

# Is the presence of endometrioma always associated with more severe disease?

M. Setälä · P. Härkki · P. Suvitie · J. Fraser ·  
J. Jalkanen · J. Kössi · A. Perheentupa · J. Mäkinen

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**Abstract** The aim of this prospective study was to estimate whether the presence of endometrioma was associated with more severe disease, and with operative findings that were considered to make surgery more demanding in patients with deeply infiltrating endometriosis located in the posterior fornix of the vagina. Ninety-eight patients scheduled for primary surgery underwent complete excision of all visible endometriotic lesions and adhesions by laparoscopy (86 patients, 87.8%) or by laparotomy (12 patients, 12.2%) in four hospitals specialized in the surgical treatment of endometriosis. Endometrioma was detected in 46 patients (47.0%). No statistically significant difference was detected between patients with and without an endometrioma, in the presence of six studied operative

findings: total obstruction of the pouch of Douglas (28% vs. 27%,  $p=0.88$ ), attachment of a posterior deep lesion to the ureter (52% vs. 44%,  $p=0.43$ ), peritoneal endometriotic lesions (80% vs. 75%,  $p=0.52$ ), other deep lesions (24% vs. 33%,  $p=0.34$ ), attachment of bowel to the uterosacral ligament deep lesion (65% vs. 69%,  $p=0.71$ ), and attachment of the rectum to a rectovaginal deep lesion (81% vs. 84%,  $p>0.99$ ). Endometrioma did not seem to be associated with operative findings that were considered to represent more severe disease, and make surgery more demanding in patients with deep endometriotic lesions in the posterior fornix of the vagina and with no previous pelvic surgery.

**Keywords** Endometriosis · Endometrioma · Deeply infiltrating endometriosis · Surgery

M. Setälä  
Department of Obstetrics and Gynecology,  
Päijät-Häme Central Hospital,  
Lahti, Finland

M. Setälä (✉) · P. Suvitie · A. Perheentupa · J. Mäkinen  
Department of Obstetrics and Gynecology,  
Turku University Hospital,  
PO BOX 52, 20521 Turku, Finland  
e-mail: marjaleena.setala@fimnet.fi

P. Härkki · J. Jalkanen  
Department of Obstetrics and Gynecology,  
Helsinki University Hospital,  
Helsinki, Finland

J. Fraser  
Department of Obstetrics and Gynecology,  
North Karelian Central Hospital,  
Joensuu, Finland

J. Kössi  
Department of Surgery, Päijät-Häme Central Hospital,  
Lahti, Finland

## Abbreviations

DIE	Deeply infiltrating endometriosis
RVE	Rectovaginal endometriosis
rASRM	Revised American Society of Reproductive Medicine
BMI	Body mass index

## Background

Endometrioma, an ovarian cyst caused by endometriosis, is one of the most commonly found endometriotic lesions. Endometrioma may be present in 30–40% of surgically treated endometriosis patients [1, 2]. It has been estimated earlier that endometrioma could be a marker for more severe endometriotic disease [1, 3, 4]. Among surgically treated endometriosis patients, its presence has been associated with an increased risk of intestinal and posterior

cul-de-sac involvement [1, 3]. In patients with deeply infiltrating disease, the presence of endometrioma has been shown to be associated with multifocality of deep lesions and increased risk of intestinal and ureteral involvement [4].

Deeply infiltrating endometriotic (DIE) lesions located in the posterior fornix of the vagina, i.e., lesions in the uterosacral ligaments and rectovaginal space, represent the most common form of deeply infiltrating endometriotic disease [5, 6]. These lesions are among the few endometriotic lesions that can be clinically diagnosed before the operation [7, 8]. Although they are usually quite easy to detect, it is often difficult to know how demanding the surgical procedures will be and how much operating time will be needed to operate on these patients. Isolated deeply infiltrating lesions in the uterosacral ligaments or in the posterior fornix of the vagina are not necessarily associated with severe adhesion formation and can often be treated with a relatively easy and short surgical procedure [9, 10]. However, technically more demanding and time-consuming surgery is needed when lesions infiltrate to the ureters or when the bowel is adherent to the lesion, causing obstruction of the pouch of Douglas, or when the lesion infiltrates to the wall of the bowel, causing a possible need for bowel surgery [10–14].

Between 23% and 50% of patients with deeply infiltrating endometriosis have endometriomas [4, 15]. Even though endometrioma is often detected in connection with DIE lesions, severe cases of deep disease can also be found without an endometrioma [3, 15]. We performed this prospective study to find out whether the presence of endometrioma is associated with intraoperative findings that were considered to represent more severe endometriotic disease, and make surgery more demanding in patients with DIE lesions located in the posterior fornix of the vagina.

## Materials and methods

Consecutive premenopausal patients who were scheduled to undergo endometriosis surgery for DIE lesions located in the posterior fornix of the vagina were enrolled to this study in four Finnish hospitals between January 2005 and December 2008. This study was performed as a part of a larger prospective multicenter trial investigating the presence of different types of endometriotic lesions and other endometriosis related findings in surgically treated endometriosis patients. Patients were considered eligible for this study if they had not undergone previous endometriosis surgery, oophorectomy, salpingectomy, hysterectomy, tubal sterilization, gastrointestinal tract surgery, or urinary tract surgery. All operations were performed by gynecologists experienced in laparoscopic endometriosis surgery. Patients requiring bowel resection were operated by multidisciplinary

approach. Patients received written and verbal information on the purpose of the study and were required to give signed informed consent before being enrolled. The study was approved by the ethics committees of all participating hospitals.

Preoperative evaluation included clinical gynecological examination and transvaginal ultrasound examination in all cases. Patients completed a questionnaire concerning pain symptoms, fertility history, and medical treatment before the surgery. During the operation, location and size of all endometriotic lesions (DIE lesions, endometrioma, and peritoneal lesions), location of adhesions, and attachment of DIE lesions to the ureters were recorded in the study database. DIE was defined as an endometriotic nodule  $\geq 0.5$  cm of size that infiltrated to the retroperitoneal space [16]. The size of the lesion was visually detected after lesion was excised. The infiltration of endometriosis was confirmed histologically. Uterosacral ligament DIE was defined as a lesion infiltrating to one or both uterosacral ligaments. Rectovaginal endometriosis (RVE) was defined as a nodular lesion that was located in the posterior fornix of the vagina and that had infiltrated through the vaginal wall to the retroperitoneal space. The stage of the endometriosis was classified according to the revised classification of the American Society of Reproductive Medicine (rASRM) [17]. Only patients with histologically confirmed diagnosis of deeply infiltrating endometriosis and endometrioma were included.

The presence of six operative findings that were considered to represent more severe disease and make surgery more demanding: (1) total obstruction of the pouch of Douglas, (2) attachment of a DIE lesion to the ureter, (3) presence of peritoneal lesions, (4) presence of other DIE lesions, (5) attachment of bowel to uterosacral ligament DIE lesion (with or without infiltration of endometriosis to the bowel wall), and (6) attachment of the rectum to a RVE lesion (with or without infiltration of endometriosis to the bowel wall) was compared between patients with and without an endometrioma. Categorical variables were analyzed using chi-square test or Fisher's exact test, as appropriate. These associations were further quantified by odds ratios (OR) with 95% confidence intervals (CI). Differences in means of continuous variables were compared using the independent-samples *t* test. Statistical analyses were performed using SAS for Windows version 9.2 (SAS Institute Inc., Cary, NC, USA). Differences were considered statistically significant if the *p* value was  $< 0.05$ .

## Findings

A total of 205 premenopausal patients with no previous pelvic surgery were operated on suspected endometriosis in

four study hospitals during the recruitment time. Of these, 98 patients (47.8%) had DIE lesions located in the posterior fornix of the vagina. All patients participated to this study.

Indication for surgery was pain in 69 patients (70.4%), pain and infertility in 26 patients (26.5%), and infertility in three patients (3.1%). At the time of surgery, 27 patients (27.6%) were using contraceptive pills, two patients (2.0%) were using progestins, and two patients (2.0%) had levonorgestrel-releasing intrauterine device. Surgical procedures performed on study patients are presented in Table 1.

Uterosacral ligament DIE lesions were detected in 88 patients (89.8%), and 47 patients (48.0%) had rectovaginal DIE lesions. Thirty-seven patients (37.8%) had both rectovaginal and uterosacral ligament DIE lesions. The mean of the largest diameter of the uterosacral ligament DIE lesions and of the RVE lesions was 1.4 cm (SD 1.4, range 0.5–4.0) and 2.4 cm (SD 1.0, range 0.8–4.0), respectively.

Endometrioma was detected in 46 patients (47.0%). Comparison of clinical characteristics, rASRM scores, and surgical characteristics, between patients with and without an endometrioma is presented in Table 2. Of 46 patients

with an endometrioma, 16 patients (35%) had bilateral endometriomas, 22 patients (48%) had endometrioma on the left ovary, and eight patients (17%) on the right ovary. Five patients had more than one endometrioma per ovary. The mean of the largest diameter of the endometriomas was 3.6 cm (SD 2.4, range 0.5–10 cm).

Peritoneal lesions were detected in 76 patients (78%). Twenty-eight patients (28.6%) had 36 other DIE lesions: 19 patients (19%) in the sigmoid colon, seven patients (7%) in the appendix, seven patients (7%) in the urinary bladder, and three patients (3%) in the cecum. The mean number of DIE lesions per patient was 2.0 (SD 1.1, range 1–5) in patients with an endometrioma, and 2.2 (SD 1.1, range 1–5) in patients without an endometrioma ( $p=0.33$ ). The association between the presence of endometrioma, and the total obstruction of the pouch of Douglas, the attachment of posterior DIE lesion to the ureter, and the presence of other endometriotic lesions is presented in Table 3.

Of 88 patients with uterosacral DIE lesions, 43 patients (49%) had an endometrioma. Bowel was attached to the uterosacral ligament DIE lesion in 28 of 43 patients (65%) with an endometrioma and in 31 of 45 patients (69%) without an endometrioma ( $p=0.71$ , OR 0.83, CI 0.35–2.05).

Of 47 patients with RVE lesions, 16 patients (34%) had an endometrioma. The rectum was attached to the RVE lesion in 13 of 16 patients (81%) with an endometrioma and in 26 of 31 patients (84%) without an endometrioma ( $p>0.99$ , OR 0.83, CI 0.17–4.14).

**Table 1** Surgical procedures performed on 98 study patients

Surgical procedure	Number of patients
Division of adhesions	97
Excision of peritoneal endometriosis	76
Resection of uterosacral ligament, unilateral	48
Resection of uterosacral ligament, bilateral	40
Vaginal resection	40
Rectal resection	28
Extirpation of endometrioma, unilateral	27
Rectal shaving	19
Hysterectomy	15
Salpingectomy, unilateral	14
Appendectomy	13
Extirpation of endometrioma, bilateral	9
Salpingectomy, bilateral	8
Bladder resection	7
Oophorectomy, unilateral	7
Oophorectomy, bilateral	6
Sigmoid resection	5
Extirpation of benign ovarian tumor	4
Ileocecal resection	3
Enucleation of myoma	2
Cecal resection	1
Disk excision of rectum	1
Ureteroneocystostomy, unilateral	1
Ureteral resection and reanastomosis, bilateral	1

## Discussion

Endometriosis, and especially deeply infiltrating endometriosis, is a disease with very different clinical presentations, and it is often difficult to know how demanding surgical procedures will be needed when operating patients with suspected endometriosis. Any preoperative marker associated with the severity of the disease would be helpful in clinical practice.

Current data suggests that endometrioma could be a marker for more severe disease [1, 3, 4]. It seems to be a common finding in patients with DIE lesions located in the posterior fornix of the vagina, as 47% of our study patients had an endometrioma. However, although mean total rASRM score was significantly higher in patients with an endometrioma, our results revealed no statistically significant association between the presence of endometrioma and the six studied operative findings.

These six operative findings were chosen because they were considered to represent more severe disease and make surgery more demanding. The presence of other endometri-

**Table 2** Comparison of clinical characteristics, rASRM scores, and surgical characteristics between patients with and without an endometrioma

	Patients with endometrioma ( <i>n</i> =46)			Patients without endometrioma ( <i>n</i> =52)			<i>p</i> Value
	Mean	SD	Range	Mean	SD	Range	
Age (years)	33.5	6.9	20–52	29.5	5.6	19–43	0.002
BMI	23.7	5.0	15.6–40.6	23.7	3.5	17.5–34.2	0.97
Total rASRM score	60	31	9–128	24	26	3–114	<0.001
rASRM adnexal adhesion score	17	15	0–64	6	14	0–64	<0.001
Total operating time (min)	157	85	40–520	160	102	30–450	0.85
Laparoscopy <sup>a</sup>	41 (89%)			45 (87%)			0.69

<sup>a</sup> Data presented as *n* (%)

otic lesions was considered to represent the overall severity of the disease. The goal of contemporary endometriosis surgery is to remove all endometriosis which can be very complex especially in cases with multiple deep lesions. Totally obstructed pouch of Douglas, attachment of bowel to the DIE lesion and attachment of DIE lesion to the ureter are often detected in patients with posterior DIE lesions, but not all gynecologists are used to perform demanding adhesiolysis or ureterolysis needed in these cases. If it could be demonstrated that the presence of endometrioma is associated with this kind of findings and surgery, it could help gynecologists to decide, where and by whom these patients should be operated.

In previous studies, patients with superficial ovarian endometriosis and endometriomas had more pelvic areas involved by endometriosis, and endometrioma was a good preoperative marker for pouch of Douglas obliteration [1, 3]. Furthermore, the presence of endometrioma was associated with multifocality, and ureteral involvement of the deeply infiltrating lesions [4]. We also did expect to find out that endometrioma would be associated with studied findings, but although patients with an endometrioma had significantly more adnexal adhesions compared to the patients without an endometrioma, no other significant association was detected.

The most important factor influencing our results is probably the fact that we included only patients with no previous pelvic surgery. For that, we had two reasons. Firstly, postoperative adhesions are often difficult to

differentiate from adhesions caused by endometriosis, which would probably greatly alter the detected results. We now observed, that the presence of totally obstructed pouch of Douglas was not very frequent finding in patients without previous pelvic surgery. It was detected in 28% of the patients with an endometrioma and in 27% without an endometrioma.

Second reason to include only patients without previous pelvic surgery was the knowledge that the probability of recurrence seems to differ according to the type of operated endometriotic lesion. The recurrence of DIE lesions seems to be very rare if complete excision has been performed in the first operation, while the recurrence of endometrioma seems to be quite common, even after complete excision of the capsule [18–22]. If patients with previous endometriosis surgery had been included, the detected findings would have been largely dependent on the type of previous surgery.

There is very little previous knowledge of the prevalence of these six studied operative findings in patients with no previous pelvic surgery. Based on our findings, it seems that in general, DIE lesions in the posterior fornix of the vagina have a considerable ability to provoke adhesion formation by themselves, although the total obstruction of the pouch of Douglas was not very frequent finding. Even without an endometrioma, bowel was attached to the uterosacral ligament DIE lesion in 69%, and to the rectovaginal lesion in 84% of the patients. Associated endometrioma probably does not have a significant addi-

**Table 3** Four studied operative findings in patients with and without an endometrioma

Operative finding	Endometrioma ( <i>n</i> =46)		No endometrioma ( <i>n</i> =52)		<i>p</i> Value	OR	95% CI
	<i>n</i>	%	<i>n</i>	%			
Total obstruction of the pouch of Douglas	13	28	14	27	0.88	1.1	0.44–2.60
Attachment of DIE lesion to the ureter	24	52	23	44	0.43	1.4	0.62–3.05
Presence of peritoneal lesions	37	80	39	75	0.52	1.4	0.52–3.58
Presence of other DIE lesions	11	24	17	33	0.34	0.6	0.26–1.58

tional effect on adhesion formation in these patients. The attachment of DIE lesion to the ureter was also a common finding, as it was detected in 48% of the patients. Additionally, 29% had other DIE lesions located in the bladder, or in the intestine. When present, these findings represent the most severe forms of the endometriotic disease, and gynecologists who operate these patients, should have the technical skills to perform needed surgical procedures. We believe that the knowledge of the prevalence of these findings could help to plan surgical treatment.

The fact that we included only patients with no previous surgery is also a reflection of the small number of study patients. A large number of endometriosis patients undergo repeated surgery for endometriosis, and therefore it is very difficult to obtain a large enough study population, especially if only certain types of endometriosis patients are studied. Due to the relatively small sample size, our result needs to be interpreted with caution. The nonsignificant *p* values could reflect either the fact that the true effect is nil or the fact that our study had low power. A larger prospective study with a proper power calculation based on the prevalence of these operative findings in patients with no previous pelvic surgery would be needed to confirm our results.

## Conclusions

It would be very useful if it could be demonstrated that endometrioma is also a practical marker for more severe disease in patients with posterior DIE lesions, as that would enable more individually tailored planning of surgical treatment and more detailed patient counseling. However, at least in this cohort of patients with DIE lesions in the posterior fornix of the vagina and with no previous pelvic surgery, the presence of endometrioma did not seem to be associated with operative findings that were considered to make surgery more demanding.

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