

Accepted Manuscript

Title: Recurrence in Deep Infiltrating Endometriosis: a Systematic Review of the Literature

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PII: S1553-4650(18)30037-2

DOI: <https://doi.org/10.1016/j.jmig.2017.12.025>

Reference: JMIG 3390

To appear in: *The Journal of Minimally Invasive Gynecology*

Received date: 12-10-2017

Revised date: 27-11-2017

Accepted date: 13-12-2017

Please cite this article as: Manuel Maria Ianieri, Daniele Mautone, Marcello Ceccaroni, Recurrence in Deep Infiltrating Endometriosis: a Systematic Review of the Literature, *The Journal of Minimally Invasive Gynecology* (2018), <https://doi.org/10.1016/j.jmig.2017.12.025>.

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1 **Review Article**

2 **Recurrence in Deep Infiltrating Endometriosis: A Systematic Review of the**
3 **Literature**

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14 Running head: Recurrence of deep infiltrating endometriosis

15 Disclosure statement: The authors declare that they have no conflicts of interest and
16 nothing to disclose.

17 250 word unstructured abstract, 5000 words limit 60 references

18 **Precis:** Recurrence and related risk factors after surgery for deep infiltrating endometriosis
19 were analyzed following a literature review, finding that younger age and higher body
20 mass index were predictors of recurrence.

21

22 **ABSTRACT**

23 Deep infiltrative endometriosis (DIE) is an enigmatic disease that typically impacts
24 the rectovaginal septum, uterosacral ligaments, pararectal space, and vesicouterine fold
25 but can involve the rectum, sigma, ileum, ureters, diaphragm, and other less common
26 sites. Surgery is the treatment of choice as medical management alone commonly fails in
27 controlling the symptoms, although recurrence is very high following surgical treatment.
28 The goal of the current study was to review recurrence rates and identify risk factors
29 related to recurrence following surgery for DIE. The review involved searching the
30 Cochrane Library, PubMed, and Google Scholar for relevant articles in accordance with
31 the study's inclusion criteria; 45 studies were considered suitable. The results showed a
32 wide heterogeneity regarding DIE recurrence, owing to inconsistent recurrence definitions
33 and follow-up length. Younger age and high body mass index were found to be risk factors
34 for DIE recurrence. Lack of complete surgical excision was another independent risk factor
35 for recurrence of disease. In conclusion, there is a need for prospective studies and a
36 more homogeneous standard for surgical treatment of DIE.

37
38 *Keywords:* DIE, Laparoscopy, Recurrence, Surgery, Risk factors.

39

40

41 Introduction

42 Endometriosis is a chronic gynecological condition that affects women primarily
43 during the reproductive years causing infertility and pelvic pain, although there are rare
44 reported postmenopausal cases [1]. Essentially, three types of lesions are reported:
45 ovarian endometriosis, superficial peritoneal endometriosis, and deep infiltrating
46 endometriosis (DIE) [2].

47 Deep infiltrating endometriosis is defined as an invasion greater than 5 mm of the
48 peritoneal surface by endometriotic lesions, most commonly located at the rectovaginal
49 septum, uterosacral ligaments, pararectal space, and vesicouterine fold [3]. These lesions
50 differ from other peritoneal surface lesions, owing to histopathologic features and a strong
51 pelvic pain correlation [4]. Deep infiltrating endometriosis can also infiltrate the rectum,
52 sigma, ileum, bladder, and even the diaphragm and upper abdomen [3]. Gastrointestinal
53 involvement of endometriosis in the rectosigmoid, small bowel (distal ileum), cecum, and
54 appendix is the most common extragenital location [3,5].

55 Surgery is the treatment of choice for DIE management as medical treatment alone
56 fails to control symptoms; there is evidence that indicates that surgery reduces pain
57 associated with endometriosis in all stages of the disease [6]. After excisional surgery,
58 recurrence of DIE varies between 2% and 43% depending on the length of follow-up [5,7-
59 14]. The cause of this statistical fluctuation is unclear [7] but may depend on the definition
60 of recurrence, sample size, and study group. The aim of this review is to evaluate the
61 recurrence rate and risks factors of recurrence following surgery for DIE with the goal of
62 reducing relapses.

63

64 Materials and Methods

65 We conducted a review of literature electronically using PubMed, Cochrane Central
66 Register of Controlled Trials, and Google Scholar to find studies on recurrence and risk
67 factors for recurrence of DIE published between January 2000 and June 2017. The MESH
68 terms “deep endometriosis”, “deep infiltrating endometriosis”, “bowel endometriosis”,
69 “colorectal endometriosis”, “rectovaginal endometriosis”, “bladder endometriosis”, “ureteral
70 endometriosis”, and “diaphragmatic endometriosis” were combined with “recurrence”,
71 “relapse”, and “risk factors”. Reference lists from the relevant publications were searched
72 for additional studies on the subject. The studies were screened by title and abstract, and
73 if after the reading of full text they met the inclusion criteria, they were selected by two
74 authors.

75 Inclusion criteria encompassed articles in the English language with the primary
76 topic being DIE and clearly reported recurrence rates and/or risk factors of relapse after
77 surgery. Exclusion criteria were case reports, those papers not providing a clear
78 differentiation between superficial endometriosis and DIE, and studies evaluating
79 specifically the effect of hormone therapy on the recurrence rate of DIE.

80 A meta-analysis was not performed as the data were widely heterogeneous and
81 incomplete, with inconsistent definitions of DIE recurrence, inconsistent types of surgery,
82 and other varying analyzed risk factors of relapse.

83

84 **Conclusions**

85 ***Recurrence Rate of DIE: Overall Consideration***

86 One thousand five hundred and twenty-six publications were identified. After
87 duplicates were removed and studies were screened for inclusion and exclusion criteria,
88 38 articles were suitable for review [5,8-44].

89 The reported risk of recurrence after surgery for DIE varies greatly among studies,
90 but overall does so owing to the definition of recurrence and length of follow-up. In
91 particular, the recurrence rate of DIE has been reported in less than 50% of studies as
92 shown by Meuleman et al [10]. The majority of studies report a short- or mid-term follow up
93 of 2 to 4 years, with a tendency of an increased recurrence rate in studies with a longer
94 follow up [10-12]. According to Guo [7], Doussett et al [8], and Vignali et al [9] the
95 recurrence rate in women with DIE varies between 2% and 43.5% and is higher when the
96 symptom recurrence noted is pain rather than surgical findings as the definition of relapse
97 [13-14]. In addition to these differing factors, the majority of randomized controlled or
98 retrospective studies [45,46] do not focus on DIE recurrence but use a matched rate for
99 superficial endometriosis and DIE as per the revised American Fertility Society
100 classification [47].

101 The articles summarized in the current review evaluate DIE recurrence rate and
102 recurrence risks factors following DIE surgery and are summarized in Table 1 [5,8-44].

103

104 ***Recurrence and Risk Factors of Relapse of DIE, Bowel Endometriosis, Colorectal***
105 ***Endometriosis, Rectovaginal Endometriosis***

106 From an accurate evaluation of the literature, 3 risk factors for recurrence of DIE
107 involving the bowel were found to be modifiable and nonmodifiable factors, such as age,
108 weight, and type of surgery.

109 Younger age at primary surgery for DIE excision is recognized by several authors
110 as a risk factor for recurrence of DIE [9,13]. It is well known that the incidence of
111 laparoscopically confirmed endometriosis decreases with increasing age [48]. Busacca et
112 al reported that women ≥ 34 years have a decrease of recurrence compared with woman \leq

113 33 years [11]. Similar results are reported in a retrospective study by Nirgianakis et al, in
114 which women < 31 years independently predicted DIE recurrence [15].

115 Body mass index (BMI) is another independent risk factor for disease recurrence
116 [15,16]. Obese women have a significantly higher rate ($p = .002$) of recurrence compared
117 with those with normal BMI [16]. In the study of Nirgianakis et al, BMI ≥ 23 kg/m² was
118 associated with higher recurrence risk ($p < .001$) [15].

119 Several authors have concluded that pregnancy after surgery seems to reduce
120 recurrence of DIE [11,13]. Donnez and Squifflet, in 2010, reported that the recurrence rate
121 of pelvic pain was significantly lower in women who became pregnant after surgery for DIE
122 [17].

123 Incomplete excision during surgery for DIE seems to be an independent risk factor
124 for recurrence of symptoms [9,18,49]. A retrospective study of Vignali et al [9] showed that
125 reoperation for DIE was predicted only by incomplete excision during the first operation
126 (odds ratio 21.9; 95% confidence interval 3.2–146.5; $p < .001$).

127 Concerning the type of surgical treatment for DIE, two approaches are being
128 practiced: radical bowel surgery and conservative bowel surgery [17,19-25,49-53]. Radical
129 rectal surgery includes colorectal resection by complete excision of the rectal segment
130 affected by the disease [19,51]. Conservative techniques may be performed by the
131 practice of rectal shaving in which the rectum is not opened [17,20] or by full excision in
132 which only the endometriosis nodule along with the surrounding rectal wall is removed
133 [21,52].

134 As the causes for recurrence are still not completely clear, there are conflicting
135 opinions regarding the role of clear bowel resection margins and disease recurrence. We
136 found only four reports that focused on the correlation between the histopathological
137 margins, collected from the resected tissue, and the risk of recurrence of DIE or symptoms

138 of DIE [15,22-24]. Nirgianakis et al [15] found 38.5% positive bowel resection margins in
139 women with disease recurrence compared with 13.2% positive bowel resection in women
140 without recurrence during a median follow up period of 53 months (range, 12–120; $p <$
141 .05). Other authors failed to demonstrate a correlation between positive bowel resection
142 margins and higher risk of recurrence [22-24].

143 There is a possible explanation for these conflicting results. Bowel occult
144 microscopic endometriosis (BOME) is detected in visually normal peritoneum with an
145 estimated prevalence up to 19% [15,23,24]. Despite these data, BOME seems to have no
146 impact on either pelvic or digestive symptoms or on recurrence of DIE after surgery [22-
147 24].

148 Regarding type of surgery, there is some evidence to support the idea that
149 conservative bowel surgery can lead to a higher risk of recurrence [10]. A large meta-
150 analysis pooled more than 1,600 patients from 49 retrospective studies. Seventy one
151 percent of patients underwent colorectal resection; 10% full excision and 17% treated with
152 superficial surgery [10]. Overall, the proven endometriosis recurrence rate appeared to be
153 significantly lower in the resection-anastomosis group (2.5%; 20/812) compared with the
154 conservative group (5.7%; 49/865).

155 Afors et al [25] compared symptoms and need for reintervention retrospectively,
156 after segmental resection, discoid resection, or shaving technique in 106 patients who
157 underwent surgery for bowel endometriosis. The data showed higher rate of reintervention
158 for recurrence in the shaving group compared with discoid or segmental resection (27.6%,
159 13.3%, and 6.6%, respectively). Similar results were reported by Roman et al in 2016 who
160 found the recurrence rate after conservative surgery to be 8.6% versus 0% for patients
161 who underwent colorectal resection, in a mean follow-up period of 80 months [20].
162 Different results were reported in a case-control study comparing recurrence rates after

163 bowel or discoid resection, after a medium follow-up of 30 months with no significant
164 difference in recurrence between radical bowel surgery and conservative surgery (13.8%
165 vs. 11.5%) [21].

166

167 ***Recurrence and Risk Factors of Relapse for Urinary Tract Endometriosis***

168 Urinary tract endometriosis is a form of DIE affecting 0.3% to 12% of all women
169 suffering from endometriosis [53]. The recurrence rate of ureteral endometriosis ranges
170 between 0 to 12% [27,28,54,55].

171 There are poor data regarding risk factors associated with a higher recurrence rate
172 after ureterolysis or ureterocystoneostomy. Uccella et al showed that younger age (32.4
173 vs. 37.6 years) at the time of ureterolysis ($P=.004$) and hydronephrosis grade ≥ 2 ($p = .02$)
174 were associated with recurrence of symptoms after long-term follow-up (52 months) [28].

175 Radical surgery seems to lower recurrence of DIE in patients with ureteral
176 endometriosis [30,31,55]. A recent review comparing ureterolysis with
177 ureterocystoneostomy showed a recurrence rate or reoperation for DIE persistence of
178 3.9% in the conservative management group and 0% in the ureteral reimplantation group
179 [55].

180 Only Fedele et al [32] have evaluated the risk factor for recurrence of bladder
181 endometriosis and found the extent of surgical excision to be impactful. When the
182 resection included both the bladder lesion and 0.5 to 1 cm deep portion of the adjacent
183 myometrium, recurrence was less frequent compared with the removal of the bladder
184 lesion only (7% versus 37% for symptom recurrence) [32].

185

186 ***Recurrence and Risk Factors of Relapse for Diaphragmatic and Thoracic***

187 ***Endometriosis***

188 Recurrence of thoracic endometriosis lesions or catamenial pneumothorax after
189 surgery were noted in 12 studies [33-44].

190 The rate of pneumothorax recurrence was widely heterogeneous varying between
191 0% and 40% [33,35,37,39]. According to Korom et al [34], the mean time to recurrence is
192 24 months after diaphragm removal with or without pleurodesis and 61 months after
193 pleurodesis. These results appear to not be associated with the extent of the procedure
194 but rather with the presence of diaphragmatic defects on the increased rate of recurrence
195 [38].

196 According to Ceccaroni et al [37], laparoscopy is another possible approach for the
197 treatment of diaphragmatic endometriosis and gives the opportunity to adequately
198 investigate the diaphragmatic surfaces with or without completely mobilizing the liver.

199

200 **Discussion**

201 The challenge in evaluating the literature stemmed from the inconsistent definitions
202 of DIE recurrence depending on author determination, varying clinical examination
203 [13,17,26] and histological variation in proving endometriosis recurrence [12,15,16,25].

204 Recurrence is higher if the follow-up is longer [7,11]. Two risk factors were identified
205 as risk factors for recurrence: an elevated BMI [15,16] and a younger age at primary
206 surgery [9,11,13,15], although a universal cut-off age was not noted.

207 Moreover, we believe that another risk linked to younger age could be the rejection
208 of postoperative hormonal therapy owing to the wish for pregnancy.

209 The higher risk of recurrence for obese or overweight women is probably owing to
210 the presence of more adipose tissue and consequently higher output of estrogen produced
211 by the aromatase activity in those tissues [16].

212 In addition, although the recurrence of superficial peritoneal endometriosis could be
213 different than that of DIE, Taylor and Williams [56] reported that recurrence is more likely
214 to be related to the cluster of disease from the original area of involvement and reflects
215 that incomplete excision at the initial surgery is an important risk factor for recurrence.

216 There is some evidence that positive bowel surgical resection margins are
217 associated with a higher risk of recurrence [15], although several authors were unable to
218 demonstrate a clear correlation [22-24]. Available data concerning the microscopic satellite
219 lesions near the resection margins could explain the inconsistent results regarding positive
220 resection margins and risk of recurrence [22-24].

221 Darwish and Roman in their recent paper [50] compared the evolution of oncologic
222 conservative surgery in the oncologic field to that of radical DIE nerve-sparing or fertility-
223 sparing surgery. Actually there are no available data to recommend a conservative
224 approach for bowel endometriosis. The debate concerning the best surgical approach in
225 the treatment of DIE of the bowel is far from over, warranting the need for prospective
226 follow-up studies with large sample sizes and clear definitions of DIE recurrence to
227 compare the recurrence rate of different surgical approaches.

228 Concerning the recurrence of urinary tract endometriosis, in particular for ureteral
229 endometriosis, the more significant risk factor seems to be the extent of disease excision
230 from the ureter [55]. Despite the approach to spare the ureter whenever possible, ureteral
231 endometriosis might be an intrinsic lesion [57] that cannot be treated with ureterolysis [31].
232 As it is impossible to differentiate intrinsic and extrinsic ureteral endometriosis
233 preoperatively, several studies note that the indication for ureterocystoneostomy should be
234 moderate/severe hydronephrosis owing to ureteral stenosis [31,58]. The conservative
235 approach may be used as the initial treatment option in most patients with ureteral

236 endometriosis, but for some patients with suspect of ureteral intrinsic lesion, and in case of
237 failure of ureterolysis, ureteral resection and reanastomosis/reimplantation may be best.

238 The relation between the recurrence rate of bladder endometriosis and the depth of
239 surgical resection of the adjacent myometrium was postulated by Donnez et al in 2000,
240 owing to the hypothesis that bladder endometriosis is an adenomyotic nodule arising from
241 the myometrium and spreading to the bladder [59]. In the case of bladder endometriosis,
242 the option of radical surgery to reduce DIE recurrence should be balanced with the risk of
243 myometrial lesions, especially for women who wish to preserve fertility.

244 The varying data concerning recurrence of diaphragmatic endometriosis may stem
245 from the small sample size, follow-up period varying between 3 to 52 months [33,37], the
246 surgical techniques (pleurodesis or surgical resection), as well as postoperative hormonal
247 treatment.

248 Standardized reporting of surgical treatment for deep endometriosis, as suggested
249 in the CORDES statement [60], may prevent bias in data collection, as much possible. The
250 deep endometriosis surgical sheet (DESS), proposed by Vanhie et al [60], could be a
251 useful tool for physicians to use the same surgical language and similar rigorous protocols
252 to compare results of different studies of DIE.

253

254 **Conclusion**

255 Younger age and increased BMI appear to be risk factors for DIE recurrence.
256 Prospective, large studies are warranted to establish the definitions of DIE as well as
257 recurrence, attempt various surgical approaches, with long-term follow-up to determine the
258 most effective medical and surgical treatment of DIE. Considering that DIE is a benign
259 disease, very often responsive to medical treatment, correct timing for the first surgery and
260 the radical nature of that surgery implies a progression of standardized essential key steps

261 in the management of the disease to reduce recurrence and reoperations as well as
262 anatomic damage while preserving fertility.

263

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415 Table 1 Recurrence rate as reported by various published studies

Author and year of publication	Type of study and sample size	Type of endometriosis	Definition of recurrence	Recurrence, %	Length of follow up
Ruffo et al 2014 [5]	Retrospective n = 900	Bowel endometriosis	Symptom recurrence, reintervention	2.9%	1–120 months
Dousset et al 2010 [8]	Prospective n = 100	Bowel endometriosis	Reintervention	2%	63–93 months
Vignali et al 2005 [9]	Retrospective n = 150	DIE	Symptom recurrence, clinical findings, ultrasound	Symptom recurrence after 36 months: 20.5% Clinical recurrence after 36 months: 9% Symptom recurrence after 60 months: 43.5% Clinical recurrence after 60 months: 28%	10–60 months
Meuleman et al 2011 [10]	Retrospective n = 45	Bowel endometriosis	Reintervention	2.2% after 12 months follow-up 4.4% after 26 months of follow-up	12–36 months
Busacca et al 2006 [11]	Retrospective n = 1,106 Ovarian endometriosis n = 367 Peritoneal endometriosis n = 198 DIE n = 152 Peritoneal + ovarian endometriosis n = 320	Ovarian, peritoneal, DIE, ovarian + peritoneal endometriosis	Symptom recurrence, clinical findings, ultrasound, increase CA 125	DIE group after 48 months: 30.6% DIE group after 96 months: 43.3%	96 months
Meuleman et al 2014 [12]	Prospective n = 203	DIE with or without bowel endometriosis	Reintervention	After 12 months follow-up: 1% After 24 months follow-up: 7% After 36 months follow-up: 10%	12–36 months
Fedele et al 2004 [13]	Retrospective n = 83	DIE, bowel endometriosis	Clinical findings, ultrasound, reintervention	Pain recurrence: 28% Clinical recurrence: 34% Reintervention: 27%	36 months
Hanssens et al 2015 [14]	Retrospective n = 108 DIE group n = 49 Superficial endometriosis (SE) n = 59	DIE	Symptom recurrence, reintervention	DIE group symptom recurrence: 50% DIE group reintervention: 35.7% SE group symptom recurrence: 21.7% SE group reintervention: 19.6%	6–80 months

Nirgianakis et al 2014 [15]	Retrospective n = 81	Bowel endometriosis	Reintervention	16%	12–120 months
Nezhat et al 2011 [16]	Retrospective n = 193	Bowel endometriosis	Reintervention	10%	12–96 months
Donnez et al 2010 [17]	Prospective n = 500	Bowel endometriosis	Symptom recurrence	8%	24–76 months
Stepniewska et al 2010 [18]	Retrospective Segmental resection (A) n = 60 DIE without bowel surgery (B) n = 40 DIE (no bowel endometriosis) (C) n = 55	Bowel endometriosis DIE without bowel endometriosis	Symptom recurrence, radiological evaluation, ultrasound, reintervention	Symptoms recurrence group A: 10% group B: 35% group C: not specified Radiologic recurrence group A: 7% group B: 23% group C: 5% Reintervention group A: 7% group B: 15% group C: 0%	48 months
Minelli et al 2009 [19]	Retrospective n = 357	Bowel endometriosis	Symptom recurrence, radiological evaluation, ultrasound, reintervention	8.4%	6–48 months
Roman et al 2016 [20]	Retrospective n = 71 Group I shaving n = 46 Group II bowel resection n = 25	Bowel endometriosis	Reintervention	Group I shaving: 8.6% Group II bowel resection: 0%	60–120 months
Fanfani et al 2010 [21]	Prospective case-control study Discoid resection (case) n = 48 Segmental resection (control) n = 88	Bowel endometriosis	Symptom recurrence, radiological evaluation, ultrasound	Discoid resection group: 13.8% Segmental resection group: 11.5%	16–46 months
Koh CE et al 2012 [22]	Retrospective n = 91	Bowel endometriosis	Reintervention	11%	12–116 months
Mabrouk et al 2012 [23]	Retrospective n = 47	Bowel endometriosis	Symptom recurrence	19%	6–35 months
Roman et al 2016 [24]	Prospective n = 103 Women without BOME n = 88 Women with BOME n = 15	Bowel endometriosis	Reintervention	Patients without BOME: 0% Patients with BOME: 6.6%*	12–36 months
Afors et al 2016 [25]	Retrospective n = 92 Group I shaving n = 47	Bowel endometriosis	Symptom recurrence, reintervention	Group I shaving: 27.6% Group II discoid resection: 13.3%	24 months

	Group II discoid resection n = 15 Group III segmental resection n = 30			Group III segmental resection: 6.6%	
Kavallaris et al 2011 [26]	Retrospective n = 55	Bowel endometriosis	Symptom recurrence	6.6%	94 months
Soriano et al 2011 [27]	Prospective n = 45 Ureterolysis n = 41 Ureterocystoneostomy n = 4	Ureteral endometriosis	Reintervention	Ureterolysis: 4.8% Ureterocystoneostomy: 0%	13–33 months
Uccella et al 2014 [28]	Retrospective (ureterolysis) n = 109 (follow up > 12 months only for 80 women)	Ureteral endometriosis	Reintervention	8.6%	15–109 months
Camanni et al 2009 [29]	Retrospective n = 80 Ureterolysis n = 76 Ureterocystoneostomy n = 4	Ureteral endometriosis	Reintervention	Ureterolysis: 2.6% Ureterocystoneostomy: 0%	7–24 months
Frenna et al 2007 [30]	Retrospective (ureterolysis) n = 54	Ureteral endometriosis	Clinical findings	7%	5–12 months
Mereu et al 2010 [31]	Prospective 56 Laparoscopic ureteroureterostomy n = 17 Ureterolysis n = 35 Ureterocystoneostomy n = 2 Nephrectomy n = 2	Ureteral endometriosis	Clinical findings, ultrasound, reintervention	Laparoscopic ureteroureterostomy: 0% Ureterolysis: 21.4% Ureterocystoneostomy: 0%	10–62 months
Fedele et al 2005 [32]	Retrospective n = 47 Base vesical lesion n = 33 Dome vesical lesion n = 14	Bladder endometriosis	Clinical findings, symptom recurrence, radiologic evaluation	Base lesion symptoms recurrence: 24.7% Base lesion clinical/instrumental recurrence: 15.5% Dome lesion symptoms recurrence: 0% Dome lesion clinical/instrumental recurrence: 0%	24–108 months
Ciriaco et al 2009 [33]	Retrospective n = 10	Diaphragmatic endometriosis	Symptom recurrence	40%	14–168 months

Korom et al 2004 [34]	Retrospective n = 3	Diaphragmatic endometriosis	Symptom recurrence	0%	13–22 months
Alifano et al 2007 [35]	Retrospective n = 114 Catamenial pneumothorax n = 28; Noncatamenial pneumothorax n = 86	Diaphragmatic endometriosis	Symptom recurrence	Catamenial pneumothorax: 32% Noncatamenial pneumothorax endometriosis-related: 27% Noncatamenial pneumothorax/not endometriosis-related: 5.3%	32.7 months
Attaran et al 2013 [36]	Retrospective n = 12	Diaphragmatic endometriosis	Symptom recurrence	8.3%	17–73 months
Ceccaroni et al 2013 [37]	Retrospective n = 46	Diaphragmatic endometriosis	Symptom recurrence, radiological evaluation	Not specified	84 months
Visouli et al 2012 [38]	Retrospective n = 5	Diaphragmatic endometriosis	Symptom recurrence, radiologic evaluation	Recurrence of pneumothorax: 20%	16–46 months
Haga et al 2014 [39]	Retrospective n = 92	Diaphragmatic endometriosis	Symptom recurrence	39.1%	25–63 months
Chiantera et al 2016 [40]	Retrospective n = 9	Diaphragmatic endometriosis	Symptom recurrence	0%	6 months
Nezhat C et al 2014 [41]	Retrospective n = 25	Diaphragmatic endometriosis	Symptom recurrence, radiologic evaluation	8%	3–18 months
Fukuoka et al 2015 [42]	Retrospective n = 150	Diaphragmatic endometriosis	Not specified	34%	8–48 months
Alifano M et al 2011 [43]	Retrospective n = 35	Diaphragmatic endometriosis	Symptom recurrence, radiologic evaluation	17.1%	1.5–138 months
Rousset-Jablonski et al 2011 [44]	Retrospective n = 156	Diaphragmatic endometriosis	Symptom recurrence, radiologic evaluation	25%	20–100 months

416 DIE = Deep infiltrating endometriosis; SE = Superficial endometriosis; BOME = Bowel occult microscopic endometriosis.

417 *Relapse was reported in 9 cases in the peritoneum and/or ovaries, in 2 cases in the rectovaginal septum, and 1 case required a new bowel resection.

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