Transhernial diagnostic laparoscopy for detection of contralateral subclinical patent processus vaginalis in cases with negative preoperative ultrasound

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Introduction and objective
Bilateral inguinal hernias are relatively common in children; this fact has led to a controversy about the necessity of bilateral surgical exploration during the repair of unilateral inguinal hernia in children. The aim of our study is to evaluate transhernial laparoscopy as a tool for the detection of subclinical contralateral patent processus vaginalis (CPPV) in cases with negative preoperative ultrasound (US).
Patients and methods
This prospective study included 60 kids who underwent unilateral herniotomy in the period from October 2015 to October 2016 at Pediatric Surgery Unit, Sohag University Hospitals, Sohag, Egypt. Ethics committee approval was obtained. Patients with bilateral hernia and those with detected subclinical CPPV by preoperative US all were excluded. Two parameters were used for evaluation of subclinical CPPV, using transhernial diagnostic laparoscopy technique: the first was inflation of the contralateral scrotal compartment in males or labia in females and the second was laparoscopic visualization (exploration) of contralateral internal ring. Demographic data, laparoscopic operation time, difficulties in the procedure, and results were all reported and analyzed.
Results
Of 60 patients, 48 were male and 12 were female. Laparoscopic operative time ranged from 5 to 12 min. Hernia side was right in 40 patients (32 male and eight female) and left in 20 patients (16 male and four female). Subclinical CPPV was proved, using transhernial diagnostic laparoscopy technique in five patients and the procedure was completed by contralateral herniotomy.
Conclusion
Transhernial diagnostic laparoscopy, for cases with negative preoperative US regarding CPPV, is a feasible, rapid, safe, accurate method, with easy technique and it seems to be more sensitive than preoperative US.

Keywords:
herniotomy, laparoscopic visualization, subclinical contralateral patent processus vaginalis

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Introduction

Concurrent contralateral inguinal exploration in children with unilateral hernia or hydrocele is a subject of considerable debate. Historically, reported incidence of contralateral hernia was documented to be up to 30%. In addition, prophylactic contralateral exploration was recommended in all cases [1]. However, recent studies and meta-analysis revealed that the risk of contralateral hernia ranges only between 5.7 and 9.5% [2,3]. Therefore, it is widely considered that contralateral groin exploration is not justified in children with unilateral disease because of the low incidence of contralateral hernia and the potential for operative complications.

To avoid unnecessary contralateral inguinal exploration, several preoperative diagnostic tools, such as physical examination, preoperative ultrasound (US), and herniography, have been used. However, these tests have low accuracy rates and high false positive rates [4]. In 1992, laparoscopy (umbilical port) was introduced as a tool for the diagnosis of subclinical contralateral patent processus vaginalis (CPPV) [5]. If CPPV is observed laparoscopically, the patent processus vaginalis can be repaired through a groin incision or laparoscopy. Transinguinal laparoscopy (inguinoscopy) has been shown to be a safe, accurate, and effective method of evaluating CPPV [6].

Objective

The objective of this study was to evaluate transhernial laparoscopy as a tool for the detection of subclinical CPPV in cases with negative preoperative US.

Patients and methods

This prospective study included 60 patients who underwent unilateral herniotomy, with negative preoperative ultrasonographic finding regarding CPPV, in the period from October 2015 to October 2016 at Pediatric Surgery Unit, Sohag University Hospital, Sohag, Egypt. Patients with bilateral clinically patent processus vaginalis or those with detected CPPV by US all were excluded from this study.

After acceptance of the scientific and ethics committee of our institution, the surgical procedures were fully explained to the parents and a written informed consent was obtained from parents.

Pediatric patients with clinically and sonographically unilateral patent processus vaginalis were admitted and routine investigations were done; inguinal incision, identification of the spermatic cord or round ligament, dissection of the sac, and opening of the sac were performed, and at this step a 5-mm laparoscopic trochar cannula was introduced through the sac. Insuflation of the abdomen by CO_2 was done at a flow rate of 1 l/min to a pressure of 8–10 mmHg. A 30° angled 5 mm telescope was then introduced and patients were repositioned at trendelenberg position for better visualization of the pelvis.

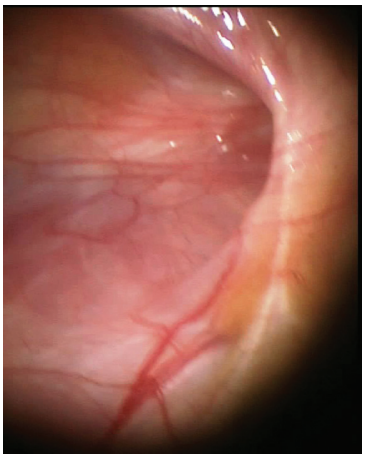
Two parameters were used for evaluation of subclinical CPPV, using transhernial diagnostic laparoscopy technique: the first was inflation of the contralateral scrotal compartment in males or labia in females and the second was laparoscopic visualization of patent contralateral internal ring. Accordingly, contralateral processus was considered patent in the presence of at least one of them. Deflation of the abdomen and herniotomy is completed. In cases with patent contralateral processus viginalis, a contralateral herniotomy is completed. Data were analyzed statistically using STATA intercooled version 9.2; STATA 9.2 software (Stata Corp LP, College Station, USA) was used for statistical analysis. Quantitative data were analyzed using Student's *t*-test to compare mean of two groups as data were normally distributed. Qualitative data were compared using χ^2-test. *P* value was considered significant if it was less than 0.05.

Results

Of 60 patients, 48 (80%) were male and 12 (20%) were female, with a male : female ratio of 4 : 1. Age ranged from 10 weeks to 8 years (mean=3.4 years and median=3.5 years). Prematurity was reported in 18 (30%) patients. The hernia was right in 40 (67%) patients (32 male and eight female) and left in 20 (33%) patients (16 male and four female).

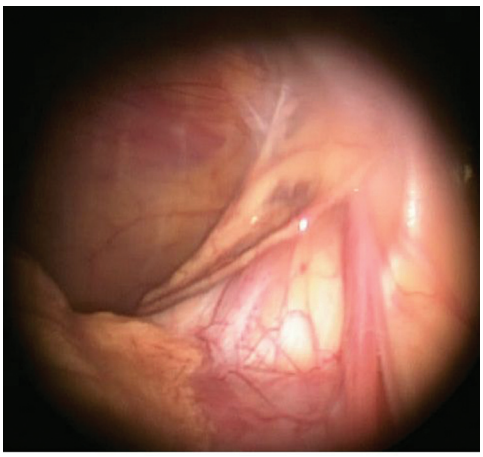
Laparoscopic operative time, calculated from introduction of the trochar cannula to extraction, ranged from 5 to 12 min (mean=8.2 min and median=8.5 min). Patent contralateral side was established in five (8.3%) patients where the procedure was completed by contralateral herniotomy (Fig. 1). Diagnosis depended on both inflation and visualization in four cases. Failure of visualization of the contralateral internal ring occurred in three (5%) cases: one because of adhesions and the other two cases because of peritoneal veil, which partially cover the internal inguinal ring and obscure its visualization (Figs 2 and 3). One of those cases had patent contralateral processus depending on inflation of the contralateral scrotal compartment. No intraoperative complications were reported during the inguinoscopy.

Figure 1



Patent contralateral internal ring

Figure 2



Adhesions obscure visualization of the contralateral internal ring

Figure 3

Peritoneal veil

Discussion

The advantages of contralateral inguinal exploration include prevention of additional anesthesia and surgeries, minimizing parental and patient inconvenience, elimination of the possibility of incarceration, and reduced costs [7]. The dissenting opinion is that the true incidence of contralateral inguinal hernia is low [8].

Many authors used preoperative US for evaluation of subliminal CPPV with documented accuracy rate ranging from 91.6 to 95%, which was confirmed by diagnostic laparoscopy or surgical exploration [9–11].

Laparoscopic examination is introduced as a tool for the diagnosis of CPPV. It enables the direct visualization of anatomic defects of the contralateral internal inguinal ring. Studies have shown that the additional time required for laparoscopic inspection is only 2–17 min [12]. In our study, the range of additional time was 5–12 min.

However, inguinoscopy has certain limitations. Since the peritoneal veil sometimes partially covers the internal inguinal ring, a direct view of the inguinal ring can be interrupted. The failure rates are reported as 3–8% [4]. On the other hand, failure to visualize the internal ring was reported in 5% of our cases. In addition, when it is difficult to observe the opened ring directly, bulging of the contralateral scrotum during gas inflation or air bubbles from the inguinal canal during scrotal manipulation are also evidence of patent processus vaginalis, which was documented in one case of our series. Thus, it is considered that these diagnostic observations can overcome the limited visibility.

Conclusion

Transhernial diagnostic laparoscopy, for cases with negative preoperative US regarding CPPV, is a feasible, rapid, safe, accurate method, with easy technique, and it seems to be more sensitive than preoperative US.

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Nil.

Conflicts of interest

There are no conflicts of interest.

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