REGULATORY T CELLS in PERIPHERAL BLOOD in women with OVARIAN and PERITONEAL ENDOMETRIOSIS

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DECLARATION OF INTERESTS:

- None
ENDOMETRIOSIS

- Ectopic endometrial tissue outside the uterus
- Etyology?
- Is endometriosis immune disease?

- Sampson: Peritoneal endometriosis due to menstrual dissemination of endometrial tissue into the peritoneal cavity (1927)
- Bulun: Endometriosis (2009)
**AIM**

- Our study aimed to evaluate peripheral blood lymphocyte subpopulations during the menstrual cycle in women with peritoneal and ovarian endometriosis relative to healthy women.
METHODS and MATERIALS

- **Subjects**
  - Study group: 65 women
    - Ovarian endometriosis
    - Peritoneal endometriosis
  - Control group: 61 healthy women

- **Exclusion criteria**
  - Rectovaginal endometriosis
  - Pelvic inflammatory disease
  - Polycystic ovary disease
  - Gynecological carcinoma
  - Ovarian cysts of different etiology
  - Use of hormonal treatment in past 3 months
METHODS and MATERIALS

- Flow cytometric analysis
  - B-lymphocytes (CD19+)
  - T-lymphocytes (CD3+)
  - T-helper cells (CD4+)
  - Cytotoxic T-lymphocytes (CD8+)
  - CD4/CD8
  - NK cells (CD56+/CD16+)
  - HLA-DR cells
  - Regulatory T-lymphocytes (CD3+/CD25++)

- Serum levels of cortisol
RESULTS: groups

- 126 enrolled women
  - 65 women with endometriosis
  - 61 healthy women
    - Phase of menstrual cycle

<table>
<thead>
<tr>
<th>Menstrual cycle</th>
<th>Follicular phase</th>
<th>Luteal phase</th>
</tr>
</thead>
<tbody>
<tr>
<td>Study group</td>
<td>37 (56,9%)</td>
<td>28 (43,1%)</td>
</tr>
<tr>
<td>Control group</td>
<td>33 (54,1%)</td>
<td>28 (45,9%)</td>
</tr>
</tbody>
</table>
RESULTS: age

The women were 20–46 years old

- Study group
  32.86 ± 6.09 years old
- Controls
  40.49 ± 3.96 years old
  \( p < 0.001 \)

<table>
<thead>
<tr>
<th>Lymphocyte Subpopulations (x10^9 cells/L)</th>
<th>P value</th>
</tr>
</thead>
<tbody>
<tr>
<td>CD3^+</td>
<td>0.474</td>
</tr>
<tr>
<td>CD19^+</td>
<td>0.308</td>
</tr>
<tr>
<td>CD4^+</td>
<td>0.265</td>
</tr>
<tr>
<td>CD8^+</td>
<td>0.715</td>
</tr>
<tr>
<td>CD4/8</td>
<td>0.072</td>
</tr>
<tr>
<td>NK</td>
<td>0.060</td>
</tr>
<tr>
<td>CD3^+/CD25^{++}</td>
<td>0.448</td>
</tr>
<tr>
<td>HLA-DR</td>
<td>0.327</td>
</tr>
</tbody>
</table>

Haynes: Effects of aging on T-cell function (2009)
Peripheral blood lymphocyte subpopulations in follicular and luteal phase of menstrual cycle in study group (A) and control group (B)

RESULTS:

- Follicular phase
- Luteal phase

A

B

* p < 0.05
RESULTS: Peripheral blood lymphocyte subpopulations in study and control group in follicular (A) and luteal (B) phase of menstrual cycle

A

B

* p < 0.05
RESULTS: Regulatory T lymphocytes during the menstrual cycle in women with and without endometriosis in peripheral blood

![Graph showing Treg levels during follicular and luteal phases for study and control groups.](image)

* p = 0.005

Berbic: Regulatory T cells and other leukocytes in the pathogenesis of endometriosis (2011)
Arruvito: Expansion of CD4+CD25+ and FOXP3+ regulatory T cells during the follicular phase of the menstrual cycle: Implications for human reproduction (2007)
Prieto: Oestradiol potentiates the suppressive function of human CD4+CD25+ regulatory T cells by promoting their proliferation (2006)
RESULTS: cortisol

• Study group: 417 ± 202 nmol/L
• Control group: 341 ± 165 nmol/L

(p = 0.022)
**RESULTS:** cortisol

<table>
<thead>
<tr>
<th>Lymphocyte subpopulations (x10^9 cells/L)</th>
<th>Cortisol correlation coefficient</th>
<th>P value</th>
</tr>
</thead>
<tbody>
<tr>
<td>CD3^+</td>
<td>-0.126</td>
<td>0.159</td>
</tr>
<tr>
<td>CD19^+</td>
<td>-0.072</td>
<td>0.423</td>
</tr>
<tr>
<td>CD4^+</td>
<td>-0.125</td>
<td>0.164</td>
</tr>
<tr>
<td>CD8^+</td>
<td>-0.055</td>
<td>0.538</td>
</tr>
<tr>
<td>CD4/8</td>
<td>-0.054</td>
<td>0.549</td>
</tr>
<tr>
<td>NK</td>
<td>0.051</td>
<td>0.574</td>
</tr>
<tr>
<td>CD3^+/CD25^{++}</td>
<td>-0.176</td>
<td>0.048</td>
</tr>
<tr>
<td>HLA-DR</td>
<td>-0.118</td>
<td>0.123</td>
</tr>
</tbody>
</table>

Bradley: Differential effects of glucocorticosteroids on the functions of helper and suppressor T lymphocytes (1981)

CONCLUSIONS

- Women with endometriosis had higher concentration of serum cortisol levels compared with healthy controls.

- There was negative correlation between serum cortisol levels and regulatory T-cells concentration in peripheral blood.
CONCLUSIONS

- Women with endometriosis do not exhibit fluctuations in the concentration of cytotoxic and activated peripheral blood lymphocytes during the menstrual cycle.

- A marked increase in regulatory T cell concentration in the luteal phase was detected only in endometriosis patients.

- This can be attributed to altered immune response in patients with endometriosis and suggests that cytotoxic cells are not sufficiently effective.
CONCLUSIONS

- Altered immune response has important role in pathogenesis of endometriosis.
Thank you for listening.