Re-assessing the value of varicocelectomy as a treatment for male subfertility: a new meta-analytical approach

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Objective: Although, varicoceles are recognized as a leading cause of male infertility, however, the value of a varicocelectomy in improving semen parameters or pregnancy outcomes is a topic of continuous debate. In this report, we present a meta-analysis with a new perspective to determine the efficacy of a varicocelectomy. We analyzed relevant articles on the topic, and included studies on infertile men with palpable varicoceles (i.e. clinical) and at least one abnormal semen parameter. We utilized a new scoring system that quantified bias, and relied on the scores for inclusion of both prospective randomized trials and observational studies. The meta-analysis evaluated only those studies that had pre and post-operative semen data on the same patient and spontaneous or natural pregnancy rates following a surgical varicocelectomy.

Design: Meta-analysis.

Materials and Methods: We performed a comprehensive literature review using the Medline (from 1985 to 2005), EMBASE, BIOSIS and Cochrane databases (1985-2005) with the following key search words: varicocele, varicocelectomy, sperm count, motility and morphology, spermatic vein ligation, microsurgery, male infertility, pregnancy etc. Only studies meeting specific selection criteria were selected for the meta-analysis. The data were then entered in the RevMan software (version 4.2.8) developed by the Cochrane collaborative for the purpose of meta-analysis (www.cochrane.org).

Results: Sperm concentration increased by 9.71 X 10^6/mL (95% CI: [7.34, 12.08], P < 0.00001) and motility increased by 9.92% (95% CI: [4.90, 14.95], P = 0.0001) following microsurgery. Similarly, sperm concentration increased by 12.03 X 10^6/mL (95% CI: [5.71, 18.35], P = 0.0002) and motility increased by 11.72% (95% CI: [4.33, 19.12], P = 0.002) after high ligation. The change in sperm morphology was statistically significant or 3.16% (95% CI: [0.72, 5.60]; P = 0.01)(Table 1). The odds of spontaneous pregnancy after surgical varicocelectomy, as compared to no/medical treatment for clinical varicocele, was significantly different at 2.87 (95% CI: [1.33, 6.20], P = 0.007) using a random effects model or 2.63 (95% CI: [1.60, 4.33], P = 0.0001) with fixed effects model (Figure 1).

Conclusion: A surgical varicocelectomy significantly improves semen parameters (count, motility and morphology) in infertile males with palpable lesions and the spontaneous pregnancy outcomes in their female partners. Contrary to previous meta-analyses, our study suggests that varicocelectomy does indeed have beneficial effects on fertility status.

Financial Support: None

Table 1: Effect of varicocelectomy on semen parameters (P<0.05 was considered significant)
<table>
<thead>
<tr>
<th>Parameters</th>
<th>Procedure</th>
<th>Increase in value</th>
<th>95% Confidence Interval</th>
<th>P-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sperm Concentration</td>
<td>Microsurgery</td>
<td>9.71 $\times 10^6$/mL</td>
<td>7.34, 12.08</td>
<td>$P &lt; 0.00001$</td>
</tr>
<tr>
<td></td>
<td>High Ligation</td>
<td>12.03 $\times 10^6$/mL</td>
<td>5.71, 18.35</td>
<td>$P = 0.0002$</td>
</tr>
<tr>
<td>Motility</td>
<td>Microsurgery</td>
<td>9.92%</td>
<td>4.90, 14.95</td>
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</tr>
<tr>
<td>Morphology</td>
<td>Microsurgery  &amp;</td>
<td>3.16%</td>
<td>0.72, 5.60</td>
<td>$P = 0.01$</td>
</tr>
<tr>
<td></td>
<td>High Ligation</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

![Figure 1: Effect of varicocelectomy on sperm parameters](image-url)

Author Disclosure Block: S.A. Prabakaran, None; A. Agarwal, None; J.L. Marmar, None; R.A. Short, None; S. Benoff, None; A.J. Thomas, None.

Category (Complete): Male Reproduction and Urology: Clinical (SMRU)

Topic (Complete):

**Topic**: Male reproductive surgery

Additional Information (Complete):

- **In-Training Awards for Research**: True
- **Resident In-Training Award**: True
- **ACCME Disclosure**: I will not be discussing non-FDA approved products
- **I agree**: True

Status: Complete

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