Relationship between the Severity of Endometriosis Symptoms (Dyspareunia, Dysmenorrhea and Chronic pelvic pain) with the Spread of the Disease on Ultrasound

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Abstract

Objectives

The prevalence of endometriosis among women of childbearing age is about 10–15%. Although many patients with endometriosis do not have any symptoms, they may suffer from dysmenorrhea, dyspareunia, and chronic pelvic pain. our aim of this study is to investigate the relationship between the severity of symptoms of endometriosis with the spread of disease on ultrasonography as well as the stage of the disease.

Results

Regarding the various analyzes were performed, the cumulative size of posterior DIE less than 1 cm significantly correlated with minimal severity of dyspareunia and chronic pelvic pain. The incidence of dyspareunia was more in patients with complete stenosis of Douglas pouch comparing with cases with incomplete Douglas pouch stenosis. The incidence of severe and very severe pain in patients with Douglas pouch stenosis is relatively higher than patients without stenosis. This study demonstrated only dyspareunia is related to the stage of endometriosis and patients with dyspareunia are 5 times more at risk of a higher stage of the disease.

Introduction

Endometriosis affects 10–15% of women of childbearing age and most patients are between the ages of 18 and 45 years [1]. The prevalence of the disease is even higher in symptomatic individuals; so that prevalence is 50% in infertile individuals and 50–90% in those with chronic pelvic pain [2, 3]. Although many patients with endometriosis do not have any symptoms, they may suffer from dysmenorrhea, dyspareunia, and chronic pelvic pain. Also, in 30% of infertile women endometriosis can be detected [4]. The ovaries are one of the most common sites of endometriosis [5]. The classic appearance of endometrioma in ultrasound examination is a homogenous and hypoechoic cystic lesion in the ovary with low-level internal echo and no internal blood flow [5, 6].

Deep infiltrative endometriosis (DIE) is a specific form of endometriosis which refers to endometrial implants above 5 mm that are penetrating the peritoneal surface. These implants are highly active and are almost associated with pelvic pain symptoms. The most common site for these implants is posterior areas even including uterosacral ligament (USL) and torus uterinus (the retrocervical part of uterine where uterosacral ligaments join there), posterior wall of the vagina and posterior wall of the rectum [7]. Although clinical findings may suggest the disease, imaging is needed for definitive diagnosis[3]. According to The American College of Obstetricians and Gynecologists (ACOG), trans vaginal ultrasonography (TVS) is the first method for studying endometriosis and MRI is used if rectovaginal or bladder involvement is suspected [3, 5]. The value of ultrasound has been proven in diagnosis of endometriosis. Several articles have shown that TVS is comparable and even better than MRI [8]. TVS is

highly specific for detection of DIE in uterosacral ligaments, rectovaginal septum, vagina and bladder [9]. Accurate mapping of disease spreading is crucial for determining treatment strategy, where the accuracy of TVS is proven for that. The dynamic nature of ultrasound increases its value, which can evaluate areas not examined by other imaging modalities.

According to the importance of endometriosis and its relatively high prevalence among women, as well as the wide range of endometriosis symptoms (including asymptomatic to severe life-threatening pain), we wanted to study the relationship between the various symptoms of the disease and the spread of its anatomical involvements. Also, accurate diagnosis of disease spread by using non-invasive methods can be effective in the treatment and follow-up of patients and TVS is the most accessible imaging method as well as the selective modality for differentiating endometrioma from other cystic lesions. We hope that this study may help to identify cases of endometriosis that do not require invasive treatment or laparoscopic diagnosis, also preoperative non-invasive mapping and grading of disease in patients requiring surgery can be helpful in improving surgical outcomes.

Methods

This study is a cross-sectional study to evaluate the association of severity of endometriosis symptoms (dyspareunia, dysmenorrhea, and chronic pelvic pain) with the spread of disease on ultrasonography in patients with endometriosis. Our target population was women complaining of pelvic pain, who referred to the radiology ward of Hazrat Rasool Akram Hospital in Tehran from 2018 up to 2020. Our inclusion criterion is patients with pelvic pain with a diagnosis of endometriosis according to ultrasound examination. The required information was extracted from the patient's ultrasound examination report and designed questionnaire and then entered to the special forms designed for this purpose. Severity of pain was determinate by Point Pain Numbered Scale 11 (NRS11), that way patient self-administered questionnaires were completed and patients gave a point ranging from zero to ten for their pain. Exclusion criteria include: other causes of pelvic pain such as pelvic inflammatory disease (PID), pelvic varices, ovarian cysts except endometrioma, Gastrointestinal and urinary problems. Ultrasound examinations were done with a Philips affinity 70 ultrasound device with vaginal probe 10 – 3 MHz, C-10 3v model; curve probe 5 – 1 MHz, C5-1 model and linear probe 12 – 3 MHz, L12-3 model. All ultrasound examinations were performed by an experienced radiologist who was unaware of the type and severity of the patient’s pain. Ultrasound examinations were done based on the systematic protocol introduced by the International Deep Endometriosis Analysis (IDEA) Consensus Group. Ultrasound examination includes the study of uterine and adnexa, sliding sign, DIE, and soft markers such as localized tenderness. Revised American Fertility Society classification (r-AFS classification) used as an endometriosis staging system.

Statistical analysis of the results was performed using the SPSS software (version 24.0; windows). To describe quantitative data, mean and standard deviation were used and frequency and percentage were used for qualitative data. To investigate the association of any of the symptoms of dysmenorrhea, dyspareunia, and pelvic pain with endometrioma, Douglas pouch stenosis, intestinal involvement, and stage of the disease, Chi-square, and Fisher's statistical tests were used considering p-value < 0.05 as

significant. Finally, to examine the relationship between each symptom with the stage of the disease, a logistic regression test for sequential data was used.

Results

Between January 2018 and August 2020, 296 patients underwent ultrasonography to DIE at the Department of Radiology. Of the 296 cases eligible for the study, 142 were excluded for the following reasons: amenorrhea, five patients (1.6%); previous resection of DIE, seven patients (2.3%); insufficient description of the posterior DIE, 10 patients (3.3%); and not consenting to participate in the study 118 patients (39.8%). Finally, 154 patients included studying. The demographics characteristics and clinical data of patients presented in Supplement 1. The mean age of participants was 32.4 ± 6.2 years. Presence and severity of pain syndrome according to r-AFS score items presented in Table 1. The severity of dysmenorrhea, dyspareunia, and chronic pelvic pain according to the extension of the disease, are presented in Table 2 respectively. Typical ovarian endometrioma, uterosacral ligament and bowel involvement in deep estudyingosis showed in Fig. 1 respectively

Table 1
Presence and severity of pain syndrome according to stage of endometriosis.

Pain syndrome	Minimal No(%)	Mild No(%)	Moderate No(%)	Severe No(%)	P. value
Dysmenorrhea					
Stage I	0	1(8.3)	2(16.7)	9(75)	0.61
Stage II	0	0	3(30)	7(70)	
Stage III	0	9(15.8)	18(31.6)	30(52.6)	
Stage IV	4(5.5)	7(9.6)	22(30.1)	40(54.8)	
Dyspareunia					
Stage I	5(45.5)	0	4(36.4)	2(18.2)	0.48
Stage II	4(44.4)	0	3(33.3)	2(22.2)	
Stage III	21(47.7)	8(18.2)	7(15.9)	8(18.2)	
Stage IV	20(34.5)	12(20.7)	17(29.3)	9(15.5)	
Chronic pelvic pain					
Stage I	7(58.3)	0	2(16.7)	3(25)	0.05
Stage II	5(50)	0	5(50)	0	
Stage III	35(60.3)	9(15.5)	10(17.2)	4(6.9)	
Stage IV	32(44.7)	22(30.6)	13(18.1)	5(6.9)	

Table 2
Severity of dysmenorrhea, dyspareunia, and chronic pelvic pain according to extension of disease

Variable	Total n:150	Minimal, (n: 0) 0%	Mild, (n:17) 11.3%	Moderate (n: 45) 30%	Severe (n:88) 58.66%	P
DYSMENORRHEA SEVERITY						0.8
Cumulative size of DIE implants						
< 1 cm	22	0	2(9.1)	9(40.9)	11(50)	
1–3 cm	47	1(2.1)	4(8.5)	19(40.4)	23(48.9)	
> 3 cm	41	2(4.9)	4(9.8)	11(26.8)	24(58.5)	
Cumulative surface of superficial peritoneal implants						0.48
0	142	4(2.8)	16(11.3)	40(28.2)	82(57.7)	
< 3 cm	5	0	1(20)	3(60)	1(20)	
> 3 cm	5	0	0	2(40)	3(60)	
Endometrioma						0.53
None	28	0	2(7.1)	5(17.9)	21(75)	
Unilateral	78	3(3.8)	12(15.4)	22(28.2)	41(52.6)	
Bilateral	51	1(2)	3(5.9)	18(35.3)	29(56.9)	
Cumulative size of endometriomas						0.31
0	28	0	2(7.1)	5(17.9)	21(75)	
≤ 3 cm	26	2(7.7)	5(19.2)	6(23.1)	13(50)	
> 3 cm	100	2(2)	10(10)	34(34)	54(54)	
Size of the largest endometrioma						0.69
0	26	0	2(7.7)	5(19.2)	19(73.1)	
≤ 3 cm	43	2(4.7)	5(11.6)	14(32.6)	22(51.2)	
> 3 cm	85	2(2.4)	10(11.8)	26(30.6)	47(55.3)	
Douglas obliteration						0.42
Absent	21	0	3(14.3)	7(33.3)	11(52.4)	
Partial	53	3(5.7)	7(13.2)	11(20.8)	32(60.4)	
complete	75	1(1.3)	7(9.3)	27(36)	40(53.3)	

Variable	Total n:150	Minimal, (n: 0) 0%	Mild, (n:17) 11.3%	Moderate (n: 45) 30%	Severe (n:88) 58.66%	P
Cumulative size of posterior DIE						0.7
1 cm <	22	0	2(9.1)	9(40.9)	11(50)	
3 cm – 1	46	1(2.2)	3(6.5)	19(41.3)	23(50)	
> 3 cm	40	2(5)	4(10)	10(25)	24(60)	
Sub peritoneal extension						0.82
Sub-peritoneal only	92	2(2.2)	10(10.9)	27(29.3)	53(57.6)	
Rectal	51	2(3.9)	5(9.8)	16(31.4)	28(54.9)	
Vaginal	1	0	0	1(100)	0	
BothRectal and Vaginal	2	0	0	0	2(100)	
DYSPAREUNIA SEVERITY						
Cumulative size of DIE implants						
< 1 cm	16	10(62.5)	3(18.8)	1(6.3)	2(12.5)	0.05
1–3 cm	36	13(36.1)	4(11.1)	9(25)	10(27.8)	
> 3 cm	37	13(34.2)	9(23.7)	13(34.2)	2(7.9)	
Cumulative surface of superficial peritoneal implants						
0	113	46(40.7)	19(16.8)	27(23.9)	21(18.6)	0.48
< 3 cm	4	1(25)	0	3(75)	0	
> 3 cm	5	3(60)	1(20)	1(20)	0	
Endometrioma						
None	26	11(42.3)	2(7.7)	9(34.6)	4(15.4)	0.14
Unilateral	61	23(37.7)	13(21.3)	11(18)	14(23)	
Bilateral	40	18(45)	7(17.5)	12(30)	3(7.5)	
Cumulative size of endometriomas						
0	26	11(42.3)	2(7.7)	9(34.6)	4(15.4)	0.52
≤ 3 cm	22	10(45.5)	3(13.6)	7(31.8)	2(9.1)	
> 3 cm	76	29(38.2)	16(21.1)	16(21.1)	15(19.7)	

Variable	Total n:150	Minimal, (n: 0) 0%	Mild, (n:17) 11.3%	Moderate (n: 45) 30%	Severe (n:88) 58.66%	P
Size of the largest endometrioma						
0	24	10(41.7)	1(4.2)	9(37.5)	4(16.7)	0.30
≤ 3 cm	36	16(44.4)	5(13.9)	7(19.4)	8(22.2)	
> 3 cm	64	24(37.5)	15(23.4)	16(25)	9(14.1)	
Douglas obliteration						
Absent	16	7(43.8)	2(12.5)	5(31.3)	2(12.5)	0.06
Partial	48	12(25)	10(20.8)	18(37.5)	8(16.7)	
complete	56	29(51.8)	8(14.3)	8(14.3)	11(19.6)	
Cumulative size of posterior DIE						
1 cm <	16	10(62.5)	3(18.8)	1(6.3)	2(12.5)	0.04
3 cm – 1	35	12(34.3)	4(11.4)	9(25.7)	10(28.6)	
> 3 cm	37	12(32.4)	9(24.3)	13(35.1)	3(8.1)	
Sub peritoneal extension						
Sub-peritoneal only	72	35(48.6)	8(11.1)	15(20.8)	14(19.4)	0.07
Rectal	42	13(31)	11(26.2)	13(31)	5(11.9)	
Vaginal	1	0	0	0	1(100)	
BothRectal and Vaginal	2	1(50)	0	1(50)	0	
CHRONIC PELVIC PAIN SEVERITY						
Cumulative size of DIE implants						
< 1 cm	23	15(65.2)	6(26.1)	1(4.3)	1(4.3)	0.07
1–3 cm	46	24(52.2)	6(13)	13(28.3)	3(6.5)	
> 3 cm	41	19(46.3)	14(34.1)	5(12.2)	3(7.3)	
Cumulative surface of superficial peritoneal implants						
0	142	74(52.1)	27(19)	30(21.1)	11(7.7)	0.26
< 3 cm	5	2(40)	3(60)	0	0	
> 3 cm	5	3(60)	1(20)	0	1(20)	

Variable	Total n:150	Minimal, (n: 0) 0%	Mild, (n:17) 11.3%	Moderate (n: 45) 30%	Severe (n:88) 58.66%	P
Endometrioma						
None	28	13(46.6)	4(14.3)	8(28.6)	3(10.7)	0.25
Unilateral	79	44(55.7)	15(19)	13(16.5)	7(8.9)	
Bilateral	50	22(44)	16(32)	10(20)	2(4)	
Cumulative size of endometriomas						
0	28	13(46.6)	4(14.3)	8(28.6)	3(10.7)	0.68
≤ 3 cm	26	15(57.7)	4(15.4)	5(19.2)	2(7.7)	
> 3 cm	100	51(51)	25(25)	17(17)	7(7)	
Size of the largest endometrioma						
0	26	13(50)	2(7.7)	8(30.8)	3(11.5)	0.38
≤ 3 cm	42	21(50)	10(23.8)	7(16.7)	4(9.5)	
> 3 cm	86	45(52.3)	21(24.4)	15(17.4)	5(5.8)	
Douglas obliterationc						
Absent	21	13(61.9)	2(9.5)	4(19)	2(9.5)	0.5
Partial	52	22(42.3)	15(28.8)	10(19.2)	5(9.6)	
complete	76	43(56.6)	14(18.4)	14(18.4)	5(6.6)	
Cumulative size of posterior DIE						
< 1 cm	23	15(65.2)	6(26.1)	1(4.3)	1(4.3)	0.03
3 cm – 1	45	24(53.3)	5(11.1)	13(28.9)	3(6.7)	
> 3 cm	40	18(45)	14(35)	5(12.5)	3(7.5)	
Sub peritoneal extension						
Sub-peritoneal only	91	49(53.3)	18(19.6)	17(18.5)	8(8.7)	0.93
Rectal	51	25(49)	12(23.5)	11(21.6)	3(5.9)	
Vaginal	1	1(100)	0	0	0	
BothRectal and Vaginal	2	1(50)	1(50)	0	0	

The cumulative size of posterior DIE less than 1 cm significantly correlated with minimal the severity of dyspareunia (p: 0.04) and chronic pelvic pain (p: 0.03). The incidence of dyspareunia was more in patients with complete stenosis of Douglas pouch comparing with cases with incomplete Douglas pouch stenosis. The incidence of severe and very severe pain in patients with Douglas pouch stenosis is relatively higher than patients without stenosis.

Using logistic regression analysis, it was shown that just dyspareunia is related to the stage of the disease so that patients with dyspareunia are 5 times more at risk of a higher stage of the disease.

Discussion

According to the high importance and prevalence of endometriosis, as well as the wide spectrum of symptoms, including life-threatening ones, we designed this study to investigate the relationship between three main symptoms of endometriosis with involved anatomic locations and disease stage. This study demonstrated that although the overall prevalence of dysmenorrhea was very high (approximately 98%), but no association between the severity of dysmenorrhea and stage of disease or anatomic location involvement was observed.

Similar studies in 2001 and 2015 also didn't observe any significant relationship between severity of symptoms and stage of disease with involved anatomic location [10, 11]. A study in 2002 found a relationship among severity of dysmenorrhea with rectovaginal involvement and adnexal adhesion that it was in contrast of our findings [7].

In our study, among the three main types of pain studied, the incidence of dyspareunia was more in patients with complete stenosis of Douglas pouch comparing with cases with incomplete Douglas pouch stenosis. The incidence of severe and very severe pain in patients with Douglas pouch stenosis is relatively higher than patients without stenosis.

In our study, it has been proven that the cumulative size of posterior DIE less than 1 cm is significantly correlated with minimal severity of dyspareunia and chronic pelvic pain. Using logistic regression analysis, it was shown that just dyspareunia is related to the stage of the disease so that patients with dyspareunia are 5 times more at risk of a higher stage of the disease. In 2007, Vercellini et al. conducted a study about the relationship between endometriosis stage and lesion type in more than 1000 patients, in which a strong association was found between Douglas pouch lesions and deep dyspareunia [12]. Porporal et al. reported a study about association between endometriosis stage and severity of the patient's chronic pelvic pain. These results were somewhat similar to the results of our study [13].

In contrast to our study, in 2015, a study evaluated the association between chronic pelvic pain and stage of endometriosis. They examined 144 women with chronic pelvic pain. Finally, they concluded that there is not any relationship between symptom severity and stage of endometriosis [11]. Also in 2001, a study was performed to understand relationship between stage, site and morphological characteristics of pelvic endometriosis with pain. They studied 469 women of childbearing age with a diagnosis of endometriosis

and history of pelvic pain for 6 months. They eventually concluded that there is no significant relationship between the severity of dysmenorrhea, dyspareunia and pelvic pain with endometriosis [11].

One of the problems and errors that were likely to occur in our study was an overestimation of pain intensity estimated by the patients who filled the questionnaire, for example, about 83% of patients with dysmenorrheal, partially respond to painkillers whereas about 56% of the patients had severe and very severe pain. While the NRS definition for “a very severe pain” was the pain which makes the person to refer to imaging centers. Subsequent possible errors could be due to the lack of definitive diagnosis of lower stages either minimal or mild who were excluded from the study because of a lack of definitive diagnosis and this caused more density of cases with moderate to severe pain in the study.

Conclusion

Finally, we conclude that the severity of dyspareunia is related to the stage of endometrioma and somewhat related to the severity of Douglas pouch stenosis. The present study shows the correlation between chronic pelvic pain and r-AFS score. Additional prospective studies are needed to validate our findings.

Limitations

It is better to perform the study with a larger sample size.

Abbreviations

DIE
Deep infiltrative endometriosis
USL
uterosacral ligament
ACOG
Obstetricians and Gynecologists
TVS
trans vaginal ultrasonography

Declarations

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Availability of data and materials

All required data are mentioned in the article. Any more data are available upon request from corresponding author.

Ethics approval and consent to participate

The study is approved by ethics committee of Iran University of Medical Sciences (IR.IUMS.FMD.REC.1397.021). Written consent was obtained from patients.

Consent for publication

Not applicable.

Competing interests

There are no conflicts of interest.

Authors contribution

EK: Study design and concept and writing; SRSM: performing the study and literature review; ZAM and AD: literature review, writing the manuscript and data collection; AK and SH: writing the article and data interpretation; SGN and GS: literature search and analysis of data. All author read the final article and approved the study.

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Figures

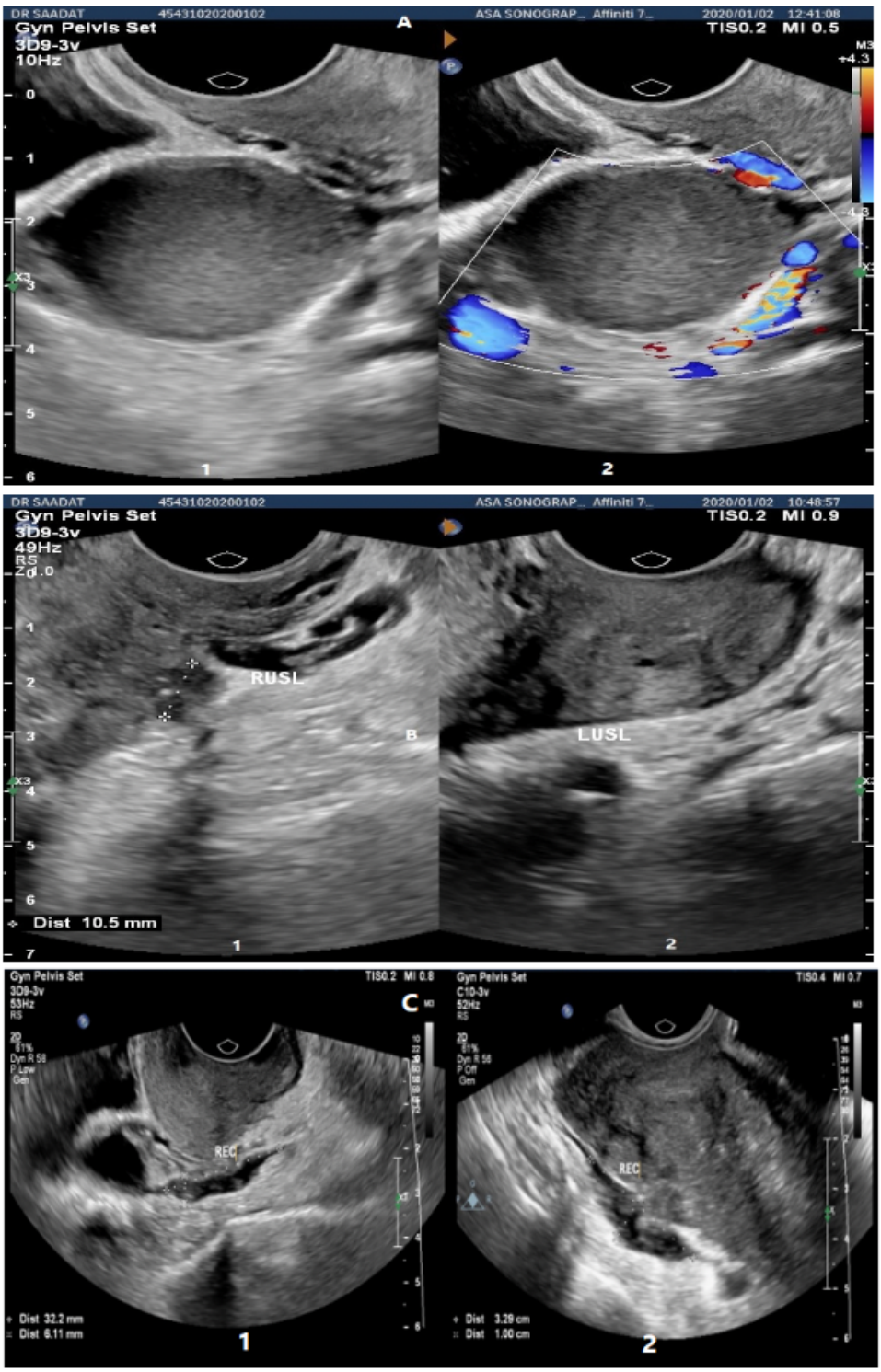

Figure 1

A) Typical ovarian endometrioma in a 31-year-old woman with long-standing chronic pelvic pain and dysmenorrhea (1, 2) gray-scale (1) and color Doppler (1) TVS images of right ovary demonstrate a unilocular cyst containing homogeneous low-level echoes and no internal vascularity at color Doppler US (classic appearance of an ovarian endometrioma) B) USL DIE in a 39-year-old woman with severe pelvic pain and dyspareunia for ten years with a history of stage IV endometriosis who was confirmed to have

extensive endometriosis at laparoscopy. (1) sagittal gray-scale TVS image shows irregular thickening of the right USL associated 10 mm endometriosis nodule in proximal. (2) Also, a moderate thickening of left USL has been shown. C) Bowel DIE in tow women. (1) Sagittal gray-scale TVS image in a 29-year-old woman with severe dysmenorrhea shows a hypoechoic nodule involving the serosal layer in the lower rectum. (2) Transverse gray-scale TVS images in a 46-year-old woman with chronic pelvic pain and cramping, show a hypoechoic nodule in the rectosigmoid junction with severe adhesion to the posterior of uterus fundus.

Supplementary Files

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