ORIGINAL PAPER / GYNECOLOGY

VM VIA MEDICA

Is the presence of deep infiltrative endometriosis underestimated in the surgical management of endometriosis?

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ABSTRACT

Objectives: The aim of the study was to determine the presence of deep infiltrative endometriosis (DIE) in the surgical management of endometriosis.

Material and methods: Operation notes and histopathological reports of women with endometriosis were retrospectively analyzed in the Ege University Hospital between 2008 and 2018. A total of 191 women with suspicious of endometriosis but without clinical signs of DIE were enrolled in the study. Laparoscopic diagnosis of DIE was compared with histopathological reports. There was no histopathology before surgery. Endometriosis was suspected only based on symptoms.

Results: A total of 213 lesions that were thought to be DIE were removed from 191 women with endometriosis. Among these 213 lesions, 179 specimens were reported as endometriosis and 34 lesions as fibro-adipose tissue. Forty-nine right uterosacral ligaments were excised, and endometriosis was detected in 44 out of 49 specimens. Histopathological examination of 45 left uterosacral ligaments revealed endometriosis in 35 specimens. Finally, 25 endometriotic nodules were removed from the recto-vaginal space, and 22 of these were verified as endometriosis by a pathologist. The positive predictive value of laparoscopic visualization for DIE in the group suspected of endometriosis but without any clinical findings of DIE was 84%.

Conclusions: Women with the suspicious of endometriosis, qualified to surgery, because of infertility or pain, should be prudently investigated to confirm or to exclude coexistence of DIE even if no preoperative sign of DIE was observed to provide complete resection. Otherwise, DIE continues to grow, causes pain postoperatively, and complicates subsequent surgery.

Key words: deep infiltrative endometriosis; endometrioma; endometriosis surgery; laparoscopy; pelvic pain; minimal invasive surgery

Ginekologia Polska 2023; 94, 1: 41–45

INTRODUCTION

Endometriosis is defined as the appearance of endometrial tissue outside the uterine cavity. This unwarranted occurrence triggers inflammation and stimulates peripheral nerves, which can cause minimal to severe pain.

Endometriosis lesions are classified as ovarian, superficial peritoneal, or deeply infiltrative [1]. Endometrioma occurs when ectopic endometrial tissue is located deep in the ovary and bleeds in a cyclic manner. It causes chocolate-like fluid that is surrounded by ovarian cells. Deep infiltrative endometriosis (DIE) is determined as a solid endometriosis mass that > 5 mm deep into the peritoneum [2]. Typically, DIE occurs in the recto-vaginal septum, uterosacral ligament, rectum, recto-sigmoid colon, appendix, or the urinary tract.

Incidence of endometriosis is not known, but according to a retrospective cohort study which investigate 9500 women who had open or laparoscopic hysterectomy, histopathological confirmed endometriosis incidence was 15% [3]. Preferred approach is laparoscopic radical removal of lesions, and special methods are required for vaginal or

rectal wall DIE [4]. These techniques are shaving technique, segmental or discoid resection of bowel. Techniques of surgery on urinary tract in DIE contains shaving, partial resection, or complete resection of DIE nodules of bladder, and shaving or complete excision of DIE nodules of ureter, and end to end, end to side anastomosis, and in advanced cases uretero-neo-cystostomy or ureteroileal anastomosis [5, 6].

Complete resection is essential during endometriosis surgery because endometriosis is a chronic and mostly progressive illness and needs lifelong treatment. Incomplete resection cannot provide a pain-free life for patients. Therefore, endometriosis surgery should be performed in specialized centers by experienced surgeons. Still, there are not efficiently sensitive and specific diagnostic tests for the clinical diagnosis of DIE.

Objectives

We hypothesize that DIE is more common that one thinks and should be considered in differential diagnosis. This study was conducted to determine the presence or incidence of DIE in laparoscopic endometriosis surgery and to emphasize its importance.

MATERIAL AND METHODS

A total of 220 women who had laparoscopic diagnosis of endometriosis in the Ege University Hospital between 2008 and 2018 were assessed for eligibility, and 191 women without clinical signs of DIE were enrolled in the current retrospective cohort study. Patients' charts, operation notes, and histopathological reports were retrospectively analyzed.

Positive preoperative physical examination and imaging findings were accepted as exclusion criteria. Vaginal tenderness in examination, the presence of the posterior vaginal wall nodules, and cervical immobility or lateral deviation were accepted as positive suggestive signs of DIE. The presence of nodules on the recto-vaginal septum, bladder, ureter, or bowel detected on magnetic resonance imaging (MRI) or transvaginal ultrasound performed preoperatively were accepted as positive suggestive signs of DIE on imaging modalities.

All operations were performed laparoscopically by the same surgeons (FS and AA) under general anesthesia. In our clinical practice, we take biopsies from suspicious areas, or we directly excise lesions without using any energy modality because the use of ablative techniques may mask the histopathological diagnosis of endometriosis. Endometriomas were excised with traction and countertraction method. Combined techniques for endometrioma surgery were applied for women to reduce the negative effect of surgery on the ovarian reserve.

The rates of endometrioma and DIE and the coexistence of these two different disease phenotypes were determined. As a second outcome measure, laparoscopic diagnosis was compared with histopathological diagnosis of endometriosis.

The study was approved by the Ege University Institutional Ethics Committee with 19-9T/40 reference number before the study began on 05 September 2019. The collected data was transferred to SPSS software version 16.0 (SPSS for Windows, Version 16.0, SPSS Inc., Chicago) for statistical analyses.

RESULTS

The median age of the 191 women suffering from endometriosis was 31 years (range 21–46 years). Infertility and/or pelvic pain were the common symptoms of the disease in our series (Tab. 1). A pelvic mass was detected in 164 women, and uterine fibroid was detected in 34 women preoperatively (Tab. 1).

According to the American Society for Reproductive Medicine system (rASRM), 77% of participants had stage III–IV endometriosis (Tab. 1). Endometrioma was detected in 172 of 191 participants. DIE was detected in 127 of 191 participants. One hundred eight of the 172 women with endometrioma had DIE concomitantly, and 19 women had DIE alone (Tab. 1). Two hundred thirteen lesions from 191 women that were expected to be DIE were removed during surgeries. Consequently, histopathological examinations revealed endometriosis in 179 specimens, whereas fibro-adipose tissue was identified in 34 lesions.

Table 1. Characteristics of patients	
	N (range or %)
Age	31 (21–46)
Pelvic pain	28 (15)
Infertility	53 (28)
Adnexal mass	164 (86)
Uterine fibroid	34 (18)
Stage	Stage 1: 10 (5.2)
	Stage 2: 34 (17.8)
	Stage 3: 45 (23,6)
	Stage 4: 102 (53.4)
Endometriotic lesion type	Endometrioma: 172 (90.0) Endometrioma & DIE: 108 (56.5) DIE Alone: 19 (9.9)
Endometrioma types	Unilateral Endometrioma: 126 (73.2) Bilateral Endometrioma: 46 (26.8)
Unilateral endometrioma sides	Left: 73 (57.9) Right: 53 (42.1)
DIE sides	Left: 60 (47.3) Right: 67 (52.7)

DIE — deep infiltrative endometriosis

Table 2. Consistency of laparoscopic and pathological diagnosis for deep infiltrative endometriosis

Anatomical site	Laparoscopic diagnosis (n)	Pathological diagnosis (n)	Positive predictive value [%]
Left sacrouterine ligament	45	35	77.7
Right sacrouterine ligament	49	44	89.7
Left peritoneal cover of ureter	47	40	85.1
Right peritoneal cover of ureter	47	38	80.8
Rectovaginal septum	25	22	88.0
Overall positive predictive value			84.0

Endometriosis was confirmed in 44 of 49 right uterosacral ligament excisions and in 35 of 45 left uterosacral ligament excisions. Histopathological examination of 94 peritoneal biopsies, which cover the ureters from both sides, confirmed endometriosis in 38 patients on the right side and 40 patients on the left side. Finally, histopathological examination of 22 of 25 nodules removed from the recto-vaginal space revealed endometriosis.

The positive predictive value of the laparoscopic diagnosis of DIE in the right uterosacral ligament was 89.7% and that in the left uterosacral ligament was 77.7%. The positive predictive value of laparoscopic diagnosis of DIE in the peritoneum, which covers the ureters on both sides, was 82.9%. Histopathological examination of 22 of 25 nodules removed from the recto-vaginal space confirmed DIE, and the positive predictive value of laparoscopic diagnosis was 88%. The overall positive predictive value of laparoscopic visualization for DIE was 84% in our series (Tab. 2).

DISCUSSION

Endometriosis is described as the occurrence of endometrial and stromal tissues outside of the uterine cavity. After implantation, endometrial tissue grows and produces an inflammatory response, which causes varying degrees of pain. Endometriosis affects approximately 7–10% of women [7]. But the incidence is increasing to 35–50% in women with symptoms [8]. The current study was conducted to define the presence of DIE in the surgical management of endometriosis and to analyze the accuracy of laparoscopic diagnosis of endometriosis.

A prospective study conducted by Audebert et al. [9] showed that the ovary is the most predominantly affected site in endometriosis, with an incidence rate of 66.94%, followed by the sacrouterine ligaments, with an incidence rate of 45.51%. Audebert et al. [9] reported DIE incidence in the same trial as 14.4%. In our series, 172 of 191 women with a histopathological diagnosis of endometriosis had endometrioma, and the incidence was 90%. DIE was detected in 127 of 191 (66.4%) participants. One hundred eight women with endometrioma had DIE concomitantly (56.5%),

and 19 women had DIE alone (9.9%) All operations were performed with maximum care to preserve the ovarian reserve. Cysts were excised by traction and countertraction techniques. Hemostatic sutures employed after cystectomy instead of bipolar coagulation for hemostasis. Sahin et. al. [10] proved that hemostatic sutures are better than bipolar electrocoagulation for hemostasis after cystectomy in terms of preserving the ovarian reserve. The postoperative levels of anti-Mullerian hormone were significantly lower than the preoperative levels in the bipolar electrocoagulation group, no such decline was noted in the suture group.

DIE is described as a solid endometriosis mass that is > 5 mm deep in the peritoneum [2]. One of the major concerns with the increase of endometriosis-related pain and the progression of DIE is the delay in diagnosis. Moreover, complete resection is as important as early diagnosis. Surgeons note the frequency of DIE to be the highest in the sacrouterine ligaments (69.2%), followed by the recto-vaginal area (14.5%), the bladder (6.4%), and the intestine (9.9%) [11]. Additionally, accurate diagnosis of DIE is essential for effective treatment of the disease. There is a poor relation between severity of DIE and symptoms [12]. The sensitivity of physical examination as a second step of diagnosis ranges from 46% to 73% [13]. Transvaginal ultrasound and MRI seem to be the most accurate, sensitive, and specific tools for non-invasive diagnosis of DIE [14]. According to an MRI study, endometrioma and DIE co-existence rate was 31.4% [15]. Recently, Sloss et al. [16] conducted a retrospective study to determine the diagnostic accuracy of MRI in predicting depth of deep infiltrating endometriosis (DIE) of the rectosigmoid. MRI reached a high sensitivity and specificity for rectal wall disease (sensitivity, 86.4%; specificity, 100%) in this study. However, these methods cannot always reach the desired high sensitivity values. European Society of Human Reproduction and Embryology (ESHRE) guidelines approve the laparoscopic visualization as the gold standard for the diagnosis of endometriosis [17]. But histopathological diagnosis more accurate than laparoscopic inspection (sensitivity of 94% and a specificity of 79%) [18]. According to our results, 108 of the 172 women with endometrioma

had DIE concomitantly. The rate of endometrioma and DIE coexistence was 62% in our study, even in the absence of any positive preoperative physical examination or imaging findings. DIE is thought to affect 14–20% of women with endometriosis, but the rate was much higher in our series [11, 19]. Therefore, gynecologists who perform endometriosis surgery should investigate DIE during surgery to provide complete resection. Otherwise, DIE continues to grow and causes pain postoperatively. Although persistent pain due to incomplete surgery is already an issue, additional expense for its treatment increases the direct or indirect cost of the treatment of endometriosis. Additionally, it should be kept in mind that intra-abdominal adhesions and complication rates increase in recurrent surgeries.

Endometriosis is precisely diagnosed by histopathological investigation, but the existing literature is insufficient to establish consistent findings that would help laparoscopic and histopathological diagnosis of DIE. Type of lesion, location, the severity of the disease, and the experience of the surgeon determine the accuracy of diagnosis [20]. Filho et al. [21] showed that laparoscopic findings when compared with histopathological evaluation had 72% positive predictive value, 98% negative predictive value, and 79% specificity and 98% sensitivity. According to a review which conducted by Wykes et al. diagnostic sensitivity of laparoscopic inspection for endometriosis was 94% (95% CI 80–98%) and specificity was 79% (95% CI 67–87%) [18]. Increased awareness of DIE, improved quality of video laparoscopy, and advanced quality of laparoscopic surgery training increase the frequency and accuracy of diagnosis. According to our series, the positive predictive value of the laparoscopic diagnosis of DIE was 89.7% for the right uterosacral ligament, 77.7% for the left uterosacral ligament, 82.9% for the peritoneum, which covers the ureters on both sides, and 88% for the nodules removed from the recto-vaginal space. The overall positive predictive value of laparoscopic visualization for DIE in our series was 84%.

Some strengths of our study are that it encompasses 10 years of data for endometriosis surgery, which is a very difficult procedure, from a tertiary referral center. Furthermore, all suspected endometriosis lesions were resected for histopathological examination. The coagulation method of endometriosis lesions, which eliminates the chance of histopathological examination, was not used. Moreover, all procedures were performed by the same surgeons, which prevents inter-operator variability and bias. Limitations of the current study included the retrospective nature of the data. Larger and well-designed prospective studies are needed to increase DIE awareness in the surgical management of endometriosis.

CONCLUSIONS

Women with the suspicious of endometriosis, qualified to surgery, because of infertility or pain, should be prudently investigated to confirm or to exclude coexistence of DIE even if no preoperative sign of DIE was observed to provide complete resection. Otherwise, DIE continues to grow, causes pain postoperatively, and complicates subsequent surgery.

Conflicts of interest

All authors declare no conflict of interest.

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