Incarcerated Pediatric Hernias

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KEYWORDS

• Incarcerated pediatric hernia • Inguinal hernia • Umbilical hernia • Spigelian hernia • Femoral hernia

KEY POINTS

- Indirect inguinal hernias are the most commonly incarcerated hernias in children, with a higher incidence in low birth weight and premature infants.
- Contralateral groin exploration to evaluate for a patent processus vaginalis or subclinical hernia is controversial, even laparoscopically, given that most never progress to clinical hernias.
- Most indirect inguinal hernias can be reduced nonoperatively. Given the high risk of recurrence and morbidity, it is recommended to repair them in a timely fashion, even in premature infants.
- Laparoscopic repair of incarcerated inguinal hernia repair is considered a safe and effective alternative to conventional open herniorrhaphy.
- Other incarcerated pediatric hernias (umbilical, femoral, spigelian, epigastric, lumbar, and direct inguinal), which are extremely rare, may be managed effectively with laparoscopy.

INTRODUCTION

Indirect inguinal hernias are the most common incarcerated pediatric inguinal hernias, although incarceration of other pediatric hernias, such as femoral, umbilical, spigelian, epigastric, direct inguinal, and lumbar, has been reported in the literature. This article discusses the current literature on the diagnosis and management of incarcerated hernias.

INDIRECT INGUINAL HERNIA

Epidemiology

Indirect inguinal hernia is one of the most common surgical conditions seen by pediatric surgeons.[1] The overall incidence of indirect inguinal hernias ranges from 0.8% to 5% in full-term infants,[2,3] but the risk is significantly increased in low birth weight (<1 kg) and premature infants, with a prevalence up to 30%.[3,4] The risk of incarceration

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in children ranges from 3% to 16%, although it is as high as 31% in premature infants, with most occurring within the first year of life.[5,6] Inguinal hernias are more common in boys compared with girls (5:1 ratio), but girls have a higher incidence of bilateral inguinal hernias compared with boys (25.4% vs 12.9%). There does not seem to be a difference in rate of incarceration between boys and girls.[2,7]

Anatomy

An indirect inguinal hernia is a congenital abnormality from the failure of the processus vaginalis to close. The processus vaginalis is an outpouching of peritoneum that, along with the gubernaculum, guides the testes in their descent through the inguinal ring into the scrotum. In girls, the canal of Nuck, which is functionally similar to the processus vaginalis, terminates in the labia majora and assists in guiding the ovaries to their final location in the pelvis. The processus vaginalis and canal of Nuck both close between 36 and 40 weeks of gestation. The left testis descends before the right and commonly closes first, resulting in a higher incidence of right-sided inguinal hernias (60%).[1,8]

Clinical Presentation/Diagnosis

Most inguinal hernias are asymptomatic, and they are often found during routine physical examination, or by a parent. It presents as intermittent bulging in the groin, scrotum, or labia, often with straining. An incarcerated hernia presents as an irreducible nonfluctuant bulge that is tender and may be erythematous. The child is usually inconsolable, and may have obstructive symptoms such as nausea/vomiting, lack of bowel function, and abdominal distention. If incarceration progresses to strangulation, the child may have peritonitis, bloody stools, and hemodynamic instability.

Other conditions may be confused for an incarcerated hernia, such as a retractile testis, lymphadenopathy, and hydrocele.[8] Although ultrasonography has been described as a tool to help differentiate these causes,[9] physical examination can help make the correct diagnosis. For example, if the clinician's fingers can discretely feel the upper edge of the bulge in the scrotum, then it is likely a hydrocele because a hernia has bowel going up into the inguinal canal. Also, a hydrocele should not be tender. Abdominal radiograph may show dilated loops of bowel and/or air fluid levels consistent with a bowel obstruction.

Nonoperative Management

Unless there is evidence of bowel compromise, peritonitis, or hemodynamic instability, nonoperative reduction should be attempted because 70% to 95% of incarcerated inguinal hernias are successfully reduced.[5,10,11] Reduction attempts are usually performed using sedation and analgesics, although there is not a standardized protocol, and pharmacotherapy should be at the discretion of the provider.[12]

The following is the preferred technique of the authors for nonoperative reduction. The patient is placed in the supine position. One hand should be placed above the external ring, with fingers around the hernia neck to keep it fixed in place and prevent the hernia contents from sliding over the external ring. The other hand should provide simultaneous moderate and steady pressure on the hernia contents toward the abdominal cavity along the axis of the inguinal canal and internal ring. Continuous pressure may help push out some of the bowel edema and regular, delicate movement of the fingers on the hernia sac may move the hernia contents, both aiding in reduction.[13] It may take several minutes to successfully reduce the hernia.

If the inguinal hernia is unable to be reduced, or there is concern for an incomplete reduction, then operative reduction should be performed emergently. Although it is unlikely to reduce gangrenous bowel successfully, it has been reported to be possible in the literature, so there should be close observation of the patient afterward.[14]