The influence of clinical and subclinical varicocele on testicular volume

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Objective: To examine the possible loss of testicular volume in infertile men with clinical and subclinical varicocele by using ultrasound (US)-derived measurements of testicular volume.

Design: Retrospective review of clinical and scrotal US reports.

Setting: University infertility clinic.

Patient(s): Infertile men (n = 404) presenting for evaluation from 1992 to 1996.

Intervention(s): None.

Main Outcome Measure(s): Presence of clinical or subclinical varicocele, US-derived measurements of testicular volume.

Result(s): In men with clinical left or subclinical left varicocele, left testicular volume was significantly less than right testicular volume (12.9 versus 14.1 and 13.2 versus 14.7 mL, respectively). This finding was not observed in men with bilateral clinical or bilateral subclinical varicoceles or in men without varicocele.

Conclusion(s): Our data confirm previous reports showing that a clinical left varicocele can negatively impact on left testicular volume and for the first time show that a subclinical varicocele is also associated with decreased left testicular volume. (Fertil Steril® 1997;68:671–4. © 1997 by American Society for Reproductive Medicine.)

Key Words: Varicocele, subclinical varicocele, testicular volume, scrotal ultrasound
MATERIALS AND METHODS

We reviewed the scrotal US reports of men referred for infertility evaluation at our andrology clinic from 1992 to 1996. All patients referred to our clinic underwent scrotal ultrasonography. Ultrasonography was performed with the patient in the supine and upright position by using an Acuson 128 US unit with a 7.5-MHz transducer (Mountain View, CA).

Scrotal ultrasonography was performed by a trained ultrasonographer to rule out any pathology (including presence or absence of enlarged testicular veins at rest and during Valsalva maneuver) and to measure testicular volume. Testicular volume was calculated by the formula: volume = length × width × anteroposterior diameter × 0.53 (11). We defined a subclinical varicocele as one that is not palpable clinically but is detected on US. The diagnosis of a subclinical varicocele was made when one or more veins had a maximal diameter of >3 mm either at rest or during a Valsalva maneuver (11).

The history and clinical examination reports of these men were also reviewed. The presence or absence of a clinical varicocele was noted. A clinical varicocele was detected by scrotal examination of the patient in the upright position (with and without valsalva maneuver). Men with a history of pathology that, independent of varicocele, could affect testicular volume adversely (i.e., trauma, cryptorchidism, torsion, infection, or prior surgery) and men with solitary testicles were excluded from the study.

Values are expressed as means ± SD. A paired t-test was used to estimate statistical significance between the left and right testicular volumes within each group. A one-way analysis of variance was used to evaluate possible differences in left testicular volumes between groups (SAS Institute, Cary, NC).

Patient information for this study remained confidential and within the institution. In our institution, Institutional Review Board (IRB) approval is not necessary for retrospective studies and therefore was not obtained.

RESULTS

In total, 61 of the 404 men were excluded from the study because of a history of trauma, cryptorchidism, torsion, infection, or prior surgery. Of the 343 evaluable men, 119 (35%) had a clinical left varicocele, 29 (8%) had bilateral clinical varicoceles, 33 (10%) had a subclinical left varicocele, and 33 (10%) had bilateral subclinical varicoceles. A subset of the men with clinical left varicocele had a subclinical right varicocele (27/119). A total of 129 (38%) men had no detectable clinical or subclinical varicoceles and served as controls (Table 1).

In men with clinical left varicocele, left testicular volume was significantly less than right testicular volume (12.9 versus 14.1 mL, P <0.001). In that subset of men with clinical left and subclinical right varicocele, left testicular volume was less than right testicular volume, but this did not reach statistical significance (P = 0.06). In men with subclinical left varicocele, left testicular volume was also significantly less than right testicular volume (13.2 versus 14.7 mL, P <0.001). On the other hand, left testicular volume was not statistically significant compared with right testicular volume in men with bilateral clinical and bilateral subclinical varicoceles (P >0.05). In men without varicocele, left testicular volume also was not statistically significant compared with right testicular volume (P >0.05) (Table 1). There were no statistical significance in left testicular volumes between the groups.

DISCUSSION

The reported association between clinical left varicocele and ipsilateral testicular atrophy suggests, but does not prove, that testicular atrophy may be a marker of testicular injury in men with a varicocele. With the use of calipers, Lipshultz and Corriere (8) objectively showed that left testicular size in men with a left varicocele was significantly smaller than in a control group of men.

The World Health Organization (WHO) (9) presented similar data in a multicenter study that evaluated the physical findings and semen characteristics of men presenting for infertility. The WHO study reported that varicocele (mostly on the left side) was associated with relative left testicular atrophy compared with the contralateral testis.

Pinto et al. (10) recently reported that the difference between right and left testicular volume

<table>
<thead>
<tr>
<th>Group</th>
<th>Testicular volume (mL)</th>
<th>P value*</th>
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<tbody>
<tr>
<td></td>
<td>Left</td>
<td>Right</td>
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<tr>
<td>Left clinical varicocele (119)</td>
<td>12.9 ± 4.6†</td>
<td>14.1 ± 4.9</td>
</tr>
<tr>
<td>Bilateral clinical varicocele (29)</td>
<td>11.6 ± 5.0</td>
<td>12.1 ± 5.6</td>
</tr>
<tr>
<td>Left subclinical varicocele (33)</td>
<td>13.2 ± 3.3</td>
<td>14.7 ± 3.9</td>
</tr>
<tr>
<td>Bilateral subclinical varicocele (33)</td>
<td>13.3 ± 5.5</td>
<td>14.4 ± 5.9</td>
</tr>
<tr>
<td>No varicocele (129)</td>
<td>12.3 ± 5.2</td>
<td>12.8 ± 4.9</td>
</tr>
</tbody>
</table>

Note. Values in parentheses are number of men.

*Within group comparison between right and left testicular volumes.
†Values are means ± SD.
‡NS = not significant; P > 0.05.
The lack of standardized criteria for diagnosis and the conflicting treatment outcome reports on subclinical varicocele raise questions about the existence and significance of this entity (17-21). Our data support the notion that, in infertile men, subclinical varicocele is a real pathologic entity, at least, in that it is clearly associated with testicular atrophy. Whether testicular atrophy in infertile men with subclinical varicocele equates to impaired testicular function or subfertility remains to be answered.

The lack of a fertile control group in this study limits our ability to comment on the possible correlation between loss of testicular volume and fertility. Pinto et al. (10) have shown that men with varicocele and prior fertility also have associated atrophy of the testicle (as assessed by physical examination), suggesting that testicular atrophy alone does not appear to be predictive of fertility status. However, it is possible that some of the men with varicocele, prior fertility, and atrophy of the testicle suffer from subfertility or secondary infertility. The specificity of our findings does urge us to assess further those men with varicocele and loss of testicular volume. A prospective study might allow us to determine whether testicular atrophy is a useful predictor of fertility in these men.

This is the first study to examine the influence of a varicocele on testicular size with US measurements of testicular volume. Our data confirm previous reports showing that a clinical left varicocele can impact negatively on left testicular volume and for the first time show that a subclinical varicocele also is associated with decreased left testicular volume. This is also the first report showing that bilateral varicoceles are not associated with relative loss of left testicular volume, highlighting the specificity of our findings.

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REFERENCES