

# Accuracy of Transvaginal Ultrasonography for Diagnosis of Endometriosis Taking Laparoscopy as Gold Standard

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## ABSTRACT

**Background and Objective:** Endometriosis is a common gynaecological disease with a diverse clinical presentation. Laparoscopy has long been considered the gold standard diagnostic modality for endometriosis but with the evolution of non-invasive, high resolution transvaginal ultrasonography, it is frequently used as the first line diagnostic technique in making a preoperative diagnosis for endometriosis. This study was designed to determine the diagnostic accuracy of transvaginal ultrasonography (TVS) in diagnosis of endometriosis taking laparoscopy as gold standard.

**Methods:** A total of 118 women of child bearing age who presented with symptoms of pelvic endometriosis in the department of gynecology, Bakhtawar Amin Hospital Multan were included. The study duration was from June 01, 2018 to May 31, 2020. Patients were first investigated on TVS examination to diagnose endometriosis. Afterwards, diagnostic laparoscopy was performed in all patients to confirm the diagnosis of endometriosis. Accuracy of TVS was determined in terms of sensitivity, specificity, positive predictive value (PPV) and negative predictive value (NPV).

**Results:** Mean age of the patients was  $31.7 \pm 7.4$  years. Most common presenting complaint was dysmenorrhea in 89 (75.4%) patients followed by dyspareunia in 36 (30.5%), chronic pelvic pain in 30 (25.4%) patients and subfertility in 18 (15.3%) patients. On TVS, endometriosis was diagnosed in 69 (58.5%) patients. While on diagnostic laparoscopy, endometriosis was diagnosed in 75 (63.6%) patients. The sensitivity of TVS in diagnosis of endometriosis was calculated as 82.7%, specificity as 83.7%, PPV as 89.9% and NPV as 73.5%.

**Conclusion:** TVS appears to be the alternative and safe modality for diagnosis of endometriosis. It can be used as an alternative to diagnostic laparoscopy for the early diagnosis of endometriosis. It has a good sensitivity and specificity for diagnosis of endometriosis.

**KEYWORDS:** Endometriosis, Laparoscopy, Transvaginal ultrasonography, Child bearing age.

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## INTRODUCTION

Endometriosis is the presence of endometrial tissue outside the uterine cavity that can impair the quality of life of affected patients.<sup>1,2</sup> It is a common gynecological disease that affects millions of women every year worldwide.<sup>3</sup> The prevalence rate is upto 15% in women of in their child bearing age.

Endometriosis can be silent and remain undiagnosed for a significant period or may present with chronic pain in pelvic region or infertility. Common presenting symptoms of endometriosis are; pelvic pain, dyspareunia, and dysmenorrhea. In many patients it is diagnosed incidentally during routine clinical evaluation.<sup>4,5</sup>

Clinical diagnosis of endometriosis is a major dilemma because of non-specific symptoms in these patients, as it is very difficult to distinguish pelvic pain of endometriosis from other causes of pain such as pain caused by pelvic infections or non-gynecological diseases e.g. gastroenterology, urologic or musculoskeletal disease.<sup>6,7</sup> Laparoscopy is the first-line recommended investigation for diagnosis of endometriosis and its treatment.<sup>8</sup> But laparoscopy is an invasive test and requires general anesthesia and can cause minor complications in upto 3.0% patients and major complications such as perforations in up-to 0.5% patients.<sup>9</sup>

Transvaginal ultrasonography (TVS) is routinely done for detailed evaluation of gynecologic conditions as it provides more accurate evaluation as compared to transabdominal ultrasonography. Recent studies have reported that TVS can accurately diagnose the endometriosis.<sup>10</sup> Because TVS is a minimal invasive test that does not require any sedation and can be performed in outpatient settings.<sup>10</sup> So the aim of the present study was to determine the diagnostic accuracy of TVS in diagnosis of endometriosis taking laparoscopy as gold standard.

## METHODS

A total of 118 women of child bearing age who presented with symptoms of pelvic endometriosis in the department of gynecology, Bakhtawar Amin Hospital Multan were included after taking Ethical approval vide Letter No.22985E.C./BAM&DC. The study duration was from June 01, 2018 to May 31, 2020. The inclusion criteria was women of

childbearing age (15 – 45 years) with either pelvic pain of > 6 months duration either continuous or intermittent not specifically associated with menstrual cycle or with pelvic pain associated with periods and sexual intercourse +/- painful defecation, or women presenting with subfertility and symptoms suggestive of endometriosis. Pregnant women, women having any genital tract malformation or gynaecologic cancer were excluded.

The sample size was calculated by taking estimated frequency of endometriosis in suspected cases as 54.4%.<sup>10</sup> Expected sensitivity and specificity of TVS was 97.3% and 98.5% respectively and the desired precision level was 4.0% for sensitivity.<sup>10</sup>

Patients were first investigated on TVS examination to rule out endometriosis, the following features on TVS were suggestive of endometriosis; imbalanced ovaries e.g. left ovary higher than the right, ovarian and uterine adhesions, or fixation of ovaries to iliac vessels.

After TVS, on the next day, diagnostic laparoscopy was performed in all patients to confirm the diagnosis of endometriosis.

## STATISTICAL ANALYSIS

Data was entered and analyzed using Statistical Package for the Social Sciences (SPSS version 20.0). Contingency table of (2×2) was formulated to determine the sensitivity, specificity, positive and negative predictive values (PPV and NPV) of TVS taking laparoscopic as a gold standard.

## RESULTS

Mean age was of the patients was  $31.7 \pm 7.4$  years. Most common presenting complaint was dysmenorrhea in 89 (75.4%) patients followed by dyspareunia in 36 (30.5%) patients, chronic pain in 30 (25.4%), subfertility in 18 (15.3%) and dysuria in 04 (3.4%) patients (Table-1).

On TVS, endometriosis was diagnosed in 69 (58.5%) patients. While on diagnostic laparoscopy, endometriosis was diagnosed in 75 (63.6%) patients. The sensitivity of TVS in diagnosis of endometriosis was 82.7%, specificity 83.7%, PPV 89.9% and NPV 73.5% (Table-2).

**Table 1:** Baseline characteristics of enrolled patients (n = 118).

Symptom	Frequency
Dysmenorrhea	89 (75.4%)
Dyspareunia	36 (30.5%)
Chronic pelvic pain	30 (25.4 %)
Subfertility	23 (19.5%)
Dyschezia	18 (15.3%)
Dysuria	4 (3.4 %)

**Table 2:** Accuracy of TVS in diagnosis of endometriosis.

		Endometriosis on Laparoscopy		Total
		Yes	No	
Endometriosis on TVS	Yes	62	07	69
	No	13	36	49
Total		75	43	118

Sensitivity: 82.7%

Specificity: 83.7%

Positive Predictive value (PPV): 89.9%

Negative Predictive value (NPV): 73.5%

## DISCUSSION

Endometriosis is a common gynecological disorder of child bearing age. Early diagnosis is always challenging, if diagnosed non-invasively it can reduce the need for unnecessary diagnostic laparoscopies.<sup>11</sup> Studies have reported association of endometriosis with infertility, the association is weak in cases having mild endometriosis.<sup>12</sup> So early diagnosis of endometriosis in infertile couples can help to decide early treatment options in these patients and can bypass the need of differential diagnosis.<sup>13</sup> In the present study, 19.5% cases of endometriosis presented with infertility.

So accurate diagnosis is very important in patients having symptoms suggestive of endometriosis. Physical examination is of less importance and there is always a need to look for imaging modalities for confirmatory diagnosis.<sup>14</sup>

In present study, TVS was used for diagnosis of endometriosis and evaluated its accuracy against diagnostic laparoscopy. We found 82.7% sensitivity and 83.7% specificity of TVS against laparoscopy.

A study conducted by Said TH & Azam AZ<sup>15</sup> on accuracy of TVS in diagnosing endometriosis reported that TVS as 97.3% sensitive and 98.5% specific. The authors diagnosed endometriosis in 54.4% patients.<sup>15</sup> Another study by Menakaya et al.<sup>16</sup> reported that TVS is 72.2% to 86.8% sensitive and 96.9% to 98.3% specific for diagnosis of

endometriosis depending upon the location of the lesions.

Another study by Bazot et al.<sup>17</sup> containing 83 women having surgically proven endometriosis, the authors reported that TVS is 78.5% sensitive and 95.2% specific in the diagnosis of endometriosis. Moreover, a systematic review on accuracy of TVS reported that TVS has a sensitivity of 91.0% and specificity of 98%.<sup>18</sup>

Another systematic review compared the accuracy of MRI with TVS for diagnosis of rectosigmoid endometriosis and reported that both of these techniques are equally effective for diagnosing endometriosis.<sup>19</sup>

Although laparoscopy is the gold standard for the diagnosis of endometriosis, however, efficacy of laparoscopy is reduced in patients with mild or minimal disease. It is also difficult to diagnose lesions which are atypical in appearance.<sup>20</sup>

## CONCLUSION

TVS appears to be the alternative and safe modality for diagnosis of endometriosis. It can be used as an alternative to diagnostic laparoscopy for the early diagnosis of endometriosis.

## LIMITATIONS OF THE STUDY

This study may be supplemented with possible future larger scale studies in order to strengthen the conclusions drawn about study topic under discussion

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## CONFLICT OF INETEREST

None to declare.

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None to disclose.

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### Author's Contribution

**SN:** Conception of study, acquisition, analysis of data.

**ZA:** Conception of study, acquisition of data, drafting the article.

**AA:** Intellectual input, critical review of the manuscript.

**TF:** Acquisition and critical revision of data.

**RS:** Acquisition of data, Drafting of manuscript.

**ALL AUTHORS:** Approval of the final version of the manuscript to be published.