RELATIONSHIP BETWEEN THE PERSISTENCE OF THE PROCESSUS VAGINALIS AND AGE IN PATIENTS WITH CRYPTORCHIDISM

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ABSTRACT

Objectives: To assess if there is an age group where the occurrence of persistent processus vaginalis is more frequent in patients with cryptorchidism.

Materials and Methods: We studied 24 fetuses with gestational age between 23 and 35 weeks postconception (control group) and 102 patients (137 testes) with cryptorchidism aged between 1 and 33 years (mean 10.3 years). We considered 2 situations for analysis of the processus vaginalis: a) complete persistence of processus vaginalis and, b) complete obliteration of the processus vaginalis between the internal inguinal ring and the upper pole of the testis.

Results: Of the 137 cases of cryptorchidism, the processus vaginalis was patent in 79 (57.6%) and obliterated in 58 (42.4%). Of the 55 patients between 1 and 4 years old, 37 (67.2%) had a patent processus vaginalis and 18 (32.8%) an obliterated one. Of the 37 patients between 5 and 8 years, 17 (45.9%) had patent processus vaginalis and 20 (54.1%) had an obliterated processus. In the 45 patients over 9 years of age, in 25 (55.5%) the processus vaginalis was patent and in 20 (44.5%) it was obliterated. In the fetuses, we found 4 cases (8.3%) of persistence of the processus vaginalis.

Conclusions: There was no difference in the occurrence of patent processus vaginalis between the various age ranges under study. Patent processus vaginalis was more frequent in patients with cryptorchidism than in fetuses.

Key words: testis; cryptorchidism; fetus; congenital abnormalities; surgery; inguinal hernia

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INTRODUCTION

Cryptorchidism is one of the most common congenital pathologies in males, with an incidence ranging from 2 to 5% of term births, and can reach up to 30% in premature birth (1-3). Several anomalies are associated with cryptorchidism; however epididymal anomalies and inguinal hernia are among the most frequent (3-5).

The occurrence of inguinal hernias is due to the persistence of the processus vaginalis (6,7). The processus vaginalis is a blind-ending sac extending from the peritoneum to the scrotum, which is layered by celomic epithelium (8). This generally obliterates upon the conclusion of testicular migration (6,7). In cases where the processus vaginalis does not obliterate, the child can develop inguinal hernia or communicating hydrocele (4). When the processus vaginalis is open in patients with cryptorchidism, the incidence of epididymal anomalies is significantly higher than when this structure is obliterated (9-11).

There are several studies in the literature on the incidence of epididymal anomaly and its relation to the persistence of the processus vaginalis (9-11),
nevertheless, in these studies, patients with patholo-
gies such as hydrocele or inguinal hernia were used
as a control group (10,11).

The objective of this work is to study the pro-
cessus vaginalis in patients with cryptorchidism, ob-
serving if there is an age range where the occurrence
of persistence of the processus vaginalis is more fre-
quent. As a control group, we used human fetuses
whose testes had already completed their migration,
which is undisputed in the literature.

MATERIALS AND METHODS

From January 2000 to July 2004, we studied
24 fetuses (48 testes) with gestational age between
23 and 35 weeks postconception (WPC), with mean
age of 28.7 WPC, and 102 patients (140 testes) with
cryptorchidism aged between 1 and 33 years (mean
10.3 years).

All fetuses under study were in a perfect state
of conservation with no detectable congenital mal-
fomations, with age calculated in WPC by measur-
ing the foot length (12-14). Fetal testes located in the
scrotum were used as a control group.

According to their position, cryptorchid tes-
tes were classified during surgery into 4 groups: a)
abdominal – testis locate above the internal inguinal
ring, b) internal inguinal ring – testis in contact with
the internal inguinal ring area, c) inguinal canal – testis
located between the internal and the external inguinal
ring, d) external inguinal ring – testis in contact with
the external inguinal ring.

The access used for approaching the proces-
sus vaginalis in patients with cryptorchidism was a
transversal inguinal incision above the internal in-
guinal ring. Once the inguinal canal was opened,
the testis and the spermatic vessels were identified
and, subsequently, the distal portion of the guber-
naculum that united the testis and the scrotum was
sectioned, and the spermatic vessels were dissected
up to the internal inguinal ring with an incision to
the cremaster. Placing a fine forceps inside in order
to assess its route assessed the persistence of pro-
cessus vaginalis. In fetuses, the dissection was per-
formed using as stereoscopic loupe with a magnifi-
cation of 2.5x.

In order to study the persistence of the pro-
cessus vaginalis, we considered 2 situations; a) com-
plete persistence of processus vaginalis, and b) com-
plete obliteration of the processus vaginalis between
the internal inguinal ring and the upper pole of the
testis (Figure-1).

For the contingency analysis of populations
under study, we used the qui-square statistical test
(p < 0.05) and Fisher’s exact test (p < 0.05) (15).

Informed consent was obtained for all cases
in this study. The research protocol for this study has
been reviewed and approved by our institution’s Eth-
ics Committee.

RESULTS

The positioning of the 140 cryptorchid testes
studied and its relation to the persistence of the pro-
cessus vaginalis is shown in Table-1. We observed
that most testes (50.7%) were located in the inguinal
canal. Anorchism occurred in 3 cases (2.14%), which
were subsequently withdrawn from our sample. Ab-
dominal testes presented the highest index of proces-
sus vaginalis persistence (75%), while the testes lo-

<table>
<thead>
<tr>
<th>Testicular Position</th>
<th>Total (%)</th>
<th>Processus Vaginalis</th>
</tr>
</thead>
<tbody>
<tr>
<td>Abdominal</td>
<td>16 (11.4)</td>
<td>12 (75)</td>
</tr>
<tr>
<td>Internal Ring</td>
<td>16 (11.4)</td>
<td>10 (62.5)</td>
</tr>
<tr>
<td>Canal</td>
<td>71 (50.7)</td>
<td>47 (66)</td>
</tr>
<tr>
<td>External Ring</td>
<td>34 (24.2)</td>
<td>10 (29)</td>
</tr>
<tr>
<td>Anorchism</td>
<td>3 (2.14)</td>
<td>0</td>
</tr>
<tr>
<td>Total</td>
<td>140 (100)</td>
<td>79 (57.6)</td>
</tr>
</tbody>
</table>
cated in the external inguinal ring presented only 29% of processus vaginalis persistence.

The relationship between the patient’s age and persistence of the processus vaginalis is shown in Table-2. Of the 137 cases under study, the processus vaginalis was patent in 79 (57.6%) and obliterated in 58 (42.4%).

The age range that showed the highest frequency of persistence of processus vaginalis was between 1 and 4 years old (67.2%). However there was no statistically significant difference between this and the remaining groups; that is, patients between 5 and 8 years of age (p = 0.3749) and patients over 9 years of age (p = 0.2657).

In the age range between 1 and 2 years of age, our sample consisted of 24 testes (16 patients), of which 16 (66.6%) presented a patent processus vaginalis.

<table>
<thead>
<tr>
<th>AGE</th>
<th>Patent Processus Vaginalis</th>
<th>Obliterated Processus Vaginalis</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 to 4 years (55 pts)</td>
<td>37</td>
<td>18</td>
</tr>
<tr>
<td>5 to 8 years (37 pts)</td>
<td>17</td>
<td>20</td>
</tr>
<tr>
<td>&gt; 9 years (45 pts)</td>
<td>25</td>
<td>20</td>
</tr>
<tr>
<td>Total = 137 pts</td>
<td>79 pts (57.6 %)</td>
<td>58 pts (43.4 %)</td>
</tr>
</tbody>
</table>
In fetuses whose testes are already positioned in the scrotum, we found 4 cases (8.3%) of persistence of the processus vaginalis. When we compared the cases of persistence of the processus vaginalis in fetuses with patients with cryptorchidism, we observed a higher prevalence of persistence of the processus vaginalis in the patients with cryptorchidism ($p < 0.0001$).

**COMMENTS**

The processus vaginalis is a structure identified in all species where there is testicular migration. This conduct allows the passage of the male gonad through the inguinal canal so it can be positioned inside the scrotum, which is the favorable environment for spermatogenesis (6).

Normally, the processus vaginalis obliterates following the testicular migration, separating the tunica vaginalis and the peritoneal cavity. Though it has been frequently postulated that the tunica vaginalis would have one parietal and one visceral layer, some authors state that this is incorrect since the celomic epithelium is absorbed by the tunica albuginea during the embryonal period (16). Thus, the processus vaginalis would form only one parietal layer, which is called tunica vaginalis.

The exact moment when the closing of the processus vaginalis occurs is still unknown. Studies suggest that at birth, there is persistence of the processus vaginalis in up to 80% of boys, with progressively decreasing rates throughout the first year of life (7,11,16). In a significant number of adult men, the processus vaginalis never obliterates. However, in the majority of these cases, there is no development of indirect inguinal hernia (7,11,16).

There is no agreement concerning the site where the closing of the processus vaginalis begins. According to Scorer & Farrington (4), the occlusion would progress from the region of the internal inguinal ring to the most distal portion, while Johansen (7) suggests the opposite direction.

The absence of complete regression that leaves a fibrous and non-elastic tissue in the place of the processus vaginalis could be associated with the occurrence of the so-called ascent of the testes. This term is used to describe those testes that, in spite of being initially located in the newborn’s scrotum, are identified as cryptorchid at a later age. This vestigial structure would prevent the development of the spermatic cord in response to the somatic growth, anchoring the testis, which would then assume a higher position (16,17).

In our sample, the processus vaginalis was patent in 57.6% of patients with cryptorchidism and in 8.3% of fetuses. The incidence of persistence of the processus vaginalis was significantly higher in patients with cryptorchidism than in fetuses whose testes were positioned in the scrotum.

Previous studies have evidenced the persistence of the processus vaginalis in a percentage that is similar to the present study. Jackson et al. (18) identified persistence of vaginal conduct in 51.5% of cases, and Scorer (19) found a patent conduct in 55% of cases. Heath et al. (9) detected persistence of the processus vaginalis in only 21.3% of their sample, while in 64 cases Bica & Hadziselimovic (20) report persistence of the processus vaginalis in 81.3% of the cases.

While analyzing patient ages, we observed that in cryptorchidism the age range with the highest frequency of persistence of the processus vaginalis was between 1 and 4 years of age (67.2%). However, there was no statistically significant difference in relation to the other 2 groups. In the 45 cases where patients were older than 9 years of age, the processus vaginalis was open in 25 (55.5%). These findings do not confirm a trend towards the closing of the processus vaginalis with age.

We conclude that there was no difference in the frequency of patent processus vaginalis between the age ranges under study, and that a patent processus vaginalis was more frequent in patients with cryptorchidism than in fetuses.

**REFERENCES**


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