Primary new-onset hydroceles presenting in late childhood and pre-adolescent patients resemble the adult type hydrocele pathology

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A B S T R A C T

Aim: The aim of this study was to investigate the presence of a patent processus vaginalis (PPV) in children of late childhood and pre-adolescence presenting with new onset hydrocele.

Material and methods: All males with hydrocele presenting at our department from January 2011 to January 2013 were followed. Patients with secondary hydroceles were excluded. Demographic data, medical history, clinical symptoms and signs relative to their pathology and U/S findings were recorded. According to their indications, patients were either operated or followed up. Patients surgically treated, consisted our study group.

Results: Sixty patients were identified. Thirty were followed until resolution of their hydrocele. Forty-seven patients were surgically treated. Twenty-seven had right sided hydrocele (57.44%), 13 had left sided hydrocele (27.66%) whereas in 7 patients the hydroceles were bilateral (14.9%). All patients were operated by an inguinal approach. In all patients (19.14%) presenting with new-onset hydrocele at the age > 10 years (range: 10–15 years), intraoperative exploration did not reveal a PPV. All patients were followed at least for 6 months post-operatively.

Conclusion: Early evidence shows that primary new onset hydroceles presenting in late childhood and pre-adolescence seem to be non-communicating and resemble the adult type hydrocele pathology.

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The pathologies of patent processus vaginalis (PPV) are the most common surgical entities that pediatric surgeons treat in a regular everyday basis. Inguinal hernias and communicating hydroceles, although they share the same underlying aetiology, are managed differently with early repair offered for the first and initial follow up and possible surgery for the latter. The usual approach to children with hydrocele, is close observation and follow up until the age of 2 years. In case that a hydrocele persists over that age or presents at that age or older, the usual proposed management is surgical treatment by an inguinal approach in order to highly ligate a PPV or to explore for the presence of a possible PPV [1].

However it has been noted in the literature that age is inversely related to the presence of PPV with hydroceles presenting at pre-adolescence probably being associated with absence of PPV and therefore possibly not warranting an inguinal approach [2]. We prospectively followed patients with hydrocele presenting at our department in order to determine a possible age cut off point for the presence of PPV and assess our current hydrocele protocol of treatment.

1. Materials and methods

All boys with hydrocele presenting at our department from January 2011 to January 2013 were followed. Demographic data, medical history and clinical symptoms and signs relative to their pathology were recorded. According to their indications, patients were either operated or followed up. Our study group consisted of all patients that were surgically treated.

The diagnosis of hydrocele was made according to the medical history and clinical evaluation. Fluctuation of the hydrocele and the ability to reduce its size under mild manipulation during clinical examination were marked. Specific attention was given regarding the reported change of size and volume of the hydrocele by the parents, especially in those children wherein a communicating hydrocele could not be demonstrated during clinical examination. Surgical findings were registered in the operative reports of each child.

In our department we traditionally follow a strict treatment protocol for the management of children with hydrocele. All patients younger than 2 years presenting for consultation, after initial evaluation are closely observed and followed up. In cases that hydrocele persists above the age of 2 years, surgical treatment is proposed. Accordingly, in patients that present for consultation after the age of 2 years, surgical treatment is proposed as the only definitive therapy.

Pre-operative U/S is performed in all patients for identification of a PPV. A PPV is identified and confirmed when a tubular hypoechoic structure is recognized extending from the internal inguinal ring towards the scrotum that increases in diameter and fills with fluid when abdominal pressure is increased [3,4]. The operative approach that we use is by inguinal incision, high ligation of the PPV and drainage of the hydrocele fluid. In cases that a PPV is not recognized, we extract...
the testis into the wound and the tunica vaginalis is plicated according to Lord's description, especially in older children [5].

Hydroceles of the cord and hydroceles secondary to other pathologies such as scrotal infection or trauma, ascites or those presenting as postoperative complications owing to other operations were excluded from the study. All patients were followed up for a period of at least 6 months in order to recognize any complications or recurrence of the hydrocele.

2. Results

Sixty children with hydrocele were referred for consultation to our department in the 2-year period from January 2011 to January 2013. Mean age of hydrocele onset was 4.9 years. In 13 patients the hydrocele resolved spontaneously during follow up, before they reached the age of 2 years old.

In the remaining 47 patients, the hydrocele persisted or presented after the age of 2 years and they were all operated immediately after or close to the diagnosis. Mean age of hydrocele onset was 5.1 years. Twenty-seven patients had a right-sided hydrocele, 13 had a left-sided hydrocele whereas in 7 patients the hydrocele was bilateral for a total of 54 hydroceles. Age distribution at hydrocele onset, laterality and the presence of PPV or not is shown in Table 1.

Preoperative U/S investigation was performed in all patients. A PPV was identified in all patients except from those with new onset hydrocele aged > 10 years. Reduction of the hydrocele fluid during clinical assessment and/or a history indicative of hydrocele size fluctuation was clearly negative for all these cases.

We noticed that the majority of patients with a PPV were aged between 2 and 5 years. As age increased, the number of patients declined, as did the recognition of a true PPV during surgical exploration. In the ages from 7 to 10 years only 3 boys presented for consultation for new onset hydrocele whereas in the ages > 10 years (range: 10–15) the number of new onset hydroceles increased to nine.

In 35 patients (age range: 2–7 years) a true PPV was found and a high ligation was performed. In 3 patients (age range: 7–10 years) a partial PPV was recognized, i.e. a PPV that is open at the internal inguinal ring but obliterated somewhere during its course to the testis with no communication to the hydrocele [6]. These patients were also treated with high ligation at the level of the internal inguinal ring complemented with drainage of the fluid and window creation of the tunica vaginalis.

The present study demonstrated the absence of a PPV at preoperative ultrasound as well as during surgery in all nine boys who presented with primary hydrocele after the age of 10 years. On the contrary, all cases younger than 10 years were identified with a PPV at the preoperative ultrasound; at surgery, a partially PPV was recognized in the children between seven and 10 years old (n = 3) and a complete PPV in children younger than 7 years (n = 35).

Interestingly, little was found in the literature with respect to primary non-communicating hydrocele in children, age of presentation and optimal management. Wilson et al., in a retrospective study of 93 children with 101 hydroceles with an age from 0.1 to 19.9 years found that 88.5% of children older than 10 years and all children older than 12 years had intraoperative findings consistent with a primary non-communicating hydrocele. They concluded that age is inversely proportional to the presence of PPV and that children older than 12 years should be offered a scrotal approach [2]. To our knowledge, this was the first study turning attention to this group of hydrocele patients.

In our study, 38 of the 47 hydrocele patients (82.97%) were reported with an identifiable PPV. They were all less than 10 years old, and they were all operated by an inguinal approach and high ligation of the PPV. In 3 of them, a partial PPV was recognized and in these patients the operation was completed with drainage of the fluid and window creation of the tunica vaginalis.

In the remaining 9 patients no PPV was recognized and hydrocele was treated according to Lord's repair after extraction of the testis into the wound. All these 9 patients were aged 10–15 years. We preferred the repair of idiopathic non-communicating hydrocele using the Lord’s approach, as it is bloodless, does not need full dissection of the hydrocele and shows less complications and recurrences compared with other methods [14]. Lord’s repair in these latter patients could possibly be offered through a scrotal instead of an inguinal approach with other methods [14].

In contrast to most hydroceles associated with a PPV, non-communicating hydroceles were associated with a natural history indicative of absence of a PPV since they did not change in size during the day or according to the activity of the child, and with inability to reduce hydrocele fluid through a PPV at clinical examination. The differentiation of non-communicating from hydroceles associated with a PPV upon clinical grounds (age > 10 years, history, clinical

Table 1

<table>
<thead>
<tr>
<th>Side</th>
<th>Patients (no.)</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Right</td>
<td>27</td>
<td>57.44</td>
</tr>
<tr>
<td>Left</td>
<td>13</td>
<td>27.66</td>
</tr>
<tr>
<td>Bilateral</td>
<td>7</td>
<td>14.9</td>
</tr>
<tr>
<td>Total</td>
<td>47</td>
<td>100</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Age distribution of hydrocele onset (years)</th>
<th>No.</th>
<th>Percentage</th>
<th>Intra-operative identification of PPV</th>
</tr>
</thead>
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<tr>
<td>2–3</td>
<td>18</td>
<td>38.3</td>
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</tr>
<tr>
<td>3–4</td>
<td>8</td>
<td>17.0</td>
<td>Yes</td>
</tr>
<tr>
<td>4–5</td>
<td>4</td>
<td>8.51</td>
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</tr>
<tr>
<td>5–6</td>
<td>3</td>
<td>6.38</td>
<td>Yes</td>
</tr>
<tr>
<td>6–7</td>
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<td>4.26</td>
<td>Yes</td>
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<tr>
<td>7–8</td>
<td>1</td>
<td>2.13</td>
<td>Partial</td>
</tr>
<tr>
<td>8–9</td>
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<td>2.13</td>
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<tr>
<td>9–10</td>
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</tr>
<tr>
<td>10–11</td>
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<tr>
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<tr>
<td>12–13</td>
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<tr>
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<td>No</td>
</tr>
<tr>
<td>Total: 47</td>
<td>100</td>
<td></td>
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</tr>
</tbody>
</table>
exam) was verified by the respective ultrasound and intraoperative findings in all cases.

Similarly to Wilson et al., we noticed that age was inversely related to the number of patients with hydrocele and a recognizable PPV during surgical exploration. Before age 7, all 35 cases had a complete PPV. In the ages from 7 to 10 only 3 boys were referred to us and a partial PPV was identified during surgery. In the ages > 10 years, the number of patients increased to 9 and in all of them we failed to recognize a PPV.

Discrepancies with respect to the suggested age cut-off point for non-communicating hydrocele differentiation between our study and the study by Wilson et al. (> 10 years versus > 12 years respectively) could be attributed to different study designs (prospective versus retrospective), patients’ age range and sample sizes (our sample size was limited because of the prospective design). For further study with bigger sample size and more long-term follow up for non-communicating hydroceles, the preferred management and the recurrences rate would probably be required.

Our data suggest that primary hydroceles with an onset after the age of 10 years can be safely approached with the clinical suspicion of the non-communicating differentiation and subsequently be repaired through a scrotal approach. An ultrasound investigation should be performed in all cases to verify the absence of a PPV as well as to search for any testicular or epididymal abnormalities, i.e., to exclude secondary hydroceles.

References


