Contralateral inguinal exploration in males under 2 years with unilateral inguinal hernia; is it justified ?

Thesis
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استكشاف المنطقة الإربية المعاكسة فى الذكور أقل من عامين الذين يعانون من فتق اربى فى جهة واحدة : هل هو مبرر؟

رسالة توطئة
للحصول على درجة الماجستير في الجراحة العامة

مقدمة من

مصطفى محمود ابراهيم ابراهيم
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Introduction

Inguinal hernias and hydroceles are among the most common pediatric surgical problems and inguinal hernia repair is one of the most common operations performed by pediatric surgeons.

The incidence of indirect inguinal hernia in term neonates is about (3.5-5%), which increases in premature neonates to reach (9-11%). Inguinal hernia is more common in boys (male to female ratio is about 5:1 to 10:1) ***(Judah, 2000)***.

Few topics in pediatric surgery have drawn as much attention or generated more controversy than the management of the contralateral side in children presenting with a unilateral hernia.

The advantages of routine contralateral exploration are related to avoiding the issues associated with the development of contralateral hernia, including parental anxiety, cost, anesthesia, and risk of contralateral incarceration. The disadvantages include potential injury to the vas deferens and testes, increased operative time, and the fact that in many infants it is an unnecessary procedure ***(Frederick, 2005).***

The relevant issues in the debate revolve around the frequency of occurrence of contralateral hernias and the relation of this to age, gender, and side of the clinically apparent hernia ***(Frederick, 2005).***

In this study we are trying to know the frequency of occurrence of contralateral inguinal hernia in full term boys below 2 years old after unilateral inguinal hernia repair in order to determine if routine contralateral inguinal exploration in this age group is justified or not.

Incidence

Inguinal hernia repair is the most common operation performed by pediatric surgeons. The percentage of children with inguinal hernias ranges from 0.8% to 4.4 % ***(Philip and Scott, 2006).***

Age:

Inguinal hernia most commonly presents during the first year of life, with a peak during the first few months and approximately one third of children are younger than 6 months at the time of operation ***(Philip and Scott, 2006).***

The highest incidence of hernia is found in premature infants: 16% to 25%.This correlates fairly well with the patency rate of the processus vaginalis; at birth, 80% are patent, and the rate decreases dramatically during the first 6 months of life. However, all indirect hernias, regardless of age at presentation, are likely secondary to failure of the processus vaginalis to close completely during fetal and newborn development ***(Philip and Scott, 2006).***

Sex:

Males are much more likely to have hernias, with the reported male-female ratio between 3:1 and 10:1.Although premature infants have a higher incidence of hernia, there does not appear to be a significant gender difference among this group ***(Philip and Scott, 2006).***

Side:

Approximately 60% of hernias are right sided. This is true for males and females. In males, this is possibly the result of the later descent of the right testicle than the left, but this obviously does not explain the observation in females. Bilateral hernias are present in approximately 10% of cases. It has been suggested that patients with left-sided hernias are more likely to develop right-sided hernias than vice versa. More recent data suggest that this may not be true, however ***(Philip and Scott, 2006).***

Family History:

Approximately 11.5% of patients have a family history of hernia. There is an increased incidence in twins as well about 10.6% in male twins and 4.1% in female twins ***(Philip and Scott, 2006).***

Table (1): Factors that may contribute to development of congenital inguinal hernia ***(Philip and Scott, 2006)***.

Factors Contributing to the Development of Congenital Inguinal Hernia
Urogenital: • Undescended testis • Exstrophy of bladder
Increased peritoneal fluid: • Ascites • Ventriculoperitoneal shunt • Peritoneal dialysis
Increased intra-abdominal pressure: • Repair of exomphalos or gastroschisis • Severe ascites (e.g., chylous) • Meconium peritionitis
Chronic respiratory disease: • Cystic fibrosis
Connective tissue disorders: • Ehlers-Danlos syndrome • Hunter-Hurler syndrome • Marfan's syndrome • Mucopolysaccharidosis

Embryology and Pathophysiology

Most inguinal hernias in infants and children are indirect inguinal hernias due to a patent processus vaginalis. The embryology of the inguinal region relates to the development and descent of the testes and their relation to the processus vaginalis.

The gonads develop near the kidney as a result of migration of primitive germ cells from the yolk sac to the genital ridge, which is completed by 6 weeks' gestation. Differentiation into testes or ovaries occurs by 7 or 8 weeks' gestation under hormonal influences ***(Frederick and Rescorla, 2005).***

The gubernaculum forms from the caudal end of the mesonephros and is attached to the lower pole of the testes. The lower portion of the gubernaculum has several thin, cordlike structures that appear to guide the testes into the scrotum. These occasionally pass to ectopic locations (perineum or femoral region) outside the line of normal scrotal descent ***(Frederick and Rescorla, 2005).***

Downward retroperitoneal migration of the gonads starts at about 3 months' gestation. The ovary reaches the pelvic brim

at about 12 weeks' gestation and remains at this level. The remnant of the gubernaculum in girls forms the ovarian and uterine ligaments. The testes continue to descend, reaching the level of the internal ring by 7 months' gestation ***(Frederick and Rescorla, 2005).***

The peritoneum bulges into the inguinal canal as the processus vaginalis during the third month prior to testicular descent. The gubernaculum precedes the testes and begins to shorten as it approaches the bottom of the scrotal sac. The testes descends from the internal inguinal ring during the seventh month of gestation and passes through the inguinal canal in a few days, but takes about 4 weeks to migrate from the external ring to the lower scrotum ***(Frederick and Rescorla, 2005).***

As the testis evaginates the abdominal wall, the layers of the spermatic cord are formed from the layers of the abdominal wall. The internal spermatic fascia forms from the transversalis fascia, the cremasteric fascia from the internal oblique and transversus abdominis muscle, and the external spermatic fascia from the fascia of the external oblique ***(Frederick and Rescorla, 2005).***

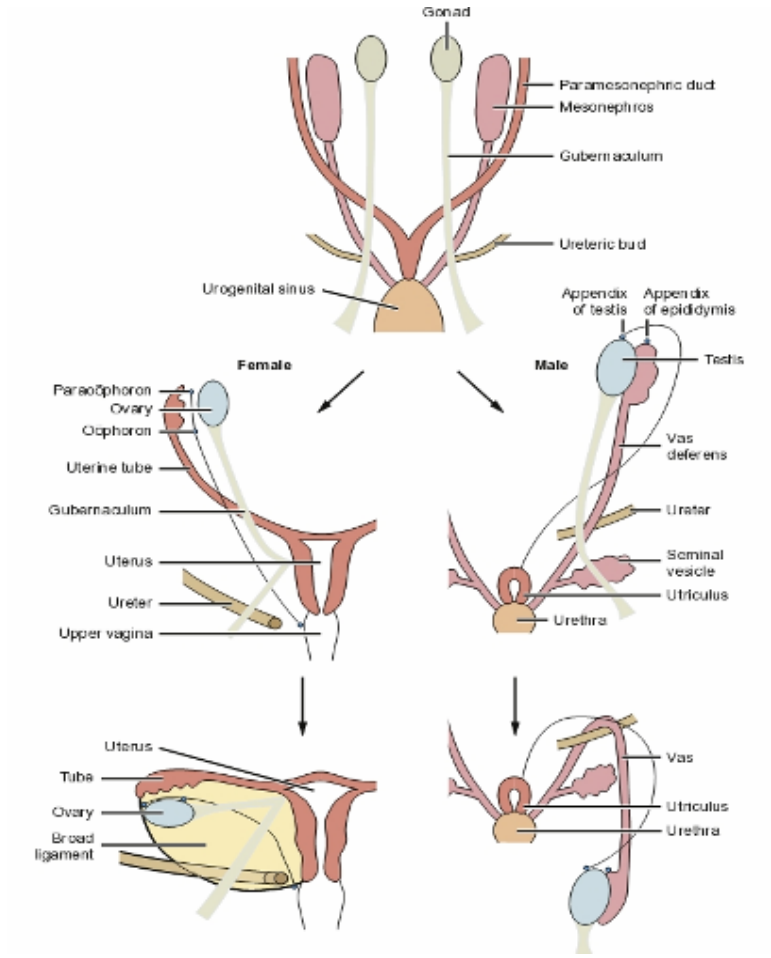

Figure (1): Internal genital development. After an indifferent phase, development follows a male or female pathway. In the female, the gonad differentiates into an ovary, and the paramesonephric ducts form the tubes, uterus, and upper vagina. The mesonephric duct degenerates and forms the ovarian and round ligaments, with vestigial remnants persisting as the epo oöphoron, the paro oöphoron, and Gartner cyst. In the male, the gonad differentiates into a testis and the mesonephric duct into the epididymis and vas deferens. The testis is united with its duct system through remnant tubules from the mesonephros, and the upper end of the mesonephric duct forms the vestigial appendix of the epididymis. The paramesonephric duct persists as the vestigial appendix testis and the prostatic utricle. ***(Peter, 2010)***

The processus vaginalis normally closes during the last few weeks of term gestation after the completion of testicular descent. Patency associated with undescended testis suggests that closure can occur only after descent of the testicle and that these processes are linked ***(Frederick and Rescorla, 2005).***

The biologic mechanisms that signal and direct the descent of the testicle through the inguinal canal and obliterate the processus are, for the most part, unknown. Androgens appear to play a role, because patency of the processus is common in androgen insensitivity syndrome ***(Frederick and Rescorla, 2005).***

However, the processus itself has no androgen receptors. Some studies showed the role of the genitofemoral nerve and calcitonin gene-related peptide (CGRP) in both testicular descent and obliteration of the processus vaginalis. They suggested that reduced CGRP release from the genitofemoral nerve prenatally may result in undescended testis, whereas reduced release postnatally may lead to hernias and hydroceles ***(Clarnette and Hutson, 1996).***

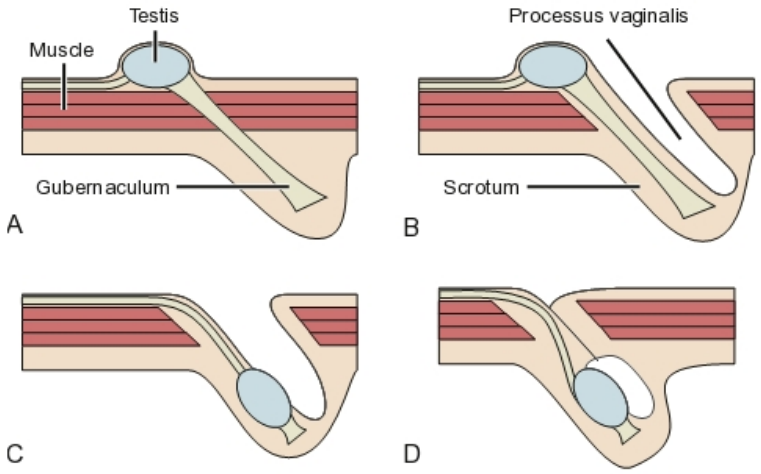

Figure (2): A-D, Development of the processus vaginalis and testicular descent. The gubernaculum traverses the abdominal wall musculature. The processus vaginalis extends along the gubernaculum, and the testis descends on its posterior wall, so that the body of the testis lies within it. The connection with the abdominal cavity is obliterated, leaving a peritoneum-lined space anterior to the testis, the tunica vaginalis. Failure of obliteration of the processus vaginalis results in a hernia or hydrocele, depending on the lumen of the connection. Occasionally, a cyst forms along the inguinal canal, representing a hydrocele of the cord **(Peter Cuckow, 2010).**

It is unknown where in the processus (i.e., proximal, middle, or distal) closure begins. After closure, the processus persists as a cord, which subsequently disappears. The portion adjacent to the testes becomes the tunica vaginalis. In girls, the canal of Nuck corresponds to the processus vaginalis, opens into the labium majus, and usually obliterates earlier than the male processus vaginalis ***(Philip and Scott, 2006).***

The exact timing of closure is uncertain. Studies have suggested that as many as 80% to 100% of infants are born with a patent processus vaginalis and that closure, if it occurs, is most likely within the first 6 months of life. After that, the patency rate falls more gradually and plateaus around age 3 to 5 years ***(Philip and Scott, 2006).***

Failure of the processus vaginalis to close accounts for nearly all inguinoscrotal abnormalities seen in infancy and childhood. Although reason for failure of closure is unknown, it is more common in cases of testicular nondescent and prematurity. In addition, persistent patency is twice as common on the right side, which is probably related to later descent of the right testis. Depending on the degree of patency of the distal processus, the hernia may be confined to the inguinal region or pass down into the scrotum ***(Frederick, 2005).***

An indirect inguinal hernia occurs when intestinal contents enter the inguinal region through a patent processus vaginalis while communicating hydrocele occurs when the opening is narrow, allowing fluid but not intestinal structures to pass into the inguinoscrotal region ***(Philip and Scott, 2006).***

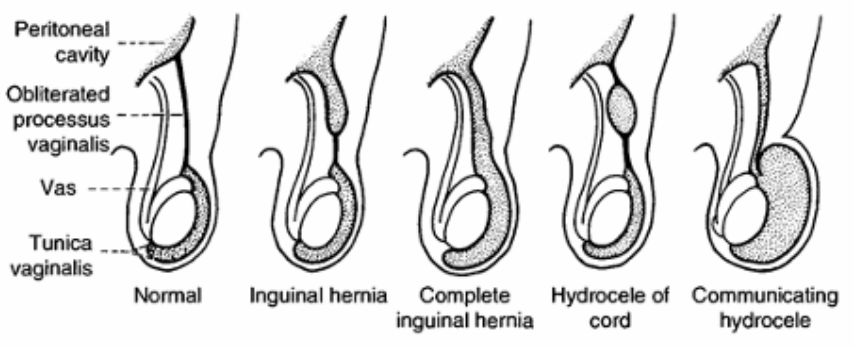

Figure (3): The most common variants of hernias and hydroceles arising from failure of complete obliteration of the processus vaginalis ***(Philip and Scott, 2006)***.

A scrotal hydrocele occurs when the proximal portion of the processus vaginalis obliterates and the tunica vaginalis fills with fluid. A hydrocele can also occur along the cord because the processus may obliterate proximal and distal to an isolated cystic dilation which is known as encysted hydrocele of the cord. In little girls, the processus (canal of Nuck) may remain patent and may fill with fluid, or allow the ovary and fallopian tube to enter the inguinal region ***(Philip and Scott, 2006).***

Although it is clear that a patent processus vaginalis is a prerequisite for an inguinal hernia, it is not sufficient, and other factors are involved as shown in Table 1 ***(Philip and Scott, 2006).***

Management

Clinical presentation and diagnosis:

Most commonly inguinal hernias present as an asymptomatic intermittent groin bulge which is easily reducible in a child who is otherwise well. Symptoms of poor feeding and irritability, occasionally described in infants with reducible hernias, often persist after herniotomy. Older children may complain of groin pain particularly after exercise ***(Emma and Agostino, 2006).***

They are often found by the parents or by the pediatrician on routine physical examination. The diagnosis is clinical and rests squarely on the history and physical examination. Maneuvers such as having the child raise the head while supine or "blowing up a balloon" with a thumb in the mouth may be helpful in small children. Standing the child upright may also help demonstrate the hernia ***(Charles, 2010).***

The differential diagnosis includes a retractile testis, inguinal lymphadenopathy, hydrocele, and prepubertal fat. In older children, neoplasia must be considered ***(Philip and Scott, 2006).***

False-negative explorations should be rare but a common occurrence is a normal examination in combination with a suggestive history. Some surgeons have the child return for a