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Deep endometriosis: a consequence of infiltration or retraction or possibly adenomyosis externa?*

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Objective: To analyze the incidence and occurrence of subtypes of deep endometriosis.

Design: Deep endometriotic lesions (>5 mm) were retrospectively analyzed, using our data base and slides taken systematically during surgery.

Setting: University Hospital Gasthuisberg (University of Leuven) which is a referral center for infertility and endoscopic surgery.

Patients: All women with deep endometriosis (n = 136) were selected from a consecutive series of 1,252 laparoscopies for infertility, pain, or both.

Interventions and Main Outcome Measurements: Deep endometriosis was excised by CO_2 laser and the depth of infiltration and the pelvic area measured. As part of an ongoing study, most lesions were photographed.

Results: Deep endometriosis is suggested to contain three subgroups. Type I is conical shaped and suggested to be formed by infiltration. Type II is deeply located and covered by extensive adhesions and probably formed by retraction. Type III is a spherical nodule with its largest dimension under the peritoneum. Types I, II, and III are found in 4.1%, 0.8%, and 0.9% of women with infertility (n = 759) and in 10.4%, 3.2%, and 3.2% of women with pelvic pain (n = 374). Types I, II, and III are most frequently found in the revised American Fertility Society classes II, III to IV, and I, respectively.

Conclusions: Three subtypes of deep endometriosis can be distinguished. Type III, which is a spherical nodule located in the recto vaginal septum is the most severe and largest lesion. This is, however, easily missed clinically because these lesions are generally scored as revised American Fertility Society class I. Fertil Steril 1992;58:924–8

Key Words: Deep endometriosis, infiltrating endometriosis, endometriosis

Pelvic endometriosis was initially described as ovarian endometriotic cysts (1) and as lesions that consist of black puckered spots or black puckered spots in a white area. During the last decade, the attention has been focused on subtle lesions such as white and red vesicles and polypoid lesions (2–4). The reported incidences of endometriosis have increased progressively over the years with the recognition and awareness of subtle lesions (2, 5).

Recently, the depth of infiltration of endometriotic lesions was recognized as an important aspect (6). Indeed, deep endometriosis was found by pathology to be active disease (7). It is strongly associated with pelvic pain (5, 7). It becomes more frequent with increasing age, suggesting that endometriosis is a progressive disease (5). Deep endometriosis could be related to a specific decrease in natural killer cell activity (8, 9). The increase in plasma cancer antigen-125 (CA-125) and placental protein 14 (PP14) concentrations were shown to be

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related specifically to endometriotic cyst and to deep endometriosis (10). Superficial pelvic implants secrete mainly toward the peritoneal cavity, whereas deep endometriosis secrete mainly toward the bloodstream (10). These data constitute cumulative evidence to consider deep endometriosis as a specific entity.

The depth of infiltration of endometriosis cannot be evaluated by inspection only. Deep endometriosis is better felt by palpation and becomes more apparent during excision. Although deep endometriosis has been recognized to become generally smaller with increasing depth, in some women the largest volume is hidden under an adhesion involving the bowel or is buried under the pelvic floor. These three forms of deep endometriosis will be described as clinically important to recognize, and their physiopathological mechanism will be discussed.

MATERIALS AND METHODS

Patients

Deep endometriosis was defined as pelvic endometriosis infiltrating deeper than 5 mm because by pathology endometriosis becomes more active when deeper than 5 mm (7) and because the frequency distribution of the depth of infiltration shows a biphasic pattern with a nadir at 5 to 6 mm (5). All women undergoing a laparoscopy for infertility, pelvic pain, or both between January 1, 1987, and January 1, 1992, (n = 1,252) at the division of reproductive medicine of the department of Obstetrics and Gynaecology of the University Hospital Gasthuisberg, Leuven, Belgium, were reviewed, and the women with deep endometriosis were selected (n = 136). During that period, the awareness of deep endometriosis and of the association of deep endometriosis and pelvic pain gradually increased. This was reflected by an increased referral of women with severe pelvic pain and/or pelvic nodularities for CO_2 laser endoscopic excision. The reported incidence of deep endometriosis thus is an overestimation of the true incidence in the population.

All deep endometriotic lesions had been excised by one surgeon (P.K.) with a CO_2 laser (Sharplan 1060; Laser Industries, Tel Aviv, Israel) as described (5). Briefly, a perfect visualization produced by the continuous smoke evacuation system (11) was found to be important for the safe excision. Excision was started by circumscribing the lesion and continued at the border between normal tissue and the implant that glows with a slight yellow appearance during vaporization. In many lesions, small brownish fluid-filled cysts were found down to the bottom of the endometriosis and were seen to explode under the laser beam, reassuring the surgeon that the edge between this lesion and the normal tissue was still deeper. The depth of infiltration was assessed during and after excision by holding a graded probe or a Nehzat aspiration/irrigation cannula (Cabot Medical, Langhorn, PA) against the lesion (4 holes, each 1.2 mm; total graded distance: 8.9 mm). This method had been validated previously by pathology (7). Endometriosis was scored according to the revised American Fertility Society (AFS) classification (12).

Types of Deep Endometriosis

All records were retrospectively reviewed and according to the description, deep endometriosis was classified as type I, II, or III (Fig. 1). Type I lesions were defined as lesions that were conical shaped, the largest area lining the peritoneal cavity. The pelvic anatomy was intact, and the pouch of Douglas and the utero sacrals could clearly be identified. Deep endometriosis was defined as a type II lesion when the pelvic anatomy was grossly disturbed by adhesions covering the deep lesion. In its most typical aspect, the rectum was adherent over the uterosacrals and the Douglas, covering almost entirely the deep lesion. Type III lesions were defined as deep lesions with their largest area under the peritoneal surface, in a pelvis with an otherwise intact anatomy (for photographic review see Koninckx and Cornillie [13]).

Data Analysis and Statistics

Data were collected during surgery into a Clipper-based data base (Nantucket, Inc., Culver City, CA)

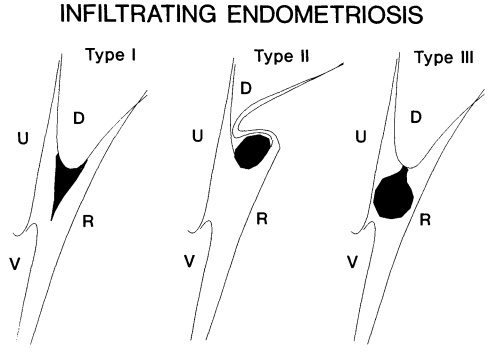

Figure 1 Infiltrating endometriosis type I is suggested to be infiltration, type II retraction, and type III possibly adenomyosis externa. The uterus (U), pouch of Douglas (D), vagina (V), and rectum (R) are indicated.

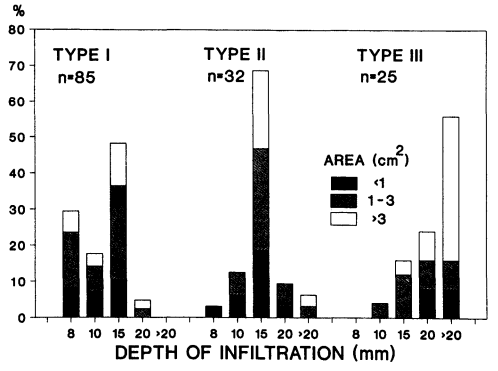

Figure 2 Frequency distribution of the depth of infiltrating in deep endometriosis types I, II, and III. The pelvic area is indicated for 6 to 8, 9 to 10, 11 to 15, 16 to 20, and >20 mm deep lesions.

and analyzed with SAS (14) (SAS Institute, Inc., Cary, NC). From the raw data, i.e., type of lesion, diameter of lesion or endometrioma, number, and depth, we calculated the area (cm^2) and the volume (cm^3) of endometriosis for each type of lesion. For the statistical evaluation, the following procedures were used: Spearman correlation, χ^2, and logistic regression. The logistic procedure was used to fit binary response data (deep endometriosis present or not). Unless stated otherwise, means ± SD are indicated for normally distributed populations and means (25th to 75th percentile) for skewed distributions.

RESULTS

The depth of infiltration varies with the type of deep endometriosis, the deepest lesions being found in type III and to a lesser extend in type II endometriosis (Fig. 2). The depth of infiltration does not correlate with the pelvic area in type I (R^2 = 0.18, not significant [NS]), in type II (R^2 = 0.20, NS), or in type III (R^2 = 0.29, NS) endometriosis. Thus, the depth of an endometriotic lesion cannot be anticipated from the pelvic inspection, and a small pelvic lesion can hide a deep and large endometriotic lesion, especially in types II and III (Fig. 2). Moreover, in some women with deep endometriosis type III, the pelvis is perfectly normal during laparoscopic inspection. In two women, the endometriotic nodule could only be found by palpation and in a third woman only during menstruation. All deep lesions types II and III were solitary deep lesions. In women with a type I lesion in a large area, only the deepest lesion was taken into account.

The incidence of deep endometriosis increases with age, although the total incidence of endometriosis remains constant (Table 1). In women with infertility (n = 759), types I, II, and III are found in 4.1%, 0.8%, and 0.9%, in women with pain (n = 374) in 10.4%, 3.2%, and 3.2%, and in women with infertility and pain (n = 133) in 11.3%, 10.5%, and 4.5%, respectively. Endometriosis was found in 61%, 67%, and 75%, respectively, of these three groups of women.

Deep endometriosis type I is found most frequently (46%) in the revised AFS class II. In comparison with deep endometriosis type I, type II is found more frequently in revised AFS classes III and IV, whereas type III is found most frequently in the revised AFS class I. This emphasizes that upon inspection deep endometriosis type III is often found as a rather small solitary typical endometriotic lesion.

DISCUSSION

Deep endometriosis, defined as endometriosis infiltrating deeper than 5 mm, was confirmed to be-

Table 1 Incidence of Endometriosis and of Types I, II, III Deep Endometriosis in Women of Different Age Groups

	Age (y)					*P* value (logistic regression*)	
	20 to 25	26 to 30	31 to 35	34 to 40	>40	Pelvic pain	Age
No.	144	489	379	169	71		
Endometriosis (%)	60.4	64.2	67.6	65.1	62.0	0.0006	NS†
Deep endometriosis (%)	8.4	11.1	9.1	16.6	19.7	<0.0001	0.02
Type I	5.6	5.5	6.1	11.2	11.3	<0.0001	0.02
Type II	.7	2.9	1.9	3.6	5.6	<0.0001	NS
Type III	2.1	2.7	1.1	1.8	2.8	0.001	NS

* The increased incidence of deep endometriosis in older women taken into account the indication for surgery, i.e., pain, infertility, or both, and the increased incidence in women with pain when age is taken into account.

† NS, not significant.

come more frequent with age and to be associated with pelvic pain (5). The reported incidence should be interpreted carefully because it reflects an active referral of gynecologists of Flanders of women with pelvic pain and nodularities for CO_2 laser excision.

The distinction between endometriosis types I, II, and III is clinically important because mainly in types II and III, the depth of the lesion cannot be anticipated from its pelvic appearance or area. As shown in Figure 2, endometriotic lesions < 1 cm^2 in surface area can hide large and voluminous endometriotic nodules extending up to 4 cm under the pelvic floor and being larger than 4 cm (for photographs see Koninckx and Cornillie [13]). From these data it can be concluded that only during excision, either by laparotomy or laparoscopy, by CO_2 laser, or by sharp dissection, the diagnosis of the extent of deep endometriosis can be made. Pelvic endometriosis is therefore advocated to be treated by excision because otherwise deep endometriosis will be missed.

Type III endometriosis is clinically important because these are most easily missed, although they are the largest nodules. Indeed, laparoscopically they often present as a small typical lesion. Our growing awareness of this disease led recently to the excision of deep endometriosis in three women with a perfectly normal pelvis without visible endometriosis. In two women, a nodule could be felt by palpation, whereas in one woman, this nodule was only apparent during menstruation.

Deep endometriosis is confirmed to be poorly reflected in the revised AFS classification. The most severe type III lesion is most frequently scored in revised AFS class I (Table 2). This lends further support to our previous considerations for including deep endometriosis in a revision of the revised AFS classification (5) or in a new functional classification.

It is speculated that the three types of deep endometriosis reflect a specific physiopathological mechanism. Type I originates conceivably from infiltration through the loose connective septa. This explains that the area of the lesions become progressively smaller as infiltration progresses. Type II is mainly formed by retraction: the endometriotic nodule buries itself under the bowel or an adhesion. Type II thus reflects retraction and adhesion formation, more than infiltration. The spherical form of type III endometriosis could suggest that it originates from under the pelvis. This could be a consequence of a closed Allen and Masters defect (for photographic review see Koninckx and Cornillie [13]), which is no longer visible during laparoscopy.

Table 2 Incidence of Types I, II, and III Deep Endometriosis in the Revised AFS Classes of Endometriosis

	Revised AFS class*			
	I	II	III	IV
Deep endometriosis (n = 136)	21.3	46.3	23.5	8.1
Type I (n = 84)	20.2	56.0	19.1	4.8
Type II (n = 29)	10.3	34.5	34.5	20.7
Type III (n = 23)	39.1	26.1	26.1	4.3

* Chi-squared I versus II = 0.009, I versus III = 0.05, II versus III = 0.06.

It could equally be that this form of endometriosis originates from mullerian rests, constituting what might be called adenomyosis externa. Another possibility is that from a certain depth of infiltration on, the peritoneal implant is no longer influenced (inhibited) by the high steroid hormone concentrations in peritoneal fluid. The endometriotic lesion thus behaves more aggressively forming spherical nodules. This hypothesis could explain why deep endometriosis type III contains the largest nodules.

In conclusion, three types of deep endometriosis are described, which could originate from infiltration (type I) or retraction (type II) or which develop mainly deep under the peritoneum (type III). The latter constitutes the largest lesions that are clinically the most easily missed during laparoscopy.

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