

Laparoscopic hernioplasties in children: the implication on contralateral groin exploration for unilateral inguinal hernias

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Abstract

Background Inguinal hernias are commonly seen in the paediatric population. Controversies still exist regarding the need for contralateral groin exploration when an unilateral inguinal hernia is presented, since the true incidence of contralateral patent processus vaginalis is not known. With the advent of laparoscopic hernioplasty, the status of the contralateral side can be evaluated at the same setting. Here, we describe our experience in this issue after the introduction of laparoscopic hernioplasty in our unit.

Methods A retrospective review was carried out between October 2002 and January 2008. All patients presented with unilateral inguinal hernias were included. The demographics of the patients and the operative findings at laparoscopy were recorded. Statistics were performed using Student *t*-test or χ^2 test as appropriate and $p < 0.05$ was taken as statistically significant.

Results During the study period, 363 children were included in our study, of which there were 292 males and 71 females. 212 patients presented with right-sided hernias and 151 were left-sided. The mean age of patients at

presentation was 48.8 months. The incidence of contralateral PPV overall was 39.7%. There was no decrease in incidence of having a contralateral inguinal hernia in relation to age.

Conclusion Laparoscopy can accurately diagnose contralateral PPV in children who undergo unilateral inguinal hernia repair and thus holds an advantage over open herniotomy. Furthermore, there should not be an age criteria for contralateral exploration for surgeons who perform open herniotomy.

Keywords Inguinal hernia · Laparoscopy · Contralateral exploration · Metachronous hernia · Children

Introduction

Inguinal hernia repair is the commonest operation performed by pediatric surgeons [1]. In 75–90% of patients, the hernia is unilateral at the time of presentation. Nonetheless, a proportion of these children can present with an inguinal hernia on the opposite side (metachronous contralateral inguinal hernia) after the initial surgical repair [2–4]. As the development of a metachronous contralateral inguinal hernia is no different from any inguinal hernia, operative repair is recommended. This management strategy thus necessitates a second operation, which many have argued, can be avoided if the contralateral side could be examined accurately before or at the first operation. As a result, many preventive strategies have been proposed since 1955 [5]. To many surgeons worldwide, open herniotomy is still the commonest performed technique. It is important to be able to diagnose the presence of contralateral inguinal hernia. Surgical exploration of the

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contralateral side and repair as needed is thus a routine. Although this approach is relatively safe and also an effective means of avoiding the development of metachronous contralateral hernias, many children will undergo negative explorations due to the incidence of contralateral hernias at around 30% [6]. To minimize this and to avoid operative complication, many surgeons have defined a cut-off age for contralateral groin exploration in all boys aged less than 2 years with unilateral inguinal hernia, believing that the incidence of contralateral inguinal hernias to be much lower after this age [7].

Despite this, it has been estimated that up to 38% would still have a negative exploration [8]. Other techniques have been employed to help in determining the presence of a contralateral inguinal hernia before operation. These include clinical palpation using the silk-glove sign and ultrasonography [9, 10]. The shortcomings of these procedures are that they are non-specific and cannot totally exclude patent processus vaginalis (PPV).

On the other hand, herniography, Bakes dilators, peritoneal insufflation and trans-inguinal laparoscopy have been introduced throughout the years as potential minimally invasive approaches to assess the presence of contralateral patent processus vaginalis (CPPV) intra-operatively [11, 12]. Most recently, laparoscopic hernioplasty has been the preferred technique for inguinal hernia repair by some surgeons. It has also been touted as the most accurate procedure in diagnosing a CPPV at the time of unilateral inguinal hernia repair. Despite this, very little information can be found on the true incidence of contralateral inguinal hernias. The aim of this study is to evaluate the true incidence of CPPV in patients presenting with unilateral inguinal hernia in a single centre setting.

Materials and methods

A retrospective review of a prospectively collected database on all patients admitted between October 2002 and January 2008 was performed. This period was chosen because of the introduction of laparoscopic hernioplasty in our unit in 2002. Patients with preoperatively diagnosed bilateral inguinal hernias or with incidental finding of PPV during other laparoscopic operations were excluded from our study. Thus, the management protocol for patients with unilateral inguinal hernias would be to repair laparoscopically the presenting side and also the contralateral side if present.

The technique of laparoscopic hernioplasty has previously been documented and will be described here briefly [13, 14]. After induction of anaesthesia, a 5-mm port was inserted through umbilicus. Peritoneal pressure of 8–10 mm of Hg was created. The internal opening of the hernia was

confirmed and diagnostic laparoscopy was performed to inspect the contralateral inguinal region. The PPV was repaired with purse-string knot using 4/0 Prolene® (Ethicon).

The demographics and operative findings were noted. Statistical analysis was done using Fisher's exact test, Student's paired *t*-test or χ^2 test when appropriate. A value of $p < 0.05$ was considered to be statistically significant.

Results

During the study period, 397 children were admitted for inguinal hernia repair. Among the 397 cases, 29 were preoperatively diagnosed as having bilateral inguinal hernias while 5 patients underwent repair of PPV incidentally found during laparoscopy for other operations. These 34 patients were excluded from our study. Of the remaining 363 patients, there were 292 males and 71 females. 212 patients presented with right-sided hernias and 151 were left-sided (58.4 vs. 41.6%). The age of the patients at presentation varied from 20 days to 18 years, with the mean age being 48.79 months (Table 1). All patients underwent laparoscopic hernioplasty with no post-operative complications.

Among the 212 cases of right-sided inguinal hernia, CPPV were found in 78 (36.7%), whilst among the 151 left-sided inguinal hernia, CPPV were found in 66 (43.7%) (Table 2). The incidence of CPPV overall was 39.7%. The incidence of having a contralateral inguinal hernia in relation to age was shown in Table 3. There was no statistically significant correlation between either the age at presentation or the side of inguinal hernias with the incidence of CPPV found at operation ($p = \text{NS}$). Post-operatively all patients were followed up from 3 months to 5 years, with an overall recurrence rate of 1%.

Discussion

There is no consensus on how to approach the contralateral groin in an infant or child who presents with unilateral inguinal hernia. Many would advocate exploration in those

Table 1 Number of patients in relation to age ($n = 363$)

Age at presentation (years)	No. of patients
<1	99
1–2	44
>2–5	120
>5–10	80
>10–18	20

Table 2 Incidence of contralateral PPV in relation to side of hernia

Side of hernia	No. of patients	No. of contralateral PPV	<i>P</i> value
RIIH	212	78 (36.7%)	NS
LIH	151	66 (43.7%)	

Table 3 Incidence of contralateral PPV in relation to age

Age (years)	Unilateral hernia	Contralateral PPV	<i>P</i> value
<2	143	64 (44.7%)	NS
2–5	120	41 (34.1%)	
>5–10	80	33 (41.2%)	
>10–18	20	7 (35.0%)	

who are under 2 years of age, based on the concepts that the bilateral involvement was most frequent under the first 6 months of life (83.5%), then it dropped gradually [15]. Rowe et al. [2] observed that 60% of children with unilateral hernia have a CPPV at 2 months of age, but only 40% have a contralateral PPV by 2 years of age.

Recently, the controversy of contralateral groin exploration has further been fueled by advance in laparoscopy, which can allow a more accurate evaluation of whether there is the presence of CPPV. This technique has obvious advantages when compared to groin exploration, as it is non-invasive to the contralateral side, therefore avoid the risk of damage to the spermatic cord structures [11]. A review of the literature can explain why there is not a definitive approach to a child who presents with unilateral inguinal hernia. A number of studies have investigated the incidence and natural history of a patent processus as it relates to an inguinal hernia. It has been suggested that a patent processus will obliterate within the first few months of life in approximately 40% of the pediatric population, and an additional 20% will close over the next 2 years [2, 6]. Therefore, 40% of the population will presumably have a persistent patent processus beyond 2 years of age. This study correlates with our study, which shows that 44.7% of children have CPPV up to 2 years of age. However, in our series, even in the older age group between 11 and 18 years, there was a 35.0% incidence rate of CPPV. In this regard, our series correlate well with the 38.6% reported in a meta-analysis of 964 patients evaluated with laparoscopy, but higher than the 23.4% reported in prospective analysis of pediatric inguinal hernias with laparoscopy at least in the neonates and younger infants. Nonetheless, we further stratified our patients into various age groups and clearly showed that the incidence of CPPV did not decrease with age. This was not done in other series thus reported [10, 16, 17]. Although, the 2005 hernia survey reported a move away from the practice of the contralateral exploration with a statistically significant decrease in the number carried out

compared with the findings of a previous similar survey conducted in 1993, as inguinal hernia is a very common condition (approximately 8000 inguinal hernias are repaired in children aged less than 15 years in England every year), a large number of children are still being exposed to a potentially unnecessary risk [7]. Unfortunately, there has been no life-long follow up carried out to determine the real risk of the development of inguinal hernia from the presence of PPV.

Many studies have indicated the initial presentation of left-sided inguinal hernia as a risk factor for metachronous presentation due to the earlier descent of the left testis [8, 18]. This was confirmed by Ikeda et al. [19] on their follow up of 2935 patients. Our study also shows the incidence of CPPV to be higher when the initial hernia presented on the left side (43.7%) than the right (36.7%). Other studies have shown that there is no statistically higher incidence of metachronous contralateral inguinal hernia related to younger age or sex [9]. Our study shows the presence of CPPV in 44.7% of patients younger than 2 years of age and 35.0% in the 11–18 years of age group, which is similar to study done by Miltenburg et al. [9], who could not demonstrate a statistically significant risk at a younger age. This finding obviously has important implication for surgeons who practice open herniotomy and selective contralateral groin exploration according to age, as we showed here that the incidence of CPPV did not decrease with age. Nonetheless, the limitation of our study is that we do not know if all the CPPV found would develop into inguinal hernias in future. Nonetheless, we still believe that it is justified to repair the contralateral side because first, inguinal hernia can present at any time. Second, we can avoid a second anaesthetic and last, prevent the risk of incarceration.

Overall, as laparoscopy can accurately diagnose a CPPV in children who undergo unilateral inguinal hernia repair. It would therefore appear that laparoscopic hernioplasty holds this advantage over open herniotomy. Furthermore, based on our findings, there should not be an age criteria for contralateral exploration for surgeons who choose to perform open herniotomy. Lastly, although we repair CPPV for children in all age group, we do not know yet if the presence of PPV equates to a subsequent hernia. As a result, further randomized study is required to validate the true incidence of inguinal hernia from PPV in future.

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