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ORIGINAL ARTICLE

# Comparison of the inguinal and scrotal approaches for the treatment of communicating hydrocele in children



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Received 24 July 2013; accepted 9 September 2013

Available online 24 December 2013

## KEYWORDS

Children;  
Hydrocele;  
Inguinal;  
Scrotal;  
Surgery

**Abstract** The inguinal approach is used for the treatment of hydrocele in the pediatric population. Although studies on scrotal orchiopexy have mentioned hernia or hydrocele repair through the same scrotal incision as a part of an orchiopexy procedure, there are a few studies reporting the treatment of isolated communicating hydrocele through a scrotal incision. We retrospectively evaluated and compared the outcomes of inguinal and scrotal approaches for the treatment of communicating hydrocele in boys. The classical inguinal and scrotal approaches to the treatment of communicating hydrocele were performed on 46 and 30 testicular units (in 43 boys and 27 boys, respectively). The patients' charts were reviewed to assess the operative times as well as the immediate and long-term complications during follow-up periods. The patients' ages ranged from 1 year to 8 years ( $3.6 \pm 2.0$  years) in the inguinal group and from 1 year to 10 years (mean  $4.6 \pm 2.8$  years) in the scrotal group. Operative time was significantly lower in the scrotal group ( $p < 0.0001$ ). The early minor complication rate did not differ between the two groups. Furthermore, there were no major complications noted. None of the patients had hydrocele recurrence after a mean follow-up of 6 months. The advantages of the scrotal approach for the treatment of communicating hydrocele are as follows: it is well tolerated, simple, and cosmetically appealing, and it has a short operative time in comparison with the standard inguinal approach. The scrotal incision technique is an effective alternative in communicating hydrocele treatment.

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Conflicts of interest: All authors declare no conflicts of interest.

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## Introduction

The inguinal approach for the treatment of inguinoscrotal pathologies in children is the recommended standard surgical procedure. This surgical approach includes freeing the spermatic cord from the attached tissue, separating and high ligating the patent processus vaginalis (PPV). It is important to prevent vas and vessels injury when high ligating the PPV. Then, the testis is fixed to the scrotum without tension [1,2]. Inguinal exploration with a subsequent scrotal incision is also the gold standard for the treatment of palpable undescended testicles, but the single scrotal incision approach has gained popularity among pediatric urologists in the past two decades [3–14].

Two main concerns with the scrotal approach are that PPV may not be ligated high enough and proximal attachments may not be separated. Recently, scrotal incision orchiopexy has successfully been performed on palpable undescended testis both without PPV and with PPV [8,9,12–14]. Moreover, the scrotal approach has been used to correct other pathologies of PPV such as inguinal hernia and hydrocele [15–19]. In this article, we retrospectively reviewed and compared the surgical outcomes of transscrotal and inguinal approaches for boys with communicating hydrocele. In addition, we defined the technical details of the scrotal approach with illustrations and discuss its advantages and disadvantages.

## Materials and methods

Seventy-six hydrocelectomies were performed on 70 children with communicating hydrocele between July 1993 and September 2011. The diagnosis of communicating hydrocele was based on clinical presentation, physical examination, and ultrasonographic findings. The main symptom in these children was a roundish, painless, and fluctuating mass in the upper scrotum. The mass size decreased while the children slept in a supine position overnight. The mass sizes increased during a Valsalva maneuver in older children and during straining or crying in infants. Manual palpating pressure on the mass reduced its size. Silk glove (or string) sign was positive in all children. Ultrasonography was used to distinguish the difficult cases. Patients with noncommunicating hydrocele or hernia were not included in this study.

Hydrocelectomies were performed using the inguinal approach on 46 testicular units (40 unilateral and 3 bilateral hydrocele) between July 1993 and September 2007. The scrotal approach has been performed since 2000 in our institution, leading a shift from the inguinal approach to the scrotal approach in hydrocele cases [9,14]. In accordance with this trend, hydrocelectomies were performed through the scrotal approach in 30 testicular units (24 unilateral and 3 bilateral hydrocele) between July 2002 and February 2012. We retrospectively reviewed the patients' charts to obtain the demographic data and postoperative outcomes including operative times, as well as the intraoperative, short-term, and long-term complications.

## Surgical technique

After the induction of general anesthesia, we made a transverse scrotal incision along the crease of the scrotal

skin. This incision was then deepened through the layers of the scrotum down to the testis. Appropriate retractors were used to expose the superior level of the external ring (Fig. 1F). The upper wound edge was retracted in an upward direction in order to allow full visualization of the inguinal canal and the external inguinal ring.

At the beginning of the surgery, the testis and spermatic cord with the hydrocele sac were brought outside the scrotal incision (Fig. 1A). In order to separate the hydrocele sac from the spermatic cord easily, the sac was not opened during dissection, which was different from the classical technique (Figs. 1B, 2A-1 and A-2). In our practice, we opened the external spermatic fascia of spermatic cord from the side that is near the vessels and vas without the margin of hydrocele sac (Figs. 1C, 2B-1 and B-2). The hernia sac was separated bluntly from the other components of the spermatic cord (Fig. 1D and E). In the Trendelenburg position, the sac was dissected up to the external inguinal ring and "a caudal traction" on the sac provided an extra separation from the cord structures (Figs. 1F and 2C). The PPV was tied as cranially as possible using a 3–0 or 4–0 absorbable suture (Fig. 1G). When the distal part of the PPV (hydrocele sac) was divided, the proximal stump of PPV fell back into the peritoneal cavity (Fig. 2D). The testis was placed into the subdartos fascia of the scrotum. The scrotal skin was closed with a running subcutaneous absorbable suture (Fig. 1H).

Patients were discharged on the operation day or the day after the surgery. All patients came back to the clinic at least once within 4 weeks after the procedure to document any recurrence and also to ensure that no other complications had occurred. Thereafter, follow-up visits were performed in the 6th month.

## Statistical analysis

The differences between inguinal and scrotal groups in terms of age, operative time, and immediate and late complications were analyzed with the Mann–Whitney *U* and Chi-square tests.

## Results

The medical charts of 70 children with communicating hydrocele were retrospectively reviewed in this study. The inguinal group comprised 43 patients (40 unilateral and three bilateral), and the scrotal group consisted of 27 patients (24 unilateral and three bilateral). These patients' ages ranged from 1 year to 8 years (mean  $\pm$  SD,  $3.6 \pm 2.0$  years) in the inguinal group and from 1 year to 10 years ( $4.6 \pm 2.8$  years) in the scrotal group (Table 1). There was no statistical difference between the two groups in terms of patient age. Operative time was statistically significantly lower in the scrotal group ( $p < 0.0001$ , Table 1). The most common early complication of scrotal hydrocelectomy was scrotal edema/induration, but there was no statistically significant difference in the total number of early complication between the inguinal and scrotal groups ( $p = 0.416$ , Table 1). As for hydrocele recurrence or testicular atrophy (late complications), both did not happen in either group. The overall success rate was 100% at the 6-month follow-up

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