European Journal of Obstetrics & Gynecology and Reproductive Biology 215 (2017) 220–223

Contents lists available at ScienceDirect

European Journal of Obstetrics & Gynecology and Reproductive Biology

journal homepage: www.elsevier.com/locate/ejogrb

Full length article

Incidence of ovarian endometrioma among women with peritoneal endometriosis with and without a history of hormonal contraceptive use

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ARTICLE INFO

Article history:
Received 25 February 2017
Received in revised form 12 June 2017
Accepted 18 June 2017

Keywords:
Hormonal contraceptive
Endometrioma
Endometriosis
Pathogenesis
Endometrioma formation

ABSTRACT

Objective(s): To determine if, among women with peritoneal endometriosis, the incidence of ovarian endometrioma at first laparoscopy differs between those with and without a history of hormonal contraceptive use.

Study design: Retrospective case-control study of women who were patients at a fertility center and had first laparoscopy from 2009 through 2015 showing, at minimum, evidence of peritoneal endometriosis (n = 136). Chart review was conducted for history of prior birth control use as well as operative and pathology notes of surgeries. Study subjects were grouped as follows: women with peritoneal endometriosis diagnosed by laparoscopy who had a history of hormonal contraceptive use (n = 93) and women with peritoneal endometriosis diagnosed by laparoscopy who had never used hormonal contraceptives (n = 43). The main outcome measure was the incidence of ovarian endometrioma among women with peritoneal endometriosis who had a history of hormonal contraceptive use as compared to women with peritoneal endometriosis who had a history of no hormonal contraceptive use.

Results: Among women with peritoneal endometriosis who had a history of hormonal contraceptive use, 17/93 (18.3%) were found to have endometriomas. Among women with peritoneal endometriosis who had a history of no hormonal contraceptive use, 21/43 (48.8%) were found to have endometriomas. The chi-square statistic was 13.6 (P-value < 0.001).

Conclusion(s): Among women with peritoneal endometriosis, those with a history of hormonal contraceptive use had a lower incidence of ovarian endometrioma than those with a history of no hormonal contraceptive use. Possible mechanisms of action include reducing the risk of a corpus luteum formation and subsequent transformation into an ovarian endometrioma or reducing the risk of ectopic endometrium implantation into the ovary via the diminution of retrograde menstruation. Although larger, prospective studies are needed, the findings of this study suggest that the use of hormonal contraception may decrease the likelihood of ovarian endometrioma formation among women with peritoneal endometriosis.

Introduction

The pathogenesis of ovarian endometriomas has been controversial [1]. Theories of endometrioma formation include the retrograde menstruation of endometrial glands and stroma onto the ovarian surface where these cells adhere with subsequent invagination of these superficial endometriotic implants into the ovary [2]. Another theory is known as coelomic metaplasia which consists of the invagination of ovarian cortical tissue and metaplasia of coelomic epithelium [3,4]. The theory of transformation of functional cysts into endometriomas has been posited as well [5,6,7].

In line with the theory of functional cyst transformation into an endometrioma, a recent hypothesis raises the possibility that a cystic corpus luteum, developing along the ovarian cortex which is adherent to the pelvic sidewall's peritoneum, results in entrapped blood within the cyst which may transform the aforementioned

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http://dx.doi.org/10.1016/j.ejogrb.2017.06.028

corpus luteum cyst into an ovarian endometrioma [8]. Prior studies have supported this possibility by showing a decreased risk of endometrioma recurrence in women using cyclic, oral contraceptives post-operatively [9,10,11]. In addition, a prospective, randomized trial of 239 women who had undergone ovarian cystectomy of endometriomas showed the efficacy of long-term cyclic and continuous postoperative use of oral contraceptives in the reduction of size and delayed recurrence of endometriomas [12]. Although a prior publication showed no association between hormonal contraceptive use and endometriomas [13], a more recent paper reported a decreased likelihood of ovarian endometriotic lesions among current users of hormonal contraceptives when compared with those who had not used hormonal contraceptives for greater than 3 months prior to surgery, suggesting a protective effect of hormonal contraceptives [14]. In the latter study, some patients had isolated endometriomas whereas others had concomitant peritoneal endometriotic disease as well. The aim of our study was to determine if, among women with peritoneal endometriosis, the incidence of ovarian endometrioma at first laparoscopy differed between those with a history of hormonal contraceptive use and those who had never used hormonal contraception.

Materials and methods

This retrospective chart review included women who had their first laparoscopy showing, at minimum, evidence of peritoneal endometriosis (n = 136) at a single private-practice fertility center, Austin Fertility & Reproductive Medicine, from January 2009 through December 2015. All laparoscopies had been performed by the same surgeon (SKK). Institutional review board approval was obtained from the Austin Multi-Institutional Review Board. Data such as patient age at time of laparoscopy, history and duration of prior hormonal contraceptive use, and type of hormonal birth control used were abstracted from the medical record and the fertility center's New Patient Questionnaire, which is routinely given to all patients at the time of the first patient visit. Operative findings and histopathology of surgical specimens were collected. Group A was defined as women with peritoneal endometriosis at first laparoscopy who had a history of hormonal contraceptive use (n = 93); Group B was defined as women with peritoneal endometriosis at first laparoscopy who had a history of no hormonal contraceptive use (n = 43). The primary outcome measure was the presence or absence of an endometrioma. Those with endometrioma and no evidence of peritoneal endometriosis (n = 3) were excluded. Pre-operative imaging of the ovaries such as transvaginal sonogram (TVS), pelvic magnetic resonance imaging, or recent reports of such imaging studies were available prior to surgery. These imaging studies made it less likely that a small endometrioma or cyst would be missed during subsequent laparoscopic surgery. Student *t*-test and Chi-square test were used for statistical analyses between groups where appropriate. A P-value of <0.05 was considered to be statistically significant.

Results

The mean age of women in Group A was 32.2 (range: 21–41) and the mean age of women in Group B was 33.7 (range: 20–44). Characteristics among women in Group A and Group B are shown in Table 1. With regards to duration of hormonal contraceptive use, 80/93 (86%) of the subjects in Group A had responded to this question of which 74 had specified the timeframe with an average duration of use of 7.73 years, whereas the remaining 6 who had responded to this question did so with nonspecific terms such as "years" or "months".

Table 1
Characteristics among subjects in Group A (women with peritoneal endometriosis and a history of hormonal contraceptive use) and Group B (women with peritoneal endometriosis and a history of no hormonal contraceptive use).

	GROUP A (n = 93)	GROUP B (n = 43)	P value
Average Age[a]			
	32.2 ± 0.460	33.7 ± 0.822	0.086[b]
Parity			
0	72 (77.4%)	33 (76.7%)	0.931[c]
1	14 (15.1%)	10 (23.3%)	0.243[c]
2	70 (7.5%)	0 (0.0%)	
>2	0 (0.0%)	0 (0.0%)	
Ethnicity			
African-American	4 (4.3%)	1 (2.3%)	0.569[c]
Asian-American	2 (2.1%)	7 (16.3%)	0.002[c]
Caucasian	70 (75.3%)	19 (44.2%)	0.000 [c]
Hispanic	16 (17.2%)	14 (32.6%)	0.045 [c]
Other	1 (1.1%)	2 (4.6%)	0.187 [c]
Dysmenorrhea			
Yes	75 (80.6%)	32 (74.4%)	0.410[c]
No	18 (19.4%)	11 (25.6%)	
Deep dyspareunia			
Yes	42 (45.2%)	21 (48.8%)	0.690 [c]
No	51 (54.8%)	22 (51.2%)	
Stage of endometriosis			
1	56 (60.1%)	15 (34.9%)	0.006 [c]
2	17 (18.3%)	5 (11.6%)	0.327 [c]
3	10 (10.8%)	9 (20.9%)	0.111 [c]
4	10 (10.8%)	14 (32.6)	0.002 [c]
Presence of endometrioma			
Yes	17 (18.3 %)	21 (48.8 %)	<0.001 [c]
No	76 (81.7 %)	22 (51.2 %)	
# of endometriomas			
0	76 (81.7%)	22 (51.2%)	< 0.001 [c]
1	10 (10.8%)	11 (25.5%)	0.026 [c]
2	4 (4.3%)	7 (16.3%)	0.017 [c]
>2	3 (3.2%)	3 (7.0%)	0.322 [c]
Hormonal contraceptive types			
Oral pills only	69 (74.2%)	N/A	
Transdermal patch only	1 (1.1%)	N/A	
Transvaginal ring only	0 (0.0%)	N/A	
Long-acting injectable only	3 (3.2%)	N/A	
Levonorgestrel-IUS only	1 (1.1%)	N/A	
More than 1 modality	19 (20.4%)	N/A	

IUS = intrauterine system.
[a] Data are presented as mean ± standard error of the mean.
[b] Student *t*-test.
[c] Chi-square test.

Among women with peritoneal endometriosis who had a history of hormonal contraceptive use, 17/93 (18.3%) were found to have endometriomas (Fig. 1). Among women with peritoneal endometriosis who had a history of no hormonal contraceptive use, 21/43 (48.8%) were found to have endometriomas (Fig. 1). The chi-square statistic was 13.6 (P-value <0.001).

Comment

In this study, women with peritoneal endometriosis who had a history of hormonal contraceptive use had a lower incidence of ovarian endometriomas than women with a history no prior hormonal contraceptive use. Although retrograde menstruation with implantation of ectopic endometrial glands and stroma onto the ovarian surface and subsequent invasion into ovarian cortex or coleomic metaplasia may be mechanisms of action of ovarian endometrioma formation, the concept of functional cyst