Endometriosis and infertility

Dr Sedighe Hosseini
Assistant professor
SBMU
introduction

• Prevalence $\rightarrow$ 0.8-6 %
• Subfertile women $\rightarrow$ 20-50%

• few implants on the pelvic peritoneum
• extensive adhesions and organ infiltration
• even lesions outside the pelvis
Possible causes for reduced fertility in women with endometriosis

- Adhesions
- Chronic intraperitoneal inflammation
- Disturbed folliculogenesis
- Luteinized unruptured follicle
- Luteal phase defects
- Progesterone resistance
- Detrimental effects on spermatozoa
- Anti-endometrial antibodies
- Dysfunctional uterotubal motility
• **Endometriosis Fertility Index (EFI):**
  This classification system is based on the point scores from the ASRM system combined with additional anamnestic, and post-surgical information

Scores 0 to 10
0–3 had only 10% probability of becoming pregnant
9–10 points had an approximately 75% success rate
**ENDOMETRIOSIS FERTILITY INDEX (EFI) SURGERY FORM**

**LEAST FUNCTION (LF) SCORE AT CONCLUSION OF SURGERY**

<table>
<thead>
<tr>
<th>Score</th>
<th>Description</th>
<th>Left</th>
<th>Right</th>
</tr>
</thead>
<tbody>
<tr>
<td>4</td>
<td>Normal</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Mild Dysfunction</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Moderate Dysfunction</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>Severe Dysfunction</td>
<td></td>
<td></td>
</tr>
<tr>
<td>0</td>
<td>Absent or Nonfunctional</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

To calculate the LF score, add together the lowest score for the left side and the lowest score for the right side. If an ovary is absent on one side, the LF score is obtained by doubling the lowest score on the side with the ovary.

**ENDOMETRIOSIS FERTILITY INDEX (EFI)**

<table>
<thead>
<tr>
<th>Historical Factors</th>
<th>Points</th>
<th>Surgical Factors</th>
<th>Points</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Age</strong></td>
<td></td>
<td><strong>LF Score</strong></td>
<td></td>
</tr>
<tr>
<td>If age is ≤ 35 years</td>
<td>2</td>
<td>If LF Score:</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td></td>
<td>7 to 8 (high score)</td>
<td></td>
</tr>
<tr>
<td>If age is 36 to 39 years</td>
<td>1</td>
<td>If LF Score:</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td></td>
<td>4 to 6 (moderate score)</td>
<td></td>
</tr>
<tr>
<td>If age is ≥ 40 years</td>
<td>6</td>
<td>If LF Score:</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td></td>
<td>1 to 3 (low score)</td>
<td></td>
</tr>
<tr>
<td><strong>Years Infertile</strong></td>
<td></td>
<td><strong>AFS Endometriosis Score</strong></td>
<td></td>
</tr>
<tr>
<td>If years infertile is ≤ 3</td>
<td>2</td>
<td>If AFS Endometriosis Score:</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td></td>
<td>≤ 1 (low score)</td>
<td></td>
</tr>
<tr>
<td>If years infertile is &gt; 3</td>
<td>6</td>
<td>If AFS Endometriosis Score:</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2 to 15 (moderate score)</td>
<td></td>
</tr>
<tr>
<td><strong>Prior Pregnancy</strong></td>
<td></td>
<td><strong>AFS Total Score</strong></td>
<td></td>
</tr>
<tr>
<td>If there is a history of a prior pregnancy</td>
<td>1</td>
<td>If AFS Total Score:</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td></td>
<td>≤ 71</td>
<td></td>
</tr>
<tr>
<td>If there is no history of prior pregnancy</td>
<td>0</td>
<td>If AFS Total Score:</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td></td>
<td>72 to 100</td>
<td></td>
</tr>
<tr>
<td><strong>Total Historical Factors</strong></td>
<td></td>
<td><strong>Total Surgical Factors</strong></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>EFI = TOTAL HISTORICAL FACTORS + TOTAL SURGICAL FACTORS:</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**ESTIMATED PERCENT PREGNANT BY EFI SCORE**

[Graph showing estimated percent pregnant by EFI score]
Therapeutic Options Available for Endometriosis-Associated Infertility

• Medical treatment

• Surgery

• ART
medical treatment

• In infertile women with endometriosis, clinicians should not prescribe ovarian suppression treatment to improve fertility

• Women seeking pregnancy should not be prescribed postoperative hormonal suppression with the sole purpose to enhance future pregnancy rates
Medical treatment

• Those women who cannot attempt to or decide not to conceive immediately after surgery should be offered hormonal therapy as it does not negatively impact their fertility and improves the immediate outcome of surgery for pain.
<table>
<thead>
<tr>
<th>Factor</th>
<th>In favour of surgery</th>
<th>In favour of ART</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ovarian reserve</td>
<td>Satisfactory</td>
<td>Decreased</td>
</tr>
<tr>
<td>Patient’s intentions and priorities</td>
<td>Patient choice</td>
<td>Patient choice</td>
</tr>
<tr>
<td>Age</td>
<td>Young</td>
<td>Old</td>
</tr>
<tr>
<td>Infertility duration</td>
<td>Short</td>
<td>Long</td>
</tr>
<tr>
<td>Associated infertility factors (male infertility or tubal blockage)</td>
<td>No</td>
<td>Yes</td>
</tr>
<tr>
<td>Previous surgery for endometriosis (specifically OMA)</td>
<td>No</td>
<td>Yes</td>
</tr>
<tr>
<td>Pelvic pain intensity</td>
<td>Intense</td>
<td>Low</td>
</tr>
<tr>
<td>Ovarian endometrioma (specifically whether bilateral)</td>
<td>No</td>
<td>Yes</td>
</tr>
<tr>
<td>Associated adenomyosis</td>
<td>No</td>
<td>Yes</td>
</tr>
</tbody>
</table>
Significant damage to ovarian reserve – up to 40% fall in serum AMH after cystectomy (endo)
IUI

• Patients with minimal to mild endometriosis

• not shown any anatomic distortion

• Women suffering from moderate to severe forms of endometriosis do not benefit from IUI
ART

- ART can be performed for infertility associated with endometriosis:
  - tubal function is compromised
  - male factor infertility
  - low EFI and/or
  - other treatments have failed
ART

• Women with endometriosis can be reassured regarding the safety of ART since the recurrence rates are not increased compared to those women not undergoing ART.

• A specific protocol for ART in women with endometriosis cannot be recommended. Both antagonist and agonist protocols can be offered based on patients’ and physicians’ preferences as no difference in pregnancy or live birth rate has been demonstrated.
ART

• Comparison of the results of ART for patients with infertility associated with endometriosis and those with other causes of infertility has not revealed any difference in live birth rates.

ART outcomes seemingly do not correlate with endometriosis phenotypes (SUP, OMA or DIE).
ART

• the presence of OMA was associated with a higher cycle cancellation rate, higher required doses of gonadotropins, a lower mean number of oocytes retrieved, a lower mean number of metaphase II oocytes retrieved and a lower total number of embryos formed.

A previous history of surgery for endometriosis (with or without ovarian surgery) statistically significantly decreases ART results.
ovarian reserve in endometriosis

• The ovarian reserve is also negatively affected by endometriosis.

• The presence of ovarian endometriomas appears to damage the ovarian reserve:
    exposing healthy ovarian tissue to free radicals
    exposing the ovary to mechanical stretch
ovarian reserve in endometriosis

• even prior to surgery, women with endometriomas have significantly lower anti-Müllerian hormone (AMH) levels than healthy women

• embryos from women with endometriosis grow more slowly and demonstrate increased rates of arrested and abnormal development
# Fertility Preservation in Endometriosis

<table>
<thead>
<tr>
<th><strong>OOOCYTE AND EMBRYO CRYOPRESERVATION</strong></th>
<th><strong>OVARIAN TISSUE CRYOPRESERVATION</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Benefits</strong></td>
<td></td>
</tr>
<tr>
<td>High success rates, particularly with embryos</td>
<td>Option for women who are unable or unwilling to undergo ovarian stimulation</td>
</tr>
<tr>
<td>Avoids a laparoscopic procedure</td>
<td>Option for women who require oophorectomy</td>
</tr>
<tr>
<td>Avoids risk of damage to ovarian tissue</td>
<td>Could be performed at the time of excision surgery for at-risk patients</td>
</tr>
<tr>
<td><strong>Risks</strong></td>
<td></td>
</tr>
<tr>
<td>Reproductive potential of follicles from endometriosis patients requires further study</td>
<td>Experimental technology</td>
</tr>
<tr>
<td>Need to cryopreserve large numbers of oocytes (15-20 in women aged &lt;38 years and 25-30 in women aged ≥38 years)</td>
<td>Potential for damage to viable ovarian tissue</td>
</tr>
<tr>
<td>Possibility of impaired oocyte and embryo quality</td>
<td>Risks of laparoscopy</td>
</tr>
</tbody>
</table>
Ovarian reserve

- Bilateral endometriomas
- Unilateral endometrioma with history of surgery for contralateral endometrioma
- History of multiple surgeries
- At risk for multiple surgeries

Normal

- Age < 37
  - Observation
- Age ≥ 37

Low

- Yes
  - Consider fertility preservation

  - Candidate for oocyte/embryo cryopreservation?
    - Yes
      - Oocyte or embryo cryopreservation
    - No
      - Ovarian tissue cryopreservation
IVF was not associated with an increased risk of OE-TOA.

The risk factors significantly associated with OE-TOA were lower genital tract infections and spontaneous rupture of ovarian endometriotic cysts.