Title

Abdominoscrotal hydrocele: excision of sac may not be necessary

Journal

Journal of Pediatric Urology, 16(4)

ISSN

1477-5131

Authors

Xu, Weichen
Ko, Joan
Fernandez, Nicolas
et al.

Publication Date

2020-08-01

DOI

10.1016/j.jpurol.2020.06.027

Peer reviewed

Abdominoscrotal hydrocele: excision of sac may not be necessary

Summary

Introduction

Abdominoscrotal hydroceles (ASH) are uncommon occurrences in **boys** and usually treated similarly to a hernia with the assumption that there is an associated patent processus vaginalis. Treatment in this manner may be challenging due to sac size, extension and **adherence to the spermatic cord**. Due to the rarity of ASH, the literature is mostly limited to small, single-institution case studies.

Objective

Our goal was to evaluate two techniques in large number. We hypothesized a simplified scrotal technique with eversion, Jaboulay procedure, would demonstrate less complications and equivalent efficacy to standard excision.

Methods

We retrospectively reviewed medical records at three tertiary children's hospitals to identify boys who underwent surgical repair of ASH between 1998 and 2018. Group 1 had excision and/or ligation of the hydrocele sac. Group 2 had a scrotal incision with limited excision and then eversion of the hydrocele sac (Jaboulay procedure). Variables that were analyzed included preoperative imaging, surgical technique, surgical findings, length of follow up, complications and recurrence of swelling.

Results

We identified 61 boys, who had 77 abdominoscrotal hydroceles. Group 1 included 38 patients with 48 hydroceles. Group 2 included 23 patients with 29 **hydroceles**. Complications were more common in Group 1 patients (18% vs 0%) but

complication rate and operative time were not statistically associated with surgery type or age. No patient in either group had recurrence of hydrocele.

Discussion

Although this is a large study for this rare condition, the analysis is limited by number and its retrospective nature.

Conclusion

For the rare and difficult to treat abdominoscrotal hydrocele, we were unable to prove with statistical significance that a simplified technique of eversion via the scrotum is safer. However, this large series did demonstrate that the simplified procedure provides equal efficacy as excision.

Summary Table

	Group 1 **Excision**	**Group 2** **Eversion**
Number of Patients	38	23
Hydroceles	48	29
Patients with complications (%)	7 (18)	0
Median operative time	60	54
Recurrences	0	0

Introduction

Abdominoscrotal hydrocele: excision of sac may not be necessary

First described by Dupuytren in 1834, ASH is a rare type of hydrocele that fills the scrotum and extends through the inguinal canal and into the extra-peritoneal space. [1,2] Although the pathogenesis is not entirely understood, it is hypothesized that increased pressure in the scrotum leads to expansion proximally into the congenitally patent processus vaginalis (PPV) and then pushes into the abdomen anterior to the peritoneum resulting in the classic dumbbell shape.[3] Multiple studies have demonstrated that **the processus vaginalis does not communicate with the peritoneal cavity**.[3–5]

Bayne et al measured scrotal pressure of ASH at more than 15cm H2O above abdominal pressure.[3] Unlike simple hydroceles the increased pressure often causes elongation of the testis and epididymis, which return to normal shape after repair. [3,6,7] In extreme cases compression on surrounding structures has led to lower extremity edema and hydronephrosis.[8,9] Besides morphologic changes from the pressure, the short and long-term impact of this pressure upon spermatogenesis with or without treatment are unknown.

Diagnosis of ASH is typically made by physical examination. The distinction between ASH and other large hydroceles is by identification of the abdominal extension which can be elicited by squeezing the scrotum with one hand and feeling the lower abdomen elevate. Others have used light to facilitate the diagnosis.[10] If diagnosis is uncertain, ultrasound may be obtained for confirmation. Since some boys with ASH have resolution, a period of observation is recommended depending upon the size and age.[4,11] Often the diagnosis is made in the operating room during inguinal exploration for an expected hernia or simple hydrocele.

ASH is most commonly treated with excision of the proximal hydrocele sac through an inguinal approach. This is often challenging due to the large and thickened tunica vaginalis adhering to the **fine** spermatic vessels and vas deferens. Compared to common hydroceles, increased complications have been reported including testis atrophy and hematoma.[12–14] In 2001 Belman described a simplified scrotal approach with plication of the sac without dissection of the inguinal portion.[15] Unfortunately, this was a limited report of technique without follow up and hence has been employed by few pediatric surgical specialists. To date, only small single-institution series (5 and 7 boys) have reported eversion of ASH.[14,16] Being a very rare condition, we gathered the experience of three institutions in order to compare efficacy of excision and eversion techniques. We hypothesized a simplified scrotal technique with eversion would demonstrate fewer complications, less operative time and equivalent efficacy when compared to standard excision.

Methods

We retrospectively reviewed medical records at three tertiary children's hospitals between 1998 and 2018 to identify boys who underwent surgical repair of ASH. The patients were categorized into two groups based upon surgical technique. **All patients had confirmation of ASH, not hernia, by internal digital palpation of the preperitoneal extension and confirmation that it did not communicate with the peritoneal space. Group 1 had dissection and excision of the hydrocele sac similar to treatment of a typical hernia. The proximal sac is dissected off the spermatic cord with excision of the preperitoneal component. Group 2 had a scrotal incision (Fig. 1) and then**

eversion of the hydrocele sac behind the testis, as described by Jaboulay and commonly used for adult scrotal hydrocelectomy. [17] After eversion, excess sac is excised to allow enough for sewing the edges together behind the testis. Drains were not utilized for either group. Early follow up interval varied by institution but follow up at one year was planned by all three institutions.

Medical records were retrospectively reviewed for the following parameters: **preoperative** ultrasound results, age at surgery, operative time, complications within 3 months of surgery, follow up interval and recurrence, **which was defined as any significant recurrence of fluid in the scrotum or inguinal area and/or reoperation**. Intraoperative times were compared between surgery types and analyzed by age using linear models. Patients who had bilateral hydrocelectomy had operative times divided in half for each hydrocele. Intraoperative time was log transformed prior to analysis in order to more closely satisfy model assumptions; estimates are reported on the original scale of the data as geometric mean ratios.

The odds of complications were compared between surgery types and analyzed by age using logistic regression models. The estimates from a logistic regression model are odds ratios, where the odds are defined as the probability of complications divided by the probability of no complications. For the comparison of the odds of complications between surgery types, estimation in the logistic regression model was conducted using Firth’s bias-reduced maximum likelihood estimation method, as there were no complications in the eversion group. Analyses were conducted

using R version 3.6.0 (2019-04-26). Firth's bias-reduced maximum likelihood estimation was conducted using the R package brglm, version 0.6.2.

Results

We identified 61 boys, who had 77 abdominoscrotal hydroceles. Group 1 included 38 patients with 48 ASHs. Group 2 included 23 patients with 29 ASHs (Table 1). Twenty-two patients had sonography prior to surgery, and all had confirmation of the abdominal component. Median age at surgery was 12 and 5 months for Groups 1 and 2, respectively.

Surgery. As multiple surgeons at three centers were included, choice of technique was physician driven. Three patients did not have a diagnosis of ASH pre-operatively (all of these were excision cases). No ASH was found to communicate with the peritoneal cavity. Six cases in Group 1 also had diagnostic laparoscopy which showed the extraperitoneal extension. No eversion cases were converted to excision, and vice versa.

Operative time. **Some cases predated electronic health records and the paper records did not detail the relevant times.** Operative times were available for 26 of 38 patients in Group 1 and 15 of 23 patients in Group 2. The median operative time for Group 1 was longer than Group 2 but was not found to be associated with surgery type (P=0.456) or age (P=0.98).

Complications. Complications were more common in Group 1 (7 out of 38 patients; 18%) than Group 2 (0 patients; 0%) (Table 1). **A total of 8 complications in 7**

patients were identified in Group 1 which included 5 Clavien-Dindo Grade I complications: 2 transected testicular arteries, 1 postoperative wound drainage requiring admission, 1 postoperative fever, 1 postoperative hematoma requiring admission and 3 Clavien-Dindo Grade II complications (that require pharmacologic or procedural intervention): 2 postoperative fevers requiring antibiotics and 1 scrotal infection requiring antibiotics. (Table 2). For the two boys with spermatic vessel injury, no attempt to repair the vessels was made since the vas deferens was not injured. All complications occurred within 3 months of surgery. The odds of complication were higher in Group 1 but not statistically significant (OR 11.2; 95% CI 0.57, 218.8; P=0.11). Occurrence of complications were not found to be associated with age (OR 0.98; 95% CI 0.89, 1.02, P=0.49).

Recurrence. Follow up was reported for 79% of Group 1 and 83% of Group 2 patients. Median time of follow up was 19 and 11 months for Group 1 and 2, respectively. No patient demonstrated hernia or recurrent hydrocele.

Discussion

We hypothesized a simplified eversion technique would demonstrate fewer complications and equivalent efficacy compared to proximal excision of the hydrocele sac. A twenty-year experience of three tertiary pediatric centers failed to support the first hypothesis (P=0.11) even though no complications were reported in the eversion group. The twenty-year review does demonstrate that eversion is as effective as standard excision.

Traditionally, complete excision of the hydrocele through an inguinal incision has been advocated to prevent recurrence.[12,18,19] The tunica vaginalis is often inflamed and thickened making the dissection challenging with significant risk of cord damage. These rare ASH cases are often described as the worst “hernia” cases of the year. This is unfortunately highlighted by the two cases of arterial transection.

In addition to the described open techniques, laparoscopic treatment has also been attempted. Laparoscopic repair of standard pediatric hydroceles has been described in multiple large series.[20] We have previously reported short-term success with laparoscopic drainage of ASH but eventual recurrence.[21] In the present series, laparoscopy was only used for diagnostic purposes in six patients showing no communication of the preperitoneal sac with the peritoneal cavity.

Few surgeons have adopted the simplified scrotal eversion approach. [14–16] Only one prior series compared eversion and excision techniques. Cozzi et al. found significantly longer post-operative stay and more complications in the excision group (13 patients) compared to the eversion group (5 patients).[14] During inguinal dissection, the very large, tense and thickened sac obscures the spermatic cord, making dissection and excision of the sac very difficult. Studies by Serels et al. and Belman both reported ligation of the vas deferens.[15,19] Our hypothesis was that the simplified approach provides equal efficacy with less risk. If true, our goal was to recommend this approach so that surgeons could avoid the technical challenges involved with the inguinal dissection and hopefully lessen complications. Unfortunately, despite no complications with eversion, we were unable to prove eversion was safer. There were eight complications in seven patients, who had

standard excision, and most notably two cases of transection of the spermatic vessels.

There are limitations to the present study. **Patients in Group 2 were significantly younger. This could be due to surgeon preference and/or severity of swelling prompting the simplified procedure.** Both groups had approximately 80% of patients with follow up. As tertiary centers, one would expect these patients would return for recurrence of swelling but this cannot be verified. A multi-institution analysis has allowed accumulation of a large number of cases despite the rarity of ASH. At the same time, analysis of multiple surgeons inherently involves some heterogeneity of surgical technique. This may be considered a limitation or benefit of the analysis.

Conclusion

Although ASH may begin as a pediatric hydrocele with peritoneal communication through the PPV, its ultimate pathology appears to reflect the adult process but with cephalad extension into the patent inguinal portion of the PPV and then into the preperitoneal space. We were unable to prove that a scrotal eversion procedure is safer. However, by avoiding dissection within the inguinal canal, and hence no major reported vessel injuries, the risk of iatrogenic injury to cord structures should be reduced. This large series did demonstrate that a simplified technique of eversion via the scrotum without cephalad excision of a presumed PPV provides equal efficacy.

Abdominoscrotal hydrocele: excision of sac may not be necessary

Conflict of Interest: None

Funding source: None to declare

References

[1] Dupuytren G. Lesons Orales de Clinique Churgicale. Baliere 1839:705.

[2] Ghosh A, McNally J. Unusual presentation of bilateral abdominoscrotal hydrocele in a child. J Pediatr Surg 1997. https://doi.org/10.1016/S0022-3468(97)90521-2.

[3] Bayne A, Paduch D, Skoog SJ. Pressure, Fluid and Anatomical Characteristics of Abdominoscrotal Hydroceles in Infants. J Urol 2008. https://doi.org/10.1016/j.juro.2008.04.086.

[4] Celayir AC, Akyüz Ü, Çiftlik H, Gürbüz A, Danişmend N. A critical observation about the pathogenesis of abdominoscrotal hydrocele. J Pediatr Surg 2001;36:1082–4. https://doi.org/10.1053/jpsu.2001.24760.

[5] Wlochynski T, Wassermann J, Generowicz Z. Abdominoscrotal hydrocele in childhood. J Pediatr Surg 1993. https://doi.org/10.1016/S0022-3468(05)80286-6.

[6] Chamberlain SA, Kirsch ABAJ, Thall EH, Emanuel ER, Hensle TW. Testicular

dysmorphism associated with abdominoscrotal hydroceles during infancy. Urology 1995. https://doi.org/10.1016/S0090-4295(99)80365-3.

[7] Adaletli I, Kurugoglu S, Kantarci F, Tireli GA, Yilmaz MH, Gulsen F, et al. Testicular volume before and after hydrocelectomy in children. J Ultrasound Med 2006. https://doi.org/10.7863/jum.2006.25.9.1131.

[8] Krasna IH, Solomon M, Mezrich R. Unilateral leg edema caused by abdominoscrotal hydrocele: Elegant diagnosis by MRI. J Pediatr Surg 1992. https://doi.org/10.1016/0022-3468(92)90295-I.

[9] Klin B, Efrati Y, Mor A, Vinograd I. Unilateral hydroureteronephrosis caused by abdominoscrotal hydrocele. J Urol 1992. https://doi.org/10.1016/S0022-5347(17)36605-3.

[10] Keihani S, Hojjat A, Kajbafzadeh A-M. Abdominoscrotal Hydrocele: Role of Physical Exam and Transillumination in Diagnosis. J Pediatr 2015. https://doi.org/10.1016/j.jpeds.2015.08.047.

[11] Upadhyay V, Abubacker M, Teele R. Abdominoscrotal hydrocele - Is there a place for conservative management? Eur J Pediatr Surg 2006. https://doi.org/10.1055/s-2006-924343.

[12] Ferro F, Spagnoli A, Lucchetti MC, Marchetti P. Abdominoscrotal hydrocele: A reliable surgical technique. Urology 2000. https://doi.org/10.1016/S0090-4295(00)00478-7.

[13] Doudt AD, Kehoe JE, Ignacio RC, Christman MS. Abdominoscrotal hydrocele: A systematic review. J Pediatr Surg 2016. https://doi.org/10.1016/j.jpedsurg.2016.06.012.

[14] Cozzi DA, Mele E, Ceccanti S, Pepino D, d'Ambrosio G, Cozzi F. Infantile Abdominoscrotal Hydrocele: A Not So Benign Condition. J Urol 2008. https://doi.org/10.1016/j.juro.2008.08.054.

[15] Belman AB. Abdominoscrotal hydrocele in infancy: A review and presentation of the scrotal approach for correction. J Urol 2001. https://doi.org/10.1097/00005392-200101000-00065.

[16] Kajbafzadeh AM, Talab SS, Elmi A, Mahboubi AH, Pourmalek P, Esfahani SA, et al. Modified scrotal approach for correction of abdominoscrotal hydrocele in children: Clinical presentation and description of technique. Urology 2010. https://doi.org/10.1016/j.urology.2010.02.009.

[17] Jaboulay M. Chirurgie des centres nerveux des viscères et des membres. Storck 1902;2:192.

[18] Mahomed AA, Stockdale EJ, Varghese J, Youngson GG. Abdominoscrotal hydrocoeles: Little place for conservatism. Pediatr Surg Int 1998. https://doi.org/10.1007/s003830050285.

[19] Serels S, Kogan S. Bilateral giant abdominoscrotal hydroceles in childhood. Urology 1996. https://doi.org/10.1016/S0090-4295(96)00022-2.

[20] Jin Z, Wang F. Effectiveness of Laparoscopy in the Treatment of Pediatric Hydrocele: A Systematic Review. J Laparoendosc Adv Surg Tech 2018;28:1531–9. https://doi.org/10.1089/lap.2018.0095.

[21] Nuguyen M, Kurzrock E. Attempted laparoscopic decompression of an abdominoscrotal hydroceleTitle. J Endourol 2004;18 (Supple:A41.

Abdominoscrotal hydrocele: excision of sac may not be necessary