 females (16.1%), 81 (59.1%) hernias were on the right side, 38 (27.7%) were on the left side, and 18 (13.1%) were bilateral. Their ages ranged from one week to 12 years (Table I).

RESULTS

Diagnosis of inguinal hernia was made in four different ways: (1) hernias which were obvious and reducible all the time; there were 95 (61.3%) cases; (2) hernias which were incarcerated or there was a history of incarceration, reduction and referral for surgery; there were 16 (10.3%) cases; (3) hernias that demonstrated on effort or change in position (standing from sitting), or crying; there were 16 (10.3%) cases; and (4) hernias that were diagnosed based solely on history alone; there were 21 (13.5%) cases. Comorbid disease conditions associated with hernia, and simultaneous operations along with herniotomy, were recorded. Both had no relation to the diagnosis of hernia.

DISCUSSION

A common and frustrating problem faced by all paediatric surgeons is the course to follow when an excellent history of inguinal hernia exists, but the hernia cannot be demonstrated at presentation. The majority of inguinal hernias in children are diagnosed with certainty, but are occasionally difficult to diagnose in some cases;

Table 1. Demographics of patients, diagnosis, comorbid diseases, and simultaneous procedures performed at the time of herniotomy.

Demographics	No. of cases (%)
Gender	
Male	115 (83.9)
Female	22 (16.1)
Total	137 (100)
Side of presentation	
Right side	81 (59.1)
Left side	22 (27.7)
Bilateral	81 (13.1)
Total	155 (100)
Diagnosis	
All times	98 (63.2)
Effort	20 (12.9)
Incarceration	16 (10.3)
History alone	21 (13.5)
Positive	9 (5.8)
Positive with digital camera	8 (5.1)
Negative	4 (2.5)
Total	155 (100)
Comorbid disease	
None	0
Prematurity	5
Central nervous system pathology	6
Congenital heart disease	3
Collagen disease	2
Total	16 (10.3)
Total simultaneous procedure	
None	0
Circumcision	16
Hydrocele	7
UDT	6
Umbilical hernia	2
Orthopaedic procedure	3
Total	34 (21.9)

a situation where the history is typical, but the hernia cannot be demonstrated. Or a question of hernia is raised and the paediatric surgeon is consulted to rule out the presence of a hernia. In an article by Rowe and Marchildon, in which questionnaires were sent to senior paediatric surgeons regarding the diagnosis of inguinal hernia in children, 45% said they would operate based on history alone, while 55% would examine the child again. The results were similar even when a paediatrician referred the child—35% would operate and 65% would examine the child again.[1] Traditional methods used to diagnose inguinal hernia in infants and children are: history-taking and physical examination; silk glove sign; herniography; ultrasonography (US), picture taken with a Polaroid camera; and laparoscopy for the contralateral side diagnosis.

The most accurate diagnosis is when the paediatric surgeon encounters the hernia out while examining the child and reduces it by his own hand. The next encounter is the obvious asymmetry between the two sides of the groin or inguinoscrotal region due to chronic hernia, resulting in thickening of the cord structures. This is best demonstrated while the child is in the upright position. The silk sign is not always easy to elicit.

Herniography is considered by most paediatric surgeons as a difficult procedure, and carries risk of complications. Although its accuracy rate is about 90%, its use has been discontinued.[2] US has been used in all fields of medical diagnosis, but rarely in the diagnosis of inguinal hernia. Its diagnostic accuracy for patent processus vaginalis (PPV) was 86.6% and 96.6% in two separate studies.[3,4] US is well known to be an operator-dependent instrument, and individual variation is substantial. Only a few recent reports on the use of US in the diagnosis of inguinal hernia have appeared in the literature.[5-7] Laparoscopy was only popularised for the diagnosis of contralateral side while operations were performed on a definite hernia. Pictures taken with a Polaroid camera, once popular, was suggested as a tool to diagnose the hernia while out. Today, with the widespread availability and use of the digital camera in many households, parents may utilise digital imaging to capture incidents like inguinal hernia in a child. We operated on 21 (13.5%) cases based on history alone. We encountered 9 (5.8%) positive cases on explorations without any additional diagnostic measures, 8 (5.1%) positive cases which were clinically diagnosed and supported with the use of digital imaging by a parent, and 4 (2.5%) cases with negative exploration. There is, to our knowledge, no reports in the literature on negative explorations to compare our results with; however, while the numbers are small, it can be reduced with more utilisation of digital imaging.

Although history-taking and physical examination remain the mainstay of diagnosis of inguinal hernia in children, the capture of a digital image of the presenting complaint by parents, can be used to aid in the diagnosis of inguinal hernia in a selected group of infants and children, and further reduce the negative exploration rate.

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