Surgical treatment of deeply infiltrating endometriosis

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Deeply infiltrating endometriosis

- Definition of rectovaginal endometriosis by Cullen 1920

- Development of laparoscopic excision techniques led to reobservation that some lesions grow deep into the subperitoneal stroma.

- Deep lesion: lesion extends more than 5 mm under the peritoneum

- Surgical classification based on locations of deeply infiltrating endometriosis (DIE)

<table>
<thead>
<tr>
<th>Location</th>
<th>Percentage of DIE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Uterosacral ligaments</td>
<td>69%</td>
</tr>
<tr>
<td>Vaginal</td>
<td>14%</td>
</tr>
<tr>
<td>Bowel</td>
<td>11%</td>
</tr>
<tr>
<td>Bladder</td>
<td>6%</td>
</tr>
</tbody>
</table>
Deeply infiltrating endometriosis

- Prospective evaluation of the incidence of DIE in 233 patients treated surgically for endometriosis in Päijät-Häme Central Hospital 2005 – 2007

<table>
<thead>
<tr>
<th>Lesion</th>
<th>No of pat.</th>
<th>% of all</th>
<th>% of deep</th>
</tr>
</thead>
<tbody>
<tr>
<td>deep lesions</td>
<td>111</td>
<td>49.8</td>
<td></td>
</tr>
<tr>
<td>uterosacral ligament</td>
<td>94</td>
<td>42</td>
<td>85</td>
</tr>
<tr>
<td>bowel</td>
<td>38</td>
<td>17</td>
<td>34</td>
</tr>
<tr>
<td>rectovaginal endometriosis</td>
<td>34</td>
<td>15</td>
<td>31</td>
</tr>
<tr>
<td>bladder</td>
<td>7</td>
<td>3</td>
<td>6</td>
</tr>
</tbody>
</table>

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Deeply infiltrating endometriosis

- Tumor-like hard nodules
- Diameter ~ 0.5 – 4 cm
- Histological components:
  - endometrial-like glands and stroma surrounded by fibrosis and smooth-muscle hyperplasia
Deeply infiltrating endometriosis

• Two theories about the pathogenesis

  Adenomyosis
  Cullen 1920, Nisolle et Donnez 1997

  Peritoneal lesion infiltrating deeper
  Koninckx et Martin 1992, Vercellini 2002

  no consensus

• How fast does it develop?

• Always limited growth
Deeply infiltrating endometriosis

- Deep endometriosis does not seem to disappear by itself or with time

- Rectovaginal endometriosis:
  
  Maintains initial consistency and volume after pregnancy and puerperium

  Reduction of volume, but not complete disappearance after menopause

  Fedele et al. 2004

- Several reports about symptomatic deep endometriosis in postmenopausal women and after bilateral salpingo-oophorectomy


- Surgery is the only way to remove deep lesion

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Aims of the surgical treatment of DIE

• Removal of deeply infiltrating lesion
• Relieve painful symptoms
• Improve fertility
• Achieve as low recurrence rate as possible
Should deep lesions always be removed?

• Progression is slow, at least in asymptomatic patients
  Fedele et al. 2002

• Malignant transformation has been reported in association of DIE lesions

• At present, endometriosis should not be considered a condition associated with a clinically relevant risk of any specific cancer
  Somigliana et al 2006

• Young patients, benign disease, no permanent cure

• Surgery carries a risk of complications

• Asymptomatic patients should not be treated with surgery, but proper follow-up should be organized
Efficacy of surgical treatment

Pain

• It is quite well demonstrated, that deep endometriosis cause pain

  Intensity of pain is correlated with the depth of infiltration
  Cornillie et al. 1990, Koninckx et al. 1991, Porpora et al. 1999

  Location of pain is associated with the location of DIE
  Fauconnier et al. 2002

• Endometriosis cause marked impairment in quality of life compared with ”normal population”

Efficacy of surgical treatment

Pain

• Prospective studies on laparoscopic excision of all endometriotic lesions have shown significant improvement in pain symptoms, which persists severel years

in quality of life

• Severe pain is the primary indication for surgical treatment
Indication for surgery: infertility

• Endometriosis cause infertility

• It is not known, if and how isolated deep lesion cause infertility

• Women with advanced endometriosis and mechanical distortion of the normal pelvic anatomy have a clear cause for decreased fertility

• Certain percentage of patients with advanced stages of endometriosis conceive spontaneously
Efficacy of surgical treatment
Infertility

• Most studies focus on pain relief, little prospective data of the effect on infertility

• Surgical treatment of rectovaginal endometriosis does not improve the likelihood of pregnancy compared to expectant management

24-month cumulative probability of conception 44.9% and 46.8% (p = 0.38)

Significant pain relief in surgically treated patients

Vercellini et al 2006

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Efficacy of surgical treatment
Infertility

• Spontaneous pregnancy rates are lower in patients
with deep bowel endometriosis
compared to endometriosis patients with no bowel involvement

Stepniewska et al 2009

A 60 patients with bowel endometriosis treated with removal of all endometriosis including colorectal segmental resection

B 40 patients with bowel endometriosis treated with removal of all endometriosis except bowel resection

C 55 patients with at least one endometrioma and deeply infiltrating endometriosis but no bowel endometriosis treated with removal of all endometriosis

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Among women with deep bowel endometriosis, monthly fecundity rates were significantly better if bowel resection was performed.

Efficacy of surgical treatment

Infertility

- Evidence supporting the efficacy of surgery as a fertility-enhancing procedure is still limited.

- The decision to perform large operations with possible bladder and bowel resections in patients with infertility has been, and still is, controversial.

- During recent years, surgical techniques have significantly evolved, and large amounts of expertise have been gained.

- In the future, surgery could be a valid treatment option for infertility in specialized centres.
How to achieve low recurrence rates?

- Electrocoagulation has no role in surgery for deeply infiltrating lesions
- Lesions should be completely excised, with scissors, ultrasound scissors or laser
How to achieve low recurrence rates?

• Complete removal of all endometriotic lesions
  
  Incomplete resection of deep lesion does not achieve any benefits and probably is the worst thing you can do.

  Peritoneal lesions, endometriomas, and adhesions are frequently found in association with DIE.

  In all studies, which have shown any benefit of the surgical treatment of DIE, all endometriotic lesions have been removed.

• Recurrence is rare if surgery is radical in the first operation (urinary bladder DIE 3 years follow-up)

  Fedele ym. 2005
How to achieve low recurrence rates?

- Proper surgery

  The first operation is crucial for the prognosis

  Unduly traumatic procedures or incomplete procedures probably greatly reduce the change of spontaneous pregnancy and increase the risk of disease recurrence (= persistence)

  Vercellini et al. 2004
Urinary bladder DIE - surgery

- DIE lesions of the urinary bladder are always located along the midline:
  - bladder dome (fundus) or
  - posterior bladder wall near trigonum

- Bladder DIE does not infiltrate to ureters
  Vercellini et al 2002,
  Abrao et al 2008

- Ureter catheters are useful during the surgery if lesion is located near trigonum

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DIE lesion located in trigonum

May be difficult to remove

Laparotomy might be needed for complete removal of the lesion

Fedele et al 2005
Bowel DIE – sigmoid colon
Bowel DIE - surgery

- Segmental bowel resection is usually needed for sigmoid, cecal and small bowel lesions
Bowel DIE - appendix

• Often attached to the right adnexa

• Appendectomy
Bowel DIE - appendix

• Quite often appendix is invaginated inside cecum

• Cecal resection or ileo-cecal resection
Uterosacral ligament DIE - surgery

- Most common Die lesion
- Most often unrecognised DIE lesion and undiagnosed cause of severe pain

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Uterosacral ligament DIE

- Isolated lesions can be treated with relatively short day-surgery procedure

- Bowel is often attached to the lesion
Uterosacral ligament DIE

- Large lesions often infiltrate to the ureter(s)

- Ureterolysis during excision in 73% of patients

Chapron et al 1999
Rectovaginal endometriosis
(Recto)Vaginal DIE - surgery
Rectovaginal endometriosis - surgery

- Two surgical techniques:

  Lesion is excised from the vagina, and ablated from the anterior wall of the rectum, segmental bowel resection is never performed


  Lesion is excised from the vagina, and segmental bowel resection is performed to the rectum


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Endometriosis in the anterior wall of rectum after separating the bowel behind the vagina
RVE - surgery

• Skeptical reports about the efficacy of the ablation technique:

  Infiltration of endometriosis to submucosa or mucosa of the bowel is common  
  Kavallaris et al 2003, Anaf et al. 2004

  62% of patients have multifocal disease  
  Kavallaris et al 2003

  5% of patients have postoperative rectum perforation and peritonitis  
  Koninckx 2006

• It is probable that ablation does not result in complete removal of the disease → recurrence rates should be high

• Not that many reports of recurrence

  One abstract report with long follow-up, recurrence 8% with 5 – 12 years follow-up  
  Donnez 2000

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RVE - surgery
Bowel resection

• Significant improvement of
  dysmenorrhea (1 – 4)
  dyspareunia (1, 2, 4)
  non-menstrual pelvic pain (1, 3)
  dyschezia (2, 4)
  quality of life (3, 4)

• No recurrence during the follow-up (1 – 3)

1. Darai et al. 2005: 40 patients, prospective, follow-up mean 15 months (3 – 22)
2. Landi et al. 2006: 70 patients, prospective, follow-up 15 ± 10
3. Lyons et al. 2006: 7 patients, prospective, follow up 1 year
4. Dubernard ym. 2006: 58 patients, prospective, follow-up mean 22 months (2-55)

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Complications after laparoscopic bowel resection for rve

<table>
<thead>
<tr>
<th></th>
<th>Leakage of fistula anastomosis</th>
<th>Rectovaginal urinary retention</th>
<th>Transient retention</th>
</tr>
</thead>
<tbody>
<tr>
<td>Kavallaris et al. 2003</td>
<td>2 / 50</td>
<td>0 / 50</td>
<td>NR</td>
</tr>
<tr>
<td>Anaf et al. 2004</td>
<td>0 / 13</td>
<td>0 / 13</td>
<td>3 / 13</td>
</tr>
<tr>
<td>Darai et al. 2005</td>
<td>0 / 40</td>
<td>3 / 40</td>
<td>7 / 40</td>
</tr>
<tr>
<td>Landi et al. 2006</td>
<td>3 / 70</td>
<td>0 / 70</td>
<td>4 / 70</td>
</tr>
<tr>
<td>Lyons et al. 2006</td>
<td>0 / 7</td>
<td>0 / 7</td>
<td>1 / 7</td>
</tr>
<tr>
<td>Ribeiro et al. 2006</td>
<td>1 / 125</td>
<td>2 / 125</td>
<td>3 / 125</td>
</tr>
<tr>
<td>Dubernard ym. 2006</td>
<td>0 / 58</td>
<td>6 / 58</td>
<td>NR</td>
</tr>
</tbody>
</table>

|                  | 6 / 363                         | 11 / 363                       | 18 / 255           |
|                  | 1.6%                            | 3%                             | 7%                 |

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Nerve-sparing technique

• No significant impairment of urinary and digestive functions
  in earlier papers of laparoscopic complete excision of rve
  with or without associated bowel resection

• There may be a negative bias in reporting
  Landi et al. 2006

• Inferior hypogastric nerves and
  inferior hypogastric plexus nerves - sparing technique
  Volpi et al. 2004, Landi et al 2006

• It is not always possible to completely preserve these nerves
  Landi et al 2006

• Women operated with nerve sparing technique resumed bladder-
  voiding function sooner
  and were more satisfied after the operation
  Voipi et al. 2004, Landi et al 2006
  Landi et al 2006

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Rve - surgery
Rve - surgery
Rve - surgery

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Surgery for DIE lesions

• Isolated uterosacral and vaginal lesions can be treated with relatively short day-surgery procedure

• Several hours are usually needed when bladder and bowel resections are performed
Surgery for DIE lesions

• Is seldom one nodule surgery

• Multifocality is common  
  Chapron et al 2003

• Most patients also have peritoneal lesions and/or endometriomas that have to be removed 
  Somigliana et al  2004 & 2007

• Some patients would benefit from hysterectomy as a treatment for severe dysmenorrhea
Surgery for DIE lesions
Ureters are a big problem

• Uterosacral ligament DIE and rectovaginal lesions often infiltrate to ureters, and ureterolysis has to be performed
Surgery for DIE lesions
Adhesions may be even bigger problem

• Most of the patients have adhesions caused by endometriosis, and adhesiolysis has to be performed
Surgery for DIE lesions, Adhesions

- Previously operated patients often have severe postoperative adhesions, especially if the previous operation was performed by laparotomy
How to organise the treatment?

• Good diagnostics

  Most of the DIE lesions can be diagnosed before the operation

• Good planning

  Gynecologists should take the responsibility of the treatment and

  Co-operate with surgeons
Procedures performed with surgeon on 43 / 111 (38.7%) patients with DIE lesions

<table>
<thead>
<tr>
<th>Procedure</th>
<th>Number of Operations</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rectal resection</td>
<td>34</td>
</tr>
<tr>
<td>Sigmoid resection</td>
<td>4</td>
</tr>
<tr>
<td>Ileocecal resection</td>
<td>2</td>
</tr>
<tr>
<td>Cecal resection</td>
<td>2</td>
</tr>
<tr>
<td>Ureteral resection and reanastomosis, both sides</td>
<td>1</td>
</tr>
<tr>
<td>Ureteroneocystostomy, left side</td>
<td>1</td>
</tr>
<tr>
<td>Deliberation of adhesions</td>
<td>1</td>
</tr>
<tr>
<td>Excision of diaphragmal endometriosis</td>
<td>1</td>
</tr>
</tbody>
</table>

Total: 46
How to organise the treatment?

• Patient has to take part in decision-making

  Treatment options and outcome probabilities should be evaluated individually

  Patients should be informed of the benefits and possible adverse affects

  Treatment decision should be based on mutual agreement
How to organise the treatment?

- When surgery is chosen as a treatment for patients with DIE
  
  proper tools and equipments
  
  trained and experienced operating theatre staff
  
  enough time to operate
  
  gynecologic surgeons with experience of endometriosis surgery
  
  available experienced gastroenterologic surgeon

  are needed before surgery should be performed