J KAU: Med. Sci., **Vol. 11,** pp. 49-59 (1423-1424 A.H. / 2003-2004 A.D.)

Abdomino-Inguino-Scrotal Hydrocele (Ten-Hydroceles with Intraabdominal Extension)

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ABSTRACT. Hydrocele with intraabdominal extension is a rare condition in children. We managed 10 hydrocele in 7 infants (3 bilateral and 4 unilateral). Eight hydrocele were abdominoscrotal and two were abdominoinguinal which represents intraabdominal extension of encysted hydrocele. Obstetric history of 6 mothers of this present study's patients supported the authors' previously proposed explanation of the push-up of the hydrocele intraabdominally by external pressure on the scrotoinguinal compartment, this pressure is created by strong uterine contractions or intra-uterine fetal position. In this paper, we present our experience in management of this condition including some of its important clinical and morphological features. Additionally, we propose to call this condition as "Hydrocele with intraabdominal extension" which includes abdominoscrotal and abdominoinguinal in males and the abdominoinguinal (pushed up hydrocele of canal of Nuck) in females.

Keywords: Hydrocele, Abdominoscrotal, Abdominoinguinal, Children's presentation, Management

Introduction

Abdominoscrotal hydrocele (ASH) is a rare condition, both in adults and children. The first reported case in children was the case of Syme in 1856[1]. The total number of the reported cases of this age group were 5, 14, 20 in 1987, 1990, and 1993, respectively[2-4]. The earlier detection of this condition is due to availability and efficacy of di-

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Accepted for publication: 16 June 2003. Received: 05 January 2003.

agnostic imaging, in particular the ultrasound[5], which can diagnose this condition even antenatally[6].

The aim, in this study, was first to present the authors' experience in management of ten hydroceles in 7 infants. Secondly, to present some important features of this condition which was observed clinically and intra-operatively. Thirdly, to present the mothers' obstetrical history of the 7 infants and its significance in the development of such condition. Fourthly, to propose calling this condition as "Hydrocele with intra-abdominal extension" to include the similar condition both in males and females.

Patients and Methods

Ten hydrocele with intraabdominal extension were seen in 7 patients, over a period of 7 years (1993-2000). Five patients were having 8 abdominoscrotal hydrocele (ASH) (2 right unilateral (Fig. 1) and 3 bilateral (Figs. 2, 3, & 4)), the 6th and 7th patients were having abdomino-inguinal hydrocele (AIH) (Figs. 5 & 6), not occupying the scrotal compartment and not communicating with the *tunica vaginalis*. This represents a pushed up encysted hydrocele. (Table 1 summarizes the 10 hydroceles.)

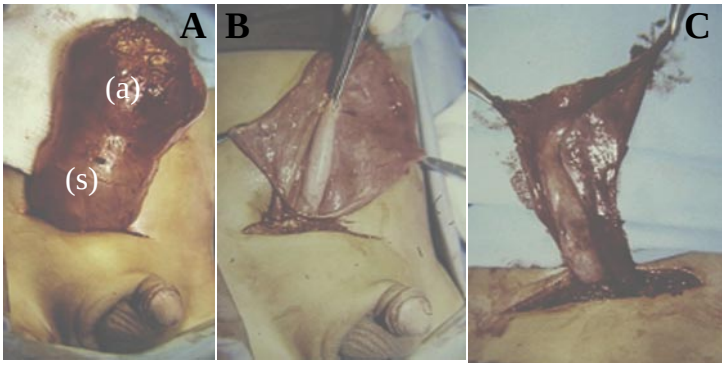

Fig. 1 A. Right unilateral AH with major intraabdominal extension
(a) abdominal part (s) scrotal part.
B. Opened ASH showing the testis and opened *tuncia vaginalis.*
C. Excised *tunica vaginalis* leaving rim around testis.

All patients were diagnosed clinically and the extent of intraabdominal compartment was evaluated by ultrasound.

According to the extent of the intraabdominal compartment the hydrocele categorized as:

1. Hydrocele with major intraabdominal extension (more than 5 cm) seen in 5 right - sided ASH. All of them needed minilaparotomy with intraabdominal extraperitoneal dissection of the cyst.

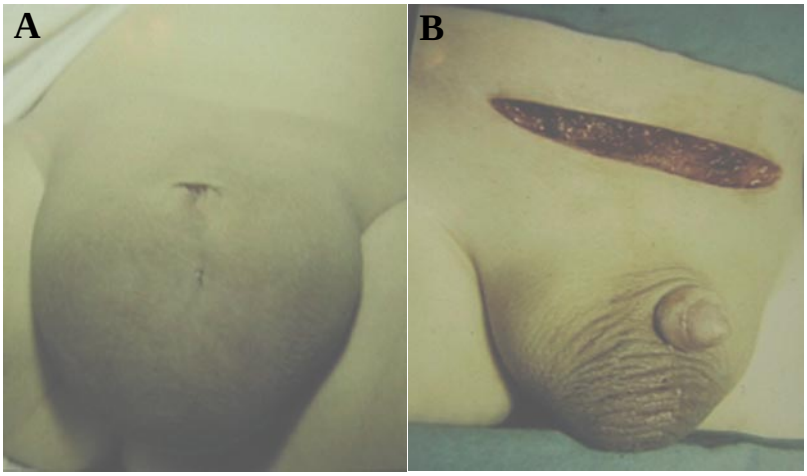

Fig. 2 Bilateral ASH
A. Preoperative;
B. Intraoperative after the exvacuation of the hydrocele.

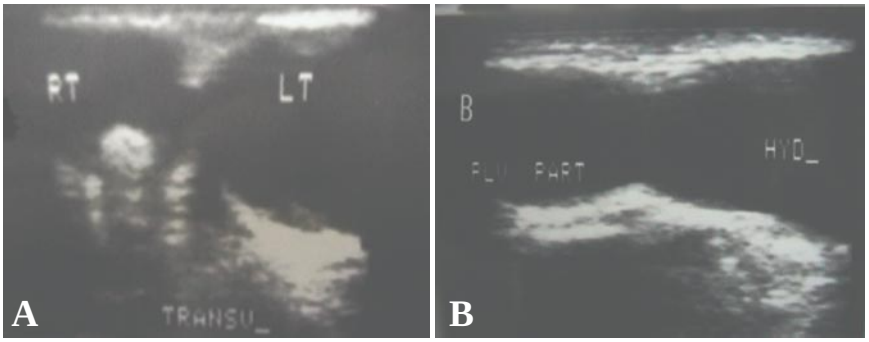

Fig. 3. Ultrasound of the bilateral ASH
A. Scrotal transverse scanning
B. Left ASH with minor intraabdominal extension.

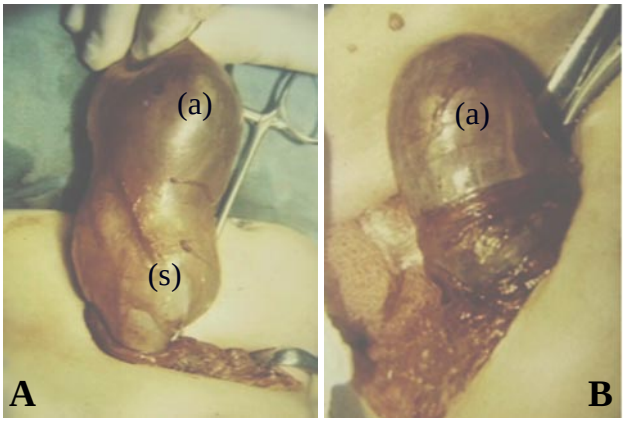

Fig. 4. Operative view of bilateral ASH
A. Right ASH with major intraabdominal extension
B. Left ASH with minor intraabdominal extension

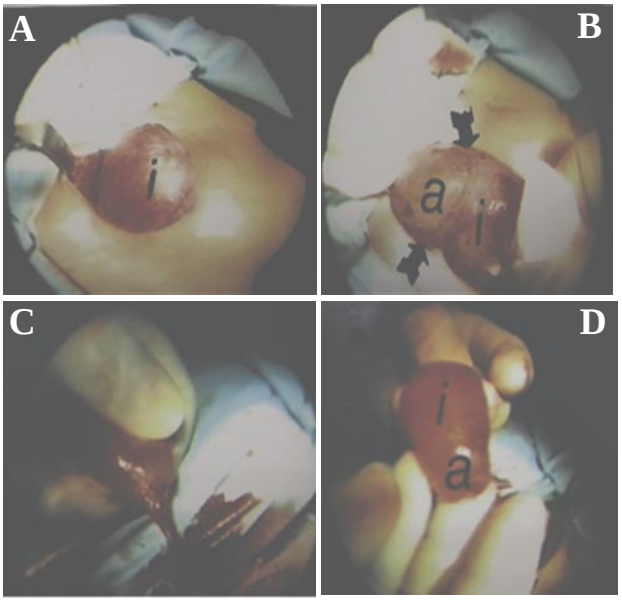

Fig. 5. AIH - A. Inguinal part delivered to the wound
B. AIH, Arrows point to the line of demarcation between the abdominal part (a) and the inguinal part (I).
C. AIH nearly excised
D. The excised AIH

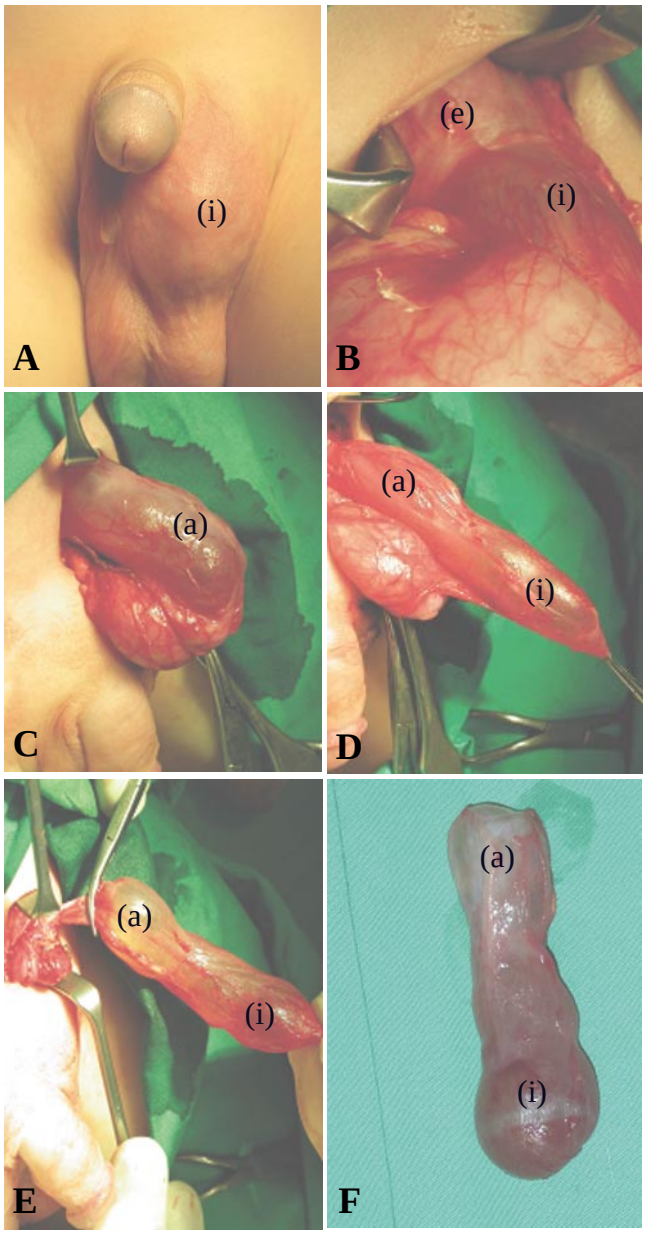

Fig. 6. AIH
A. Showing the AIH above the testis.
B. Showing the inguinal compartment (i) with the extension through the external inguinal ring (e).
C. Withdrawn abdominal compartment (a).
D. Showing the abdominal (a) and inguinal (i) compartment with the testis below.
E. AIH before the final excision.
F. The intact completely excised AIH showing abdominal (a) and inguinal (i) compartments.

Table 1. Summary of the 10 hydrocele in 7 patients.

7 Patients	10 Hydrocele	Age	Side	Size of Intra-abdominal Component	Surgical Approach	Associated Anomaly	Location of Intraabd. Component
1	(1) ASH	1 yr	Rt.	12 cm	Intraabd. Extraperit.	None	Retroperitoneal (Fig.1)
2	(2) ASH	6 mths	Rt.	10 cm	Intraabd. Extraperit.	PUJ Obst.	Retroperitoneal
	(3) ASH		Lt.	3 cm	Extraabd.		Properitoneal
3	(4) ASH	11 mths	Rt.	14 cm	Intraabd. Extraperit.	None	Retroperitoneal Perotoneal Cavity (Figs. 2, 3, 4)
	(5) ASH		Lt.	4 cm	Extraabd.		Properitoneal
4	(6) ASH	6 mths	Rt.	8 cm	Intraabd. Extraperit.	None	Retroperitoneal Perotoneal Cavity
	(7) ASH		Lt.	5 cm	Extraabd.		Properitoneal
5	(8) ASH	9 mths	Rt.	10 cm	Intraabd. Extraperit.	None	Retroperitoneal
6	(9) AIH	1 yr	Rt.	3 cm	Extraabd.	None	Properitoneal (Fig. 5)
7	(10) AIH	6 mths	Lt.	4 cm	Extraabd.	None	Properitoneal (Fig. 6)

None of the ASH or AIH was communicating with the peritoneal cavity.
ASH = Abdominoscrotal hydrocele.
AIH = Abdominoinguinal hydrocele.

2. Hydrocele with minor intraabdominal extension (5 cm or less) seen in three left-sided ASH and in one left AIH and one right AIH. All needed excision through simple inguinal incision apart of the one of the three left-sided ASH which required intraabdominal dissection for proper indentification of the *vas deferens* and testicular vessels.

All the ASH were treated by near total excision of the hydrocele sac leaving a rim of *tunica vaginalis* peripheral to the testis (Fig. 1). The two AIH were excised totally like the encysted hydrocele (Figs. 5 & 6).

Some of the worth mentioning intraoperative observations are:

a. The relation of hydrocele to *vas deferens* and testicular vessels is variable with no identifiable *proccessus vaginalis*.

b. None of the hydrocele was communicating with the peritoneal cavity but all were having free communication between the intraabdominal (extra-peritoneal) and extra-abdominal compartments. The hydrocele with properitoneal minor extension were tense cysts and the hydrocele with retroperitoneal major extension were lax hydroceles with more obvious cross fluctuation.

The observation of (a) and (b) indicated that the communication with intra-abdominal compartment was not through process vaginalis.

c. All ASH and AIH caused considerable widening of the abdominal inguinal rings which necessitate a repair of the defect to tighten the inguinal passage around the spermatic cord structures.

d. In ASH, all testes were found in abnormal fusiform shape due to the stretch by the expansion of the hydrocele sac in the abdominal scrotal access and also were found attached to the posterior aspect of the hydrocele, freely mobile, none of them were associated with short cord. All could be placed easily in the scrotum without any form of fixation.

Associated anomalies were seen in one of the patients with bilateral ASH who was having left hydronephrosis due to congenital pelviureteric junction obstruction.

A particular attention was given to the obstetrical history of the mothers to test what the author, Dr. Yasir S. Jamal, suggested in a previous report[5] in regards to the effect of intrauterine fetal position and strong uterine contractions as a trigger of a push up of the scrotal or the encysted hydrocele to acquire intraabdominal extension.

Results

All the 7 patients had uneventful post operative recovery. All ASH had ab-

dominoscrotal ultrasound 3 months and 1 year postoperatively. None of them had any recurrence. All the ASH were discharged from follow-up after 1 year. The AIH discharged after 3 months clinical follow-up as the cyst was completely excised. The summary of the obstetric history shown on Table 2.

TABLE 2. Showing the significant obstetric history of the mothers.

Cases	Significant Obstetric History
1. Rt. ASH	Breech presentation.
2. Bilateral ASH	Strong painful uterine contractions.
3. Bilateral ASH	Strong painful uterine contractions. History of prolonged labour 2 days.
4. Billateral ASH	Strong painful uterine contractions.
5. Rt. Unilat. ASH	Strong painful uterine contractions.
6. Rt. AIH	Strong painful uterine contractions.
7. Lt. AIH	None significant Obstectric History

Discussion

ASH is rare in children but awareness of the condition led to more frequent reports with different clinical and morphological presentations[1-21]. Bilateral ASH was first reported in 1988[11], we are reporting 3 further bilateral ASH.

AIH is encysted hydrocele with intraabdominal extension, this variant is less frequently reported in males than ASH[8-9] but represents the only variant of hydrocele with intraabdominal extension in females (hydrocele of canal of Nuck)[11]. We reported 2 right-sided AIH which were excised completely and intact (Figs. 5 & 6).

In the view of the experience of the authors and careful study of the other reports on this condition[1-21], the authors believe that the abdominal extension of the inguinoscrotal hydrocele develops by the same mechanism of the indirect inguinal hernia but in the opposite direction and different causes of the increased pressure in the hydrocele intrascrotally. This can be understood by the fact that *tunica vaginalis* and *processus vaginalis* are contained in the scrotal musculofascial envelope which is extensions from musculofascial envelope of abdominal cavity, the fascial nature of this envelope makes the distensibility of the hydrocele limited and creates tense hydrocele if its contained fluids increased. Any further increase in the pressure inside the hydrocele will lead to upward expansion. When the upper boarder of the hydrocele crosses the internal ring then the hydrocele acquired its abdominal extension. The following criteria are essential in the development of intraabdominal extension.

1. Hydrocele superior boarder must be adjacent to the inguinal rings, *i.e.,* infantile hydrocele, high encysted hydrocele or vaginal hydrocele expanded upward in inguinoscrotal musculofascial envelope.

2. Hydrocele must be a non-communicating or having abdominoscrotal one-way valve.

3. Hydrocele must be a tense hydrocele so the push up may occur by increased intrahydrocele pressure either by external force of strong uterine contractions or intrauterine faetal position or due to excessive fluid accumulation in the sac by abdominoscrotal one-way valve communication.

The start of the intraabdominal extension is properitoneal as the deep ring opened internally to the propretonium but further major expansion will be directed to retroperitoneum along the internal course of the structures passes through the internal ring, *i.e., vas-deferens* and testicular vessels in males and round ligament (to in between the 2 layers of the board ligaments) in females[7]. This pattern of the intraabdominal expansion was seen in our patients and other reports.

Widening of the inguinal passage was evident in our cases and other reports but it is not clear whether it was a factor facilitated the push up or it was the result of dilating effect of the pushed-up hydrocele.

It is generally agreed that surgical excision is the treatment of choice to avoid recurrence. We found as some other surgeons[11-15] that the approach must be adequate to facilitate the dissection of the intraabdominal part and avoid any damage to the cord structures. This makes us recommend the following:

- minilaparotomy for the hydrocele with major intraabdominal extension (Retroperitoneal) or when difficulty encountered in identifying the cord structures.

- simple inguinal approach for the hydrocele with minor intraabdominal extension (properitoneal) where gentle traction or aspiration of the fluids might be sufficient to deliver the cyst wall.

The widening of the inguinal passage must be repaired to avoid acquiring a direct hernia. We tightened the inguinal passages in all of our patients.

The excised sac must be sent for histopath exam to exclude the possible association of the malignant mesothelioma[15, 18].

Finally, we suggest calling this condition as “Hydrocele with intraabdominal extensions” as this will include the abdominoscrotal and abdominoinguinal hydrocele in males and the similar condition in females, *i.e.,* the hydrocele of canal of Nuck with intraabdominal extension.

Conclusion

We are reporting our experience in management of the 10 hydrocele with intra-

abdominal extension in 7 infants with presenting some of the clinical and morphological features of importance. Also, we presented further evidence of the maternal uterine factor in the development of this condition. Finally, we suggested to call the condition as “hydrocele with intraabdominal extension” to include the variants of the condition, both in males and females.

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القيلة المائية الصفنية – الأربية – البطنية
(عشرة قيلات مائية ذات إمتداد للتجويف البطني)

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المستخلص. تعتبر القيلة المائية الصفنية الممتدة لتجويف البطن من الحالات النادرة في الأطفال. ولقد قمنا بمعالجة ١٠ قيلات في سبعة مواليد (ثلاثة يعانون من قيلة بالجانبين الأيمن والأيسر وأربعة في جهة واحدة فقط) ثمانية قيلات كانت صفنية بطنية واثنان أربية بطنية وهذه ناتجة عن امتداد قيلة مائية متكيسة إلى تجويف البطن وقد أكدت دراسة تاريخ الحمل والولادة في هذه الحالات ما اقترحة المؤلف في بحثة السابق من تفسير لهذة الظاهره وهو اندفاع القيله المائيه بفعل الضغط الخارجي على الكيس المائي إما بسبب تقلصات الرحم الشديد أو وضع الجنين داخل الرحم . وفي هذة المقاله نقدم خبرتنا في علاج هذة الحالات شاملا بعض الملاحظات الهامه إكلينكيا وعلى التغيرات المصاحبة على الشكل الخارجي للكيس والأنسجة المحيطة. كما أننا نقترح تسمية هذه الظاهرة (القيلة المائية ذات الامتداد البطنى) حيث تشمل هذه التسمية القيلة البطنية الصفنية والبطنية الأربية في الذكور وما يشابهها في إلاناث حيث تحدث نفس الظاهرة في الإناث في ما يسمى بالقيلة المائية لقناة نك .