

# Coital Retrograde Menstruation as a Risk Factor for Pelvic Endometriosis

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## Abstract:

To investigate coitus during menstruation as a possible predisposing factor for endometriosis 78 patients were asked about their coital habitus during menstruation and subsequently were examined by ultrasound transabdominally, transvaginally, or both, before laparoscopy or surgery. MRI was used in six patients only. There was a statistically significant relationship between endometriosis and coital practice during menstruation. The incidence of endometriosis in patients with history of coitus in menses was 66% while the incidence was 34 % in patients with no such history. It is concluded that coitus during menses could be a predisposing factor for endometriosis.

## Introduction:

Endometriosis is the presence of functioning endometrial glands and stroma (zona functionalis) outside their normal location, the uterine cavity and musculature.<sup>(1, 2)</sup> It is a common condition diagnosed most often in white [Caucasian?] women aged 30–40 years and is found in about 30%–50% of all patients undergoing gynecological surgery.<sup>(2, 3)</sup>

Almost any organ of the body can be involved but most commonly those within the pelvis where, in order of declining incidence, it occurs in the ovaries, uterine serosal surface, cul-de-sac, fallopian tubes, large bowel (rectum, sigmoid, appendix), and urinary bladder.<sup>(4)</sup> The ectopic endometrium responds to hormonal stimulation with various degrees of cyclic hemorrhage which result in suggestive symptoms and appearances.

The accuracy of the diagnosis of endometriosis from clinical presentation is low. Although the disorder is associated with pelvic pain and the clinical triad of dysmenorrhea, dyspareunia, and infertility in about 40% of

patients, symptoms correlate poorly with the extent of the disease. Laparoscopic visualization of implants is the accepted means by which a diagnosis of endometriosis is made.<sup>(5)</sup>

Endometriosis is a complex disorder, and its causes are probably multifactorial. Three theories of histogenesis have been proposed: (a) metastatic theory (retrograde menstrual implantation, vascular and lymphatic spread and intra-operative implantation), (b) metaplastic theory, and (c) induction theory. Also researchers are investigating the role of growth factors, immunity, and other mechanisms that might contribute to the development of the disorder. The most widely accepted theory is that endometriosis results from metastatic implantation from retrograde menstruation<sup>(6)</sup> and assumes retrograde transportation of endometrial tissue from the uterus into the peritoneal cavity. The endometrial cells remain viable and implant on serosal surfaces outside the uterus. The occurrence of retrograde menstruation has been documented by diagnostic laparoscopy and studies of peritoneal dialysis fluid.

Up to 90% of women have bloody peritoneal fluid during the perimenstrual period.<sup>(7)</sup> Investigators have shown the in vitro growth potential of shed endometrium and have demonstrated viable endometrial cells in peritoneal fluid.<sup>(8)</sup> Further evidence for this theory is suggested by the anatomic pattern of the disease within the dependent areas of the pelvis.<sup>(9)</sup> Endometriosis is also seen with greater frequency in women with excessive retrograde flow due to obstructive anomalies of Mullerian duct development.<sup>(10)</sup> Other possible routes of metastatic spread include transport of endometrial cells to distant sites via the blood stream or lymphatic channels or iatrogenically during surgery or needle biopsy.<sup>(11)</sup> It was thought that sexual intercourse during menstruation could be a predisposing or helpful factor for retrograde menstruation although religious instructions usually prohibit coitus during menstruation. Only a few studies have attempted to find out the relationship between sexual practice and menstruation.

The accuracy of the diagnosis of endometriosis from the clinical presentation is low. Several authors have addressed the use of ultrasound (US) and computed tomography (CT) in detecting endometriosis<sup>(12)</sup>. Sample<sup>(13)</sup>

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in 1980 and Birnholz<sup>(14)</sup> in 1983 addressed the varied appearances of endometriosis. Sample noted inconsistency in the sonographic appearances of endometriosis and attributed this to changes related to the menstrual cycle. Birnholz discussed the two distinct clinical and sonographic forms of endometriosis: the discrete pelvic mass (endometrioma) and the diffuse form with multiple focal pelvic implants and associated adhesions. In the diffuse form, he observed generalized increased background echogenicity of the pelvis and accentuated pelvic arterial pulsations. He acknowledged that the ultrasound diagnosis of diffuse endometriosis is inferential and often based on associated clinical data.

The confident ultrasound differentiation of an endometriotic cyst from other adnexal masses may be difficult at times. MR imaging has been shown to have greater specificity for the diagnosis of endometriomas than other non-invasive imaging techniques.<sup>(15)</sup> It affords a larger field of view than ultrasound and the effect of adhesions on surrounding anatomic structures is better depicted. Therefore MR imaging can be a helpful adjunct for evaluation of adnexal masses.<sup>(6)</sup>

Lesions with degenerated blood products, including methemoglobin and concentrated protein, appear with high signal intensity areas on T1 and T2 weighted images. A common and important feature of an endometrioma is shading (ie, loss of signal within the lesion), which can be seen on T2-weighted images.<sup>(16)</sup> This shading reflects the chronic nature of endometrioma and helps differentiate it from other blood-containing lesions. Blood products within these cysts are the result of cyclic bleeding accumulating over months to years. These chronic lesions are very viscous with extremely high concentrations of iron and proteins. At these high concentrations, protein cross-linking can occur with a consequent decrease in T2-relaxation time. All of these factors may contribute to shading.<sup>(15)</sup> Shading is present when a cyst that is hyperintense on a T1-weighted image becomes hypointense on a T2-weighted image. Although the T2-weighted image often shows mixed high and low signal intensity, findings can be quite variable. Shading can range from faint, dependent layering to complete signal void, reflecting the concentration of blood products.<sup>(15)</sup> Hemosiderin-laden macrophages combined with the fibrous nature of the cyst wall give a low signal intensity on both T1 and T2-weighted images.<sup>(15)</sup>

### Patients and Methods:

Seventy-eight patients aged 23 to 48 years, clinically sumptuous for endometriosis, or infertility patients, were selected prospectively and retrospectively and were referred to the Radiology Department at Hamad Medical Corporation or at Doha Clinic Hospital, Qatar. They complained of variable endometrial symptoms and signs or from infertility. All were asked about their coitus habitus during menses. They were examined either by

transabdominal or transvaginal ultrasonography or both using an Acuson Antares Siemens ultrasound machine for a transabdominal pelvic scan using CH 6-2 MHZ convex transducer, and transvaginal scan using an EC 9-4 MHZ transducer.

To differentiate between intramural fibromyomas and adenomyosis, MR imaging was done on six patients only using an 1.5 T. MR imager (Avantos; Siemens Medical System) with a phased array body coil. Unenhanced Fast T2-weighted Half-fourier Acquisition single-shot-turbo Spin Echo (HASTE T2) MR images, T2-spin echo images, and T1-weighted spin echo without and with fat suppressed, spoiled-gradient echo (FLASH) MR images were taken in axial, coronal and sagittal planes. 140-170/2 repetition time 80 degree flip angle, 5-8 mm section thickness, 20% gap, 244 x 256 matrix, 14-22 sections acquired in a 16-27 second breath hold. This was followed by gadolinium-enhanced T1-weighted fat suppressed, spoiled gradient echo (FLASH) MR images obtained also in three planes. The contrast material was given by injector at a dose of 0.2 mmol/kg. Fat suppressed T1 Gradient echo imaging was initiated immediately, and delayed images were obtained at five minutes after contrast administration.

Sixty-nine patients underwent laparoscopic or surgical interferences and were confirmed pathologically as endometriosis.

The Z test was used for statistical analysis.

### Results:

The 78 patients were divided into Group 1 of 51 patients with a history of coitus during menses and Group 2 of 27 patients with no history of coitus during menses. (Table 1)

### Discussion:

Endometriosis is classically defined as the presence of functional endometrial glands and stroma outside the uterine cavity (ectopic as opposed to normally located or eutopic endometrium). In older literature, endometrium was further classified as endometriosis interna (endometriotic tissue within the uterine musculature) and endometriosis externa (endometrial tissue in all other sites). Currently the term adenomyosis has replaced endometriosis interna and is considered a distinct and different clinical entity because its pathogenesis, symptoms, and epidemiology differ from those of endometriosis. Endometriosis externa is now simply called endometriosis.<sup>(6)</sup>

Endometriosis is found predominantly in women of childbearing age. The mean age at diagnosis is 25-29 years but it is often greater in women who present with infertility rather than pelvic pain.<sup>(16)</sup> Endometriosis is not uncommon among adolescents. Approximately half of women under 20 years of age who have chronic pelvic pain or dyspareunia have the disease.<sup>(17)</sup>

Obstructive Mullerian duct anomalies of the cervix



Table 1:

Group	Number of the patients	History of Coitus during menstruation
1	51	+
2	27	-

Table 2: Ultrasonographic Findings

Ultrasonographic Findings	Number of patients
Unilateral ovarian cyst with unclear fluid	10
Complex right ovarian cyst	13
Complex left ovarian cyst	14
Bilateral complex ovarian cyst	15
Bilateral ovarian cysts with unclear fluid	17
Bilateral ovarian cyst cysts with fluid level	9

Z test for two proportions was used for the calculations.

For Group 1: Sample size = 54, 66%; Frequency = 36

For Group 2: Sample size = 27, 34%; Frequency = 9

Z value = 2.495. Actual confidence level was,  $t_1 = 99.4$  and  $t_2 = 98.4$ . There was a statistically significant difference between the two groups.

Table 3: The incidence of endometriosis according to the history of coitus during menses

Patient with positive history	66%
Patients with negative history	34%

or vagina account for most cases of endometriosis in girls under the age of 17 years.<sup>(18)</sup> About 5% of endometriosis cases are seen in post-menopausal women, and exogenous estrogen replaced theory is suggested to play a role.<sup>(19)</sup>

The prevalence of endometriosis is difficult to determine accurately. Laparoscopy or surgery is required for a definitive diagnosis. Endometriosis has been reported in 4.1% of asymptomatic women undergoing laparoscopy for tubal ligation but, in the same study, 20% of women undergoing laparoscopic investigation for infertility and 24% of women with pelvic pain also had endometriosis.<sup>(20)</sup> Overall prevalence, including both symptomatic and asymptomatic women, is estimated to be 5-10%.<sup>(21)</sup> When social and economic factors are considered, the

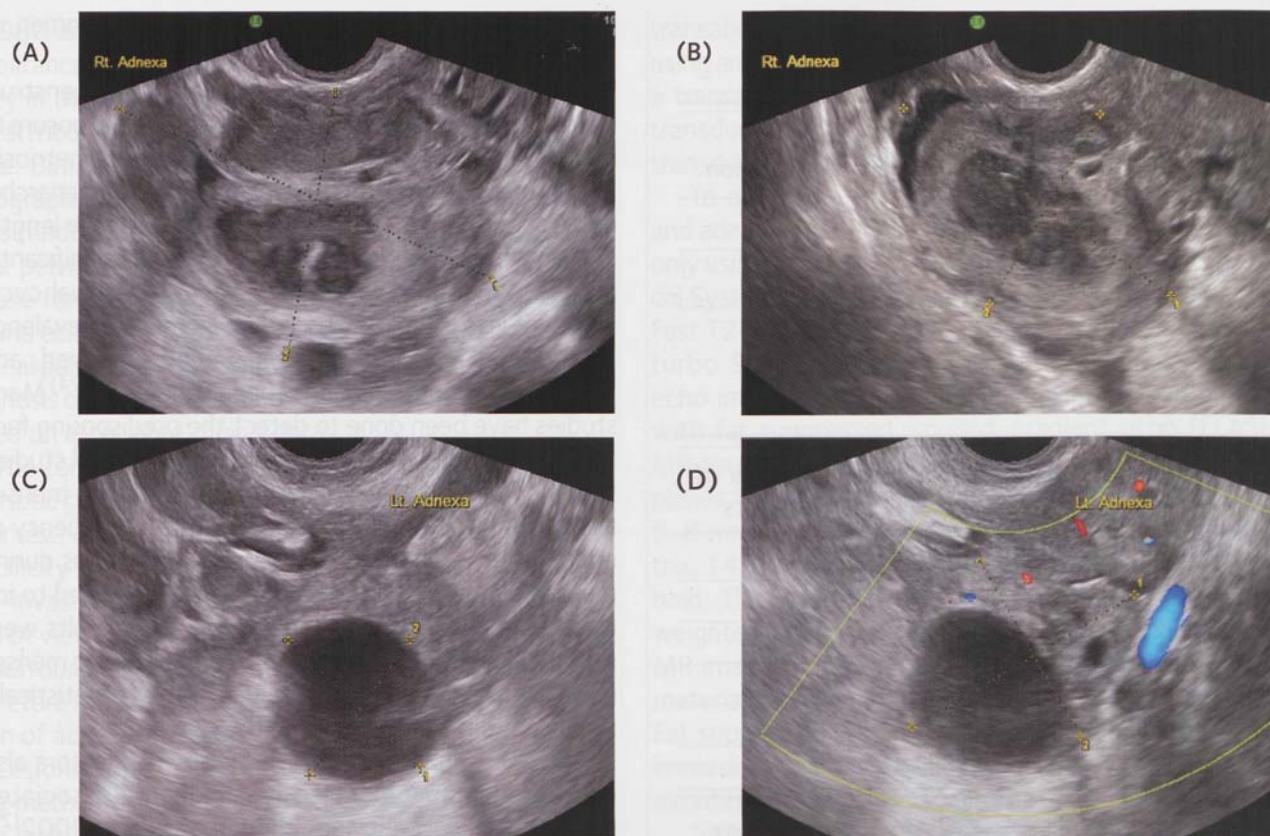
prevalence of endometriosis is the same in women of different races.<sup>(22)</sup>

In a recent study investigators compared menstrual characteristics that would increase peritoneal exposure to menstrual fluid with the risk of developing endometriosis. The three characteristics studied were age of menarche, duration of menstrual flow, and menstrual cycle length. The only menstrual characteristic that was significantly associated with endometriosis was a menstrual cycle length of less than 28 days.<sup>(23)</sup> An increased prevalence of endometriosis in families has been observed, and therefore a genetic effect has been suggested.<sup>(24)</sup> Many studies have been done to detect the predisposing factors for endometriosis. Filer and Wu, 1989<sup>(25)</sup> studied the relationship between coitus habitus during menses and endometriosis and concluded that the frequency of endometriosis was higher in patients with coitus during menses and that coitus during menses appeared to increase the chances of endometriosis. Our results were similar; 51 of the 78 had a history of coitus during menses (66%), while 27 (34%) had no such history, a statistically significant difference between the two groups.

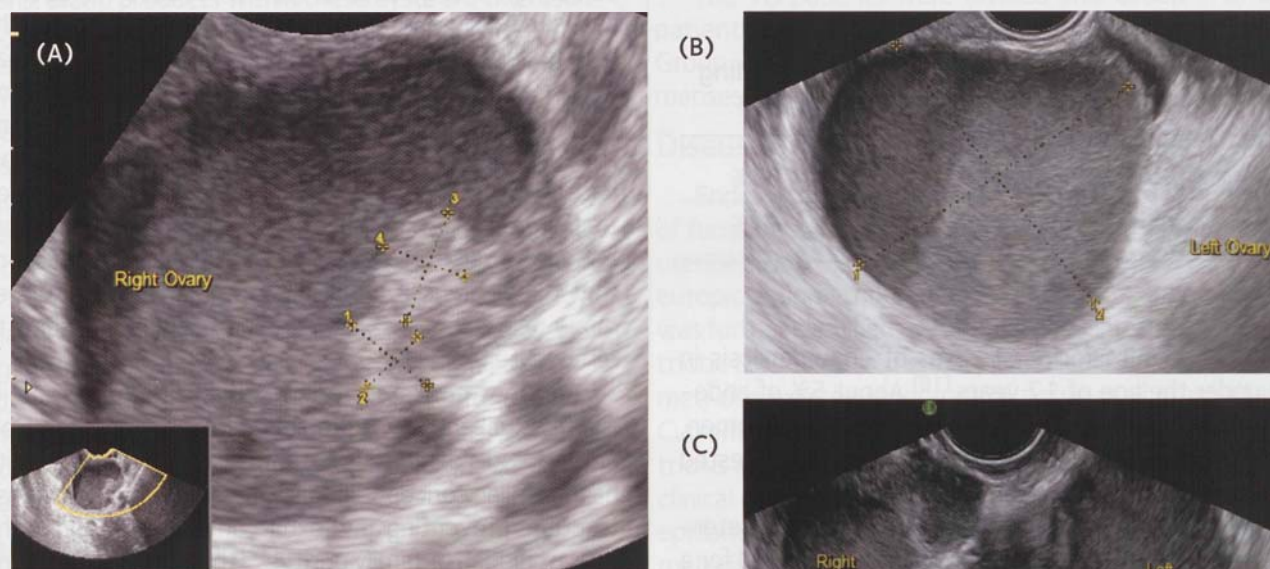
In 2003<sup>(26)</sup> another study of many risk factors also concluded that endometriosis might be associated with such sexual behavior although a study in 2002<sup>(27)</sup> attempting to determine the role of sexual relations, tampon use and douching in menstruation, with special reference to sexual relations during menstruation, found that 26.5% of the women with endometriosis, said they sometimes or often had sexual intercourse while menstruating. Among the other women, about 34% reported sexual activity during their periods. In their survey the researchers found that sexual activity—specifically, having an orgasm and tampon use, rather than contributing to the backup of menstrual fluid in the pelvic cavity and thus to the development of endometriosis, probably had a helpful reverse effect. The authors suggested that orgasm during menstruation might protect against endometriosis by enhancing the uterine contractions that expel menstrual fluid. An orgasm probably does move debris, but instead of going backward it helps to remove it.<sup>(27)</sup>

Religious concepts forbid coitus during menses; in Islam sexual activity is prohibited as written in the Holy Qur'an as it is dangerous at that time<sup>(28)</sup> and Christianity has a similar concept. Judaism has more extensive instructions preventing any sexual contact according to the laws of niddah or family purity<sup>(29)</sup> that dictate the timing of the physical relationship between a married couple and prescribe any physical contact between the couple during the time that the wife has the status of niddah (any uterine bleeding that is not caused by injury, with menstruation being the most common cause although niddah and menstruation are not synonymous. We believe that sexual intercourse during menstruation is dangerous, and can be a predisposing factor for endometriosis.



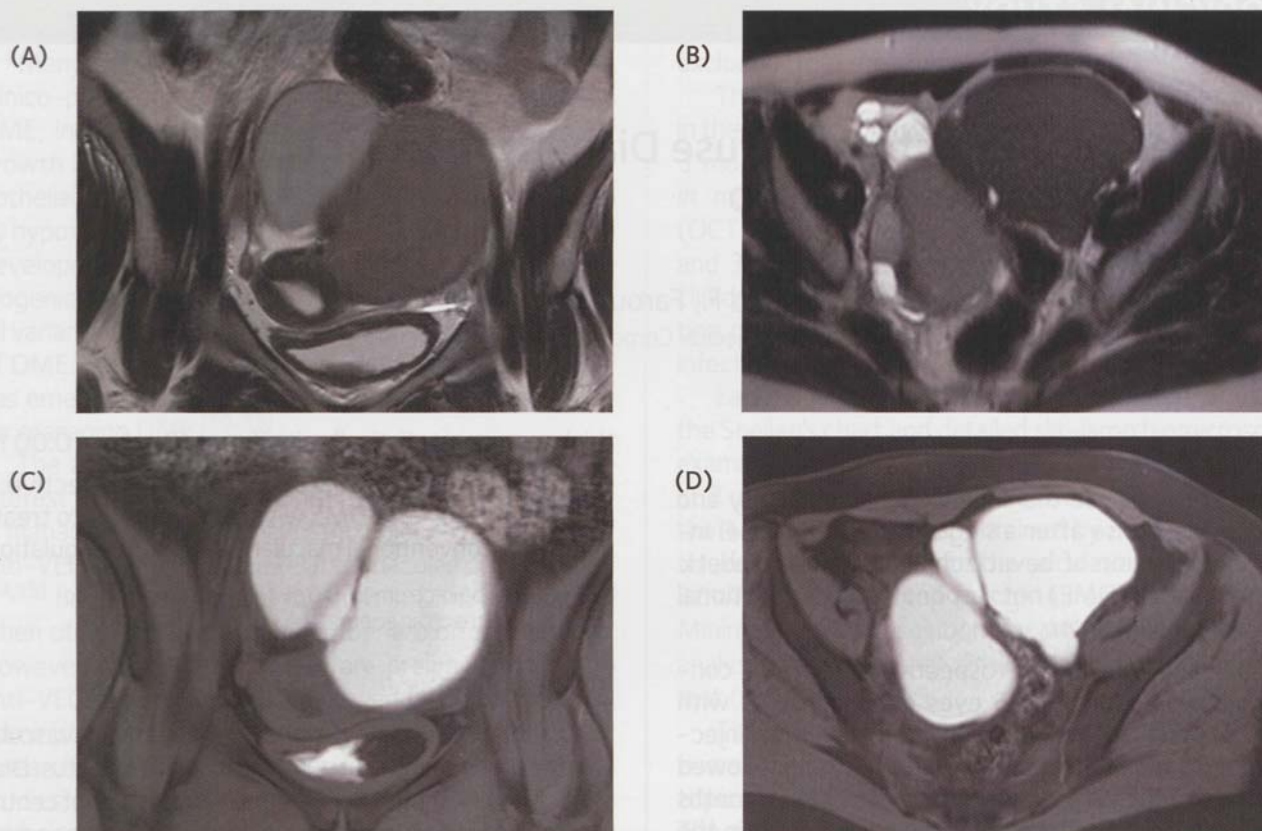


**Figure 1:** TVUS pelvic scan of a 28-year-old lady with a strong positive history of sexual intercourse during menstruation. (A, B) large complex cystic lesions with thick septations and hemorrhagic fluid in the right ovary and adnexa. (C,D) left ovary is enlarged with a large complex hemorrhagic cyst. The colored Doppler scan (D) shows intermediate vascularity. Both ovaries are displaced to the cul de sac with the 'kissing ovaries' appearance. Operative histopathological examination of the bilateral ovarian lesions confirmed the endometriomas.



**Figure 2:** TA and TV ultrasound scans of a 32-year-old lady with an infrequent habit of sexual intercourse during menstruation. (A) right ovary totally occupied by a complex hemorrhagic cyst with echogenic wall focus. (B) left ovary has a unilocular cyst with diffuse homogenous low-level internal echoes and fluid/fluid levels indicating hemorrhagic contents. (C) Image of the cul-de-sac showing the characteristic "kissing ovaries".





**Figure 3:** MRI scan of the pelvis of a 29-year-old lady presenting with primary infertility and a history of sexual intercourse during menstruation; pelvic endometriosis confirmed by operative histology. (A) Coronal T2 and (B) Axial T2 images showing bilateral large multilocular cysts containing hemorrhagic fluid in different stages of bleeding. (C) Coronal T1 fat suppressed and (D) Axial T1 fat suppressed images show intense high signals of the bilateral multilocular cystic lesions giving a classic appearance of their hemorrhagic contents.

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