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# Day-case inguinal herniotomy in Chinese children: retrospective study

## 華裔兒童中進行日間的腹股溝疝切開手術：回顧性研究

**Objective.** To review the results of day-case procedures performed for inguinal hernia or hernia-hydrocele complex in Chinese children.

**Design.** Retrospective study.

**Setting.** Day Surgery Centre of a district hospital, Hong Kong.

**Patients.** Medical records of 255 consecutive paediatric patients admitted to the Day Surgery Centre for inguinal herniotomy between July 1993 and December 1997 were reviewed. A telephone survey was conducted to assess any long-term morbidity relating to the operation.

**Main outcome measures.** Patient demographics, success of day-case herniotomy, short-term and long-term morbidity.

**Results.** There were 230 boys and 25 girls with a mean age of 8.8 years (range, 3 months to 18 years). Seven patients had bilateral herniotomy for bilateral hernia and 14 had circumcision for co-existing phimosis. Eight boys developed recurrence and three had a contralateral inguinal hernia. Postoperative ascent of the testis occurred in three patients, one of whom required orchidopexy. The unplanned admission rate was 1.6%, all for poor pain control. There were four herniotomy wound complications (two haematomas and two infections) and two circumcision wound haemorrhages.

**Conclusions.** Day-case inguinal herniotomy is safe and acceptable to Chinese children. Given these satisfactory results, paediatric patients with inguinal hernia can be safely managed with ambulatory surgery performed by suitably experienced surgeons.

**目的：**總結在華裔兒童中進行腹股溝疝或疝積水綜合症的日間手術的結果。

**設計：**回顧性研究。

**安排：**香港一所地區醫院的日間外科手術中心。

**患者：**總結了1993年7月至1997年12月期間，到日間外科手術中心進行腹股溝疝切開手術的連續255名兒科病人的醫療紀錄，並進行了電話調查以評定與手術有關的長期發病率。

**主要結果測量：**患者人口統計學數據，日間手術的成功率，短期與長期的發病率。

**結果：**患者包括230名男孩和25名女孩，平均年齡8.8歲(範圍：3個月至18歲)。其中7名患者接受雙邊疝切開手術，14名因包皮過長而進行包皮環切術。8名男孩復發，3名發現對側的腹股溝疝。3名患者手術後睪丸上昇，其中一名需要進行睪丸固定術。非預料的入院率為1.6%，全部因疼痛入院。4名患者的傷口出現併發症(2個血腫病例及2個感染病例)；另有2宗包皮環切手術傷口溢血。

**結論：**對華裔兒童而言，日間進行腹股溝疝切開手術是安全並可接受的治療方法。根據這些滿意的結果，兒科腹股溝疝患者可由具備適當經驗的外科醫生進行流動手術而得到安全的治療。

### Key words:

Ambulatory surgical procedures;  
Hernia, inguinal

### 關鍵詞：

流動外科手術程序；  
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### Introduction

Since the 1970s, the relative benefits to patients and economic savings of ambulatory (day-case) surgery have been well documented<sup>1</sup>; since the 1990s, this practice has become particularly popular. Day procedures should ideally be of short duration and involve minimal dissection, thus minimising intra-operative haemorrhage and postoperative tissue oedema, which causes pain and postoperative discomfort, in turn rendering the patient non-ambulatory and bed-ridden.<sup>2</sup>

The Day Surgery Centre at Kwong Wah Hospital was established in July 1993, and inguino-scrotal operations are among the most commonly performed day cases. The objective of this retrospective cohort study was to review the results of day-case procedures performed for inguinal hernia or hernia-hydrocele complex, including short-term and long-term morbidity outcomes.

## Methods

### *Selection criteria and preanaesthetic screening*

Patients of physical status I and II according to the American Society of Anesthesiologists (ASA) classification were accepted for day surgery. A detailed history regarding past medical illnesses was taken before recruiting patients; those with concurrent untreated illnesses, such as asthma or local infection, were considered ineligible for day-case operations. Full-term infants had to be at least 2 months old to be accepted for day surgery in this setting.

Laboratory investigations were usually limited to a full blood count unless there were any significant medical problems.<sup>3</sup> All patients underwent preoperative screening performed by day surgery nurses and evaluation on the day of surgery by anaesthetists. The patients were asked to fast for 6 hours preoperatively and were admitted to the day surgery ward on the morning of their operation. Here, they were screened for acute illnesses, such as diarrhoea, upper respiratory tract infection, and fever. If the patient had experienced such acute problems recently, anaesthetists were consulted to decide whether or not the operation should still proceed.

### *Anaesthetic and surgical procedures*

Operations were performed either by a specialist surgeon or by a surgical trainee under supervision by a specialist in general surgery. All procedures were carried out under general anaesthesia. Ilio-inguinal block or local anaesthetics were frequently added to decrease anaesthetic requirements, to provide for earlier recovery, and to decrease postoperative analgesic demand.<sup>2</sup>

The details of the herniotomy technique are given below. A transverse incision was made in the skin fold above and lateral to the pubic tubercle. After incising Scarpa's fascia, the spermatic cord was isolated, with or without splitting apart the external oblique aponeurosis. The fibres of the cremaster muscle were separated using a fine haemostat and the hernial sac could usually be found anteromedial to the other spermatic cord structures. The hernial sac was then separated and dissected to perform high ligation with an absorbable stitch. Scarpa's fascia and the external oblique muscle were re-approximated using an absorbable stitch and a skin subcuticular absorbable suture. In the case of bilateral hernia, herniotomy was performed sequentially—one side was completed before the other side was started. If circumcision was indicated, herniotomy was performed first.

### *Discharge criteria*

Patients remained in the day surgery ward for a minimum of 4 hours after operation before their home readiness was assessed using the postanesthesia discharge score.<sup>4</sup> Patients were allowed to return home only when they were alert and orientated, and had stable vital signs, absence of respiratory distress, minimal nausea and vomiting, and ambulatory ability with minimal assistance (appropriate for age). Patients were discharged only after review by both surgeon and anaesthetist. Oral analgesics and non-steroidal anti-inflammatory drug suppositories were given for pain relief. Educational brochures and instructions regarding possible postoperative complications and management were provided. A telephone advice line dealing with postoperative concerns and complications of day surgery was also made available to patients and their families.

### *Follow-up*

Patients were discharged in the evening after operation and followed up for 1 month in the day surgery postoperative clinic. If asymptomatic, they were discharged from the clinic after one or two visits, and were reminded to return if they noted any problem relating to the surgery.

For the purposes of this review, a telephone survey was conducted to document any long-term complications, subsequent complaints, or treatments received outside the Kwong Wah Hospital for the same problem.

## Results

Two hundred and fifty-five consecutive patients who underwent a total of 262 day-case inguinal herniotomy procedures between July 1993 and December 1997 were included in this study. They all belonged to ASA physical status I category. There were 230 boys and 25 girls with a mean age of 8.8 years (range, 3 months to 18 years). Seven (2.7%) patients had bilateral inguinal hernia at presentation with bilateral herniotomy performed. Fourteen (5.5%) patients had circumcision for co-existing phimosis while under anaesthesia. All patients tolerated their day surgery procedure well. There were no anaesthesia-related complications and no mortality.

Four (1.6%) of the 255 patients could not be discharged in the evening after their operation and were transferred to the in-patient ward. All were admitted for significant wound pain and were discharged the next day after the pain had been satisfactorily controlled. Complications are summarised in the Table. Two patients had postherniotomy wound haematoma, which was managed conservatively. In addition, two patients had groin wound infections that required a brief period of wound dressing. The overall early wound complication rate for herniotomy, therefore, was 1.5% (4/262 procedures). Two patients undergoing circumcision subsequent to herniotomy had bleeding complications that required resuturing for haemostasis.

**Table. Complications of inguinal herniotomy**

Morbidity	Procedures, n=262 No. (%)
Wound haematoma	2 (0.8)
Wound infection	2 (0.8)
Hernia recurrence	8 (3.1)
Hypertrophic scar	3 (1.1)
Testicular ascent	3 (1.1)
Contralateral hernia	3 (1.1)

During follow-up, the recurrence rate of hernia in this review was 3.1% (8/262 procedures); only boys were affected. Four recurrences were observed within 1 month, two within 9 months, and two within 1 year of surgery. All eight patients underwent repeat herniotomy with no further complications. Three patients developed contralateral inguinal hernia and three had hypertrophic scars. Three patients had abnormal postoperative ascent of the testis, although in two cases, the position of the testis was only slightly higher than the non-operated side. The third patient required orchidopexy. No complications were reported in the seven bilateral herniotomy patients.

Two hundred and five (80.4%) of the 255 patients were contacted over the phone to complete the survey. The other 50 could not be reached either because of a wrong telephone number or because they did not respond to the call. No additional morbidity was reported either by the patients or their parents except for one case of contralateral inguinal hernia, which was subsequently treated in the private sector.

## Discussion

An early estimate put the overall incidence of inguinal hernia in the paediatric population in Hong Kong at about 1%,<sup>5</sup> and it remains a major health issue in this age-group. About 50 new paediatric cases of inguinal hernia are encountered every year in our institution alone. Ambulatory (day-case) surgery offers certain advantages over inpatient care, such as increased cost effectiveness, reduction of waiting lists, and greater convenience to both the patients and their families.<sup>1</sup> We have been treating paediatric herniotomy as a day-case procedure for the last 7 years; this is the first time we have analysed and reported our results.

The sex incidence of inguinal hernia in our series (male: female=9:1) is similar to that observed in others.<sup>5-10</sup> However, only 7 (2.7%) of the 255 patients had bilateral presentation, which is a much lower incidence than that reported in other large studies (15%-24%).<sup>5,6,11</sup> The most likely reason for this is that infants under the age of 2 months, who may have a greater tendency to develop bilateral inguinal hernias,<sup>6,11</sup> were deliberately excluded in this series. For the bilateral hernia cases, we performed bilateral herniotomy without excessively prolonging the operating time. All seven patients were discharged without admission or additional morbidity requiring admission. Two of the 14 patients who had circumcision done subsequent to herniotomy had

postoperative penile wound haemorrhages that required suture haemostasis. However, this apparently high complication rate (14.3%) of circumcision wound haemorrhage does not reflect the true figure because it only relates to a small, non-representative group of patients with phimosis treated in our hospital. It would be imprudent, therefore, to conclude that circumcision should not be preceded by hernia surgery under the same anaesthesia. Indeed, we believe that herniotomy and circumcision can be safely performed together as part of the same day-case procedure, provided that patients and/or their parents realise and accept the possibility of additional morbidity.

The published literature indicates that elective herniotomy is associated with low morbidity, mostly due to minor wound problems.<sup>5,7,9,10</sup> The unplanned postoperative admission rate—always an important outcome measurement parameter in ambulatory surgery—was 1.6% in this study, a figure that compares favourably with the reported average of 1%.<sup>12</sup> The most common reasons for admission relate to surgical factors,<sup>12</sup> and all our admissions were due to significant wound pain. With better and refined pain control methods and meticulous surgical skill, the admission rate will probably decrease in the future.

The overall procedure-related morbidity in this series (8.0%) is believed to be an underestimate; the limitations of this study were the retrospective design, and the fact that a telephone survey only was conducted. Although we surveyed the patients at least 4 years after their operation, the 80% response rate may not have been sufficient to reveal all the long-term complications that happened after clinic discharge. Moreover, none of the patients was physically examined and therefore subtle changes, such as iatrogenic testicular ascent, would have gone undetected.

The incidence of hernia recurrence (3.1%) in this series is comparable to that reported in others (0.6%-4%).<sup>5,7,9</sup> We further analysed the recurrence figure with respect to two different categories of surgical staff, namely consultant/senior medical officer versus surgical trainee. There were seven (5%) recurrences among the 140 herniotomies performed by surgical trainees compared with only one (0.8%) recurrence among the 122 herniotomies performed by senior surgeons. Most of the failures are believed to be of a technical nature and the likelihood of hernia recurrence appears to be closely related to the experience and expertise of the surgeon performing the operation. We believe, therefore, that careful training and supervision, with emphasis on groin anatomy, should reduce the incidence of recrudescence in the future.<sup>10</sup>

There has long been debate over how to best manage the contralateral groin in children who present with a unilateral inguinal hernia. Previously, the results of retrospective studies had suggested that routine contralateral inguinal exploration was not indicated because of the low incidence of contralateral hernia development and the

possibility of damage to the vas deferens and testicular vessels.<sup>8,10</sup> However, in a recent prospective study of more than 600 patients treated for unilateral inguinal hernia, metachronous contralateral hernia developed in 14.8% of premature infants and 27.6% of children who presented with an incarcerated hernia.<sup>11</sup> The authors concluded, therefore, that contralateral inguinal exploration should be seriously considered in children with prematurity or incarceration. In this survey, only four (1.6%) of the 255 patients developed contralateral inguinal hernia during follow-up. Moreover, since we do not accept premature infants for day-case operations, we are of the opinion that routine contralateral inguinal exploration is not indicated in this setting.

The reported incidence of iatrogenic ascent of the testis following inguinal herniotomy is 0.3% to 1.6%.<sup>5,10,13</sup> In this study only one (0.4%) of the 255 patients required orchidopexy for testis malposition. We strongly agree with the recommendation that, in order to prevent testis ascent, every technical effort should be made to ensure that the testis is in the scrotum at the end of the operation.<sup>13</sup>

We have not encountered any case of testicular atrophy thus far, although this finding should be interpreted cautiously as the true incidence of subclinical atrophic change is largely unknown. Our observation may simply reflect the fact that the follow-up period is not sufficiently long and that objective measurement of testicular volume is not carried out routinely during clinic visits. The postherniotomy complication of testicular atrophy was recently assessed in a retrospective study, which found that around 6% of patients had a greater than 25% decrease in testicular volume by objective measurement using ultrasound imaging.<sup>14</sup> Although we have not yet gained sufficient experience of this subclinical reduction in testicular volume, either directly or indirectly through the published literature, we believe that it may have a significant bearing on future testicular function.

It has been suggested that long-term follow-up may be appropriate for herniotomy patients, with the potential benefits of detecting any testicular malposition or atrophy, as well as wound complications.<sup>13</sup> However, adding long-term follow-up of herniotomy patients to the existing heavy workload of out-patient surgical services in our hospital would place an even greater demand on already stretched resources and manpower. The issue of follow-up has been critically addressed in a retrospective study,<sup>10</sup> which concluded that whenever the possible complications of inguinal surgery are clearly outlined to the patients, their parents, and their family physicians, early discharge makes

more efficient use of out-patient resources without significantly affecting overall outcome.<sup>10</sup> Taking this into account, together with the very low late complication rate as reflected in our telephone survey, we will cautiously continue our practice of early discharge while providing adequate access to medical information for the patients and their parents.

## Conclusion

Ambulatory hernia surgery in paediatric patients is safe and well accepted. The Kwong Wah Hospital, through the Day Surgery Centre, provides ambulatory surgical services for both adult and child referrals, although a dedicated paediatric day surgery centre may be the best setting. To ensure the highest quality paediatric ambulatory surgical care, the conjoint efforts of surgeons, anaesthetists, and nursing staff experienced in paediatric patient care are mandatory.

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