The ultrasound perspective of the diagnosis of deep endometriosis

https://doi.org/10.56238/sevened2024.007-011

Kelvin Augusto Leite Freitas, Izabela Silva Rezende, Cássia Lorena de Oliveira Leite e Freitas, Cynthia Roberta Torres de Barros and Raquel Meirelles Gaspar Coelho Guimarães

ABSTRACT

Endometriosis is one of the main conditions causing chronic pelvic pain and infertility in the female population worldwide[1], affecting and negatively impacting quality of life in several age groups. The process of diagnostic investigation of endometriosis is challenging, especially in the public health network since it is extremely costly[11]. Among the available methods, vaginal ultrasound with bowel preparation (USGTVPI) has statistically similar detection of deep endometriosis. Data were collected from 14 (fourteen) patients treated at the Gynecological Surgery outpatient clinic of the Regional Hospital of Taguatinga (HRT) in 2022 and 2023. When analyzing the results of the questionnaire, it is noted that deep endometriosis was diagnosed via USGTVPI in many patients with menstruation disorders and pain complaints. In this context, the USGTVPI emerges as a great possibility in the technological arsenal to aid in the perception of pelvic lesions, considering that it is an easily accessible and less expensive method than other available methods, such as laparoscopic laparotomy and contrast-enhanced pelvic MRI. At this juncture, there is a need to discuss the insertion of the method as an alternative diagnosis of the pathology, especially in the Unified Health System (SUS).

Keywords: Ultrasonography with bowel preparation, Ultrasound with bowel preparation, Magnetic resonance imaging of the pelvis, Endometriosis, Deep endometriosis.

INTRODUCTION

Endometriosis is one of the main conditions causing chronic pelvic pain and infertility in the female population worldwide[1], affecting and negatively impacting the quality of life in several age groups [2] [1]. Currently, endometriosis is a disease that is the result of several discussions in the scientific community due to its great occurrence and relevance in its impact on women's health. There is evidence that about 10 to 20%[3] of women of childbearing age are affected by this condition [4] [5], which corresponds to at least 190 million women in the world in 2017 estimate[1]. Despite the great impact on the population of menacme, affecting about 30-50% of women with infertility, it has been proven that about 2-5% of postmenopausal women are also affected by the disease[2].

The disease is characterized when there is the presence of endometrial stromal/glandular tissue outside the uterine cavity, with chances of infiltration to other organs, such as the peritoneum, intestine, bladder, vagina, ureter, ovary, among others, running in parallel with an inflammatory process of varying intensity, depending on the number of lesions and degree of infiltration[6].

Among the clinical manifestations, endometriosis, as well as other pelvic inflammatory pathologies, has great exuberance. Symptoms such as pelvic pain, infertility, dysmenorrhea, abnormal uterine bleeding, dyspaurenia, dysuria, and menstrual dyschezia are not uncommon, with dysmenorrhea, dyspaurenia, and infertility, in descending order, being the most prevalent symptoms among patients[4].

Immune, hormonal and genetic factors are involved in the development of endometrial lesions. Several theories attempt to explain the origin of the disease, including the retrograde menstruation theory (or transplant theory), where it is believed that endometrial cell migration can occur by lymphatic, vascular, iatrogenic transport, or even by the retrograde flow of menstrual bleeding[7]. Another theory proposed to try to justify its histogenesis is the coelomic theory, which suggests that endometriosis lesions can be generated from a metaplastic differentiation induced by activation of an oncogenic allele gene, with transformation of coelomic epithelium into endometrial epithelium[8]. There are several current references that defend the multifactorial etiopathogenic character of the disease, which reaffirms the pathology as a relevant topic for further discussions[3].

There are several classifications for endometriosis: AFS 1979, ASRM 1985 and 1996, AAGL 2021 – in the latter, it is possible to subdivide the disease, based on the various clinical presentations, into three subtypes, for better didactic understanding: superficial peritoneal lesions (SUP), ovarian endometriomas (AOM) and deep infiltrative endometriosis[9]. In this context, the concept of deep endometriosis is highlighted in this study, as the presence of endometrial cells beyond 5 mm below the peritoneal surface[6].

Despite its mostly benign nature, due to its proliferative and infiltrative potential, endometriosis can also be related to some types of neoplasms, especially endometrioid and clear cell carcinoma of ovarian etiology [10].

The process of diagnostic investigation of endometriosis is challenging, especially in the public health network, since it is extremely costly[11], in addition to depending on the initial care that generates suspicion for the pathology, as well as on professionals with specific technical capacity to identify the lesion. It is estimated that the average length of hospital stay after initial care is 2.4 days[12]. In Brazil, between 2009 and 2013, it was estimated that the cost of the disease reaches 10.4 million reais per year[13] and 45 million reais between 2015-2019, which delays diagnosis and early treatment initiation. One of the main difficulties in the follow-up of patients is due to the high costs. About 72% of patients with infertility due to endometriosis have thought about giving up the desire to get pregnant due to the financial factor[14].

The gold standard method for diagnostic confirmation is laparoscopy-guided histopathological evaluation[10], however, it is an invasive and more expensive method. The lack of low-cost palpable methods especially affects the follow-up performed in services that do not have a multidisciplinary team for surgical approach to the lesions. Added to this fact is the lack of useful biomarkers with good accuracy in diagnosing the disease. The most widely used is the CA125, which reaches a sensitivity between 70-75%, values that are still insufficient to standardize the method in the diagnostic routine[12], which suggests the importance of developing reliable minimally invasive methods in an attempt to speed up the diagnosis of these patients.

Radiological methods are a great opportunity to expedite the discovery and staging of the degree of involvement of disease lesions[12], especially in the context of limited financial resources. Among the available methods, pelvic magnetic resonance imaging (MRI) is the method of choice[15]. Vaginal ultrasound with bowel preparation (USGTVPI) has statistically similar detection of deep endometriosis[15], despite MRI be preferred in differentiation, in the detection of typical nodules in the retrocervical region and uterosacral ligament[16] and the Ulterior is similar to that of pelvic MRI in detecting lesions in rectosigmoid, uterosacral ligaments, and rectovaginal septum[17].

This study is a subdivision of a study that is still under development, which deals with an analysis of radiological methods, USGTVPI and MRI of the pelvis, in the detection of lesions compatible with endometriosis in the detection and follow-up of endometriosis patients at the Regional Hospital of Taguatinga (HRT). Due to the difficulty in performing pelvic MRI in the public health system and the fact that patients were in adequate conditions for UGTVPI, the present study addresses the ultrasonographic perspectives in the diagnosis of deep endometriosis, highlighting the challenges encountered in the inclusion of this method in the public health system.

RESULTS

Data were collected from 14 (fourteen) patients treated at the Gynecological Surgery outpatient clinic of the Regional Hospital of Taguatinga (HRT) in 2022 and 2023.

After data collection, 1 patient was excluded according to the exclusion criteria.

We selected 13 patients who met the inclusion criteria presented: female patients over 18 years of age, presenting clinical suspicion and gynecological examination suggestive of deep endometriosis, who agreed to participate in the study and undergo transvaginal ultrasonography with bowel preparation.

The patients were submitted to a questionnaire with 10 questions, addressing the presence or absence of a previous diagnosis of endometriosis, time to diagnosis of endometriosis after the onset of symptoms (in case of previous positive response), pain during/after sexual intercourse, sleep changes, pain when urinating, pain when having a bowel movement, pain during menstrual period, pelvic pain outside the menstrual period, Trying to conceive for more than 1 year, heavy or prolonged menstruation for more than 1 year.

All patients included in the questionnaire were completed and the data were compiled in Table 1.

Table 1:

Symptoms	Proportion of selected patients	Proportion of symptomatic patients diagnosed by USGTVPI
Pain during/after sexual intercourse	61% (N =8)	50% (N = 4)
Insomnia or sleep disturbance	53% (N = 7)	42% (N = 3)
Pain when urinating	7% (N = 1)	0% (N = 0)
Pain when having a bowel movement	38% (N = 5)	60% (N = 3)
Pain during menstrual period	84% (N = 11)	27% (N = 3)
Pelvic pain outside of the menstrual period	92% (N = 12)	25% (N = 3)
Trying to conceive > 1 year	7% (N = 1)	0% (N = 0)
Heavy or prolonged menstruation > 7 days	69% (N = 9)	33% (N = 3)

When analyzing the main complaint among the selected patients, pelvic pain during and outside the menstrual period and intense or prolonged menstruation for more than 7 days stand out, respectively, with 84%, 92% and 69% of the affected patients. Among them, 25%, 27%, and 33%, respectively, were diagnosed with deep endometriosis by means of USGTVPI.

Among the patients included, the highest percentage rate of diagnosis of deep endometriosis via ultrasound was in patients who reported feeling pain when having a bowel movement and pain during/after sexual intercourse, with 60% and 50% of the patients with these complaints diagnosed by the method. The complaint of sleep alteration was mentioned in 53% of the patients included, and of these, 43% were diagnosed with deep endometriosis. Attempt to conceive for more than 1 year and

pain when urinating were reported by only 1 patient each, who did not have a diagnosis of deep endometriosis confirmed by ultrasound.

Of the patients already diagnosed prior to the study, the symptoms most frequently mentioned were infertility, insomnia, pain during bowel movements, and pain during/after sexual intercourse. The data are schematized in Table 2:

Table 2:

Symptoms	They had already been diagnosed
Pain during/after sexual intercourse	62% (N=5)
Insomnia or sleep disturbance	71% (N=5)
Pain when having a bowel movement	60% (N = 3)
Pain during menstrual period	54% (N = 6)
Pelvic pain outside of the menstrual period	41% (N = 5)
Trying to conceive > 1 year	100% (N = 1)
Heavy or prolonged menstruation > 7 days	55% (N = 5)

A total of five (5) patients received an ultrasound diagnosis, presenting lions in intestinal loops or ovary.

DISCUSSION

Analyzing the current context, endometriosis is still a pathology unknown to society in general. Added to this is the difficulty of access to diagnosis and the trivialization of gynecological symptoms by the population and health professionals, who tend to cite pain during the menstrual period as natural. This hinders the reliable collection of information about the pathology, culminating in a process of late diagnosis, even with a portion of patients developing symptoms from a young age18. The difficulties in confirming the diagnosis increase financial costs for patients19.

When analyzing the results of the questionnaire, it is noted that deep endometriosis was diagnosed via USGTVPI in a large number of patients with menstruation disorders and pain complaints. Only 46% of the selected patients had already received a radiological diagnosis prior to ultrasonography for screening for deep endometriosis, showing that early diagnosis is still one of the major challenges of this pathology. In this context, the USGTVPI emerges as a great possibility in the technological arsenal to aid in the perception of pelvic lesions, considering that it is an easily accessible and less expensive method than other available methods, such as laparoscopic laparotomy and MRI of the pelvis with contrast, in addition to being a viable method in those patients with contraindication to the use of contrast. At this juncture, there is a need to discuss the insertion of the method as an alternative diagnosis of the pathology, especially in the Unified Health System (SUS).

In 2016, the IDEA (International Deep Endometriosis Analysis) protocol was proposed, with the objective of promoting a standardization and systematization of the ultrasound examination in the clinical suspicion of endometriosis, so that the main sites affected by the lesion would not fail to be examined and documented. The orientation promulgated by the IDEA was to segment the examination into 4 stages: 1- evaluation of the uterus and appendages in the usual way, also evaluating mobility with adjacent organs; 2- Evaluation of soft markers: analysis of regions with changes in structure and consistency, as well as ovarian mobility; 3- Douglas bottom assessment with real-time slip assessment; 4- Evaluation of anterior and posterior compartments (including urinary tract and intestinal loops).

The ultrasound examination can be complemented with a physical examination, or even with a pressure applied to the transducer, in order to look for pain points, adhesions or decreased mobility. Both the transvaginal and transrectal approaches are capable of identifying lesions compatible with endometriosis, especially in the intestinal region, with precision in the evaluation of their characteristics and location. Despite this, in general, the transvaginal route is more accepted by patients. The USGTVPI allows the evaluation of direct signs – nodules and thickening, as well as indirect signs – decreased pelvic organ mobility and pain during the examination. The report of pain during the examinations is common and should be taken into account for the evaluation of the related structures.

When observing lesions, they should be identified, citing size, ideally in 3 dimensions, location, distance from the external anal sphincter, and whether they are intestinal. The USGTVPI can provide important information for better surgical programming, when appropriate.

Sonographic findings can be varied, and are often related to additional involvement in adjacent organs. Depending on the site of involvement, the same lesion may be evidenced with different sonographic characteristics.

When analyzing the adnexal region, the presence of endometriomas - cystic lesions, usually homogeneously hypoechoic, with little vascularization on Doppler study, with the appearance called "ground-glass" pattern - can lead to changes in fertility and chronic pelvic pain, as well as adhesions and deep nodules. When both ovaries are observed touching the posterior region of the uterus, a sign called kissing ovaries, it is estimated that more than 90% of patients have involvement in the fallopian tubes and approximately 20% have additional intestinal lesions[20].

The evaluation of uterosacral ligaments is challenging, since they are usually difficult to visualize structures. Nevertheless, when affected by endometriosis lesions, they become thickened, and, especially when accompanied by a small amount of free fluid in the cavity, they can be examined by the USGTVPI.

Correctly describing the lesions is extremely important, as it can alter the surgical schedule. In this context, the differentiation of lesions above or below the reflection of the peritoneum (located about 7 cm from the anal border) is highlighted, since lesions affecting the vaginal fornix and rectovaginal septum are not easily visualized by videolaparoscopy.

The posterior compartment is evaluated with a scan of the intestinal loops, from the rectovaginal septum to the sigmoid. The IDEA proposes a division of the posterior compartment into high and low rectus (divided by the peritoneal reflection of the Douglas sac fundus), rectosigmoid transition (from the torus to the uterine fundus) and sigmoid transition (above the uterine fundus). Lesions located in the lower rectum are not commonly visualized laparoscopy[21].

Endometriosis-related intestinal lesions are often more common in the anterior wall, and may be isolated, multifocal, or multicentric lesions. Depending on the degree of involvement, the best surgical schedule can be established, including techniques such as shaving, or even bowel resection.

The anterior compartment of the pelvis assessed by the USGTVPI includes the bladder, ureters, and vesicouterine space. A useful tool in the examination of the vesicouterine space is the evaluation of the sliding between the structures, where the restriction of mobility between the organs may suggest adhesion processes, typical in patients with previous cesarean section, or deep endometriosis. Transvaginal evaluation can be complemented with abdominal ultrasound, which is especially useful in the evaluation of the ureter. Dilation and non-visualization of peristalsis may suggest intrinsic or extrinsic obstruction. Information on the distance from the lesion to the vesicoureteral junction should be informed, and may be useful in the choice of techniques for surgical approach to the organ, such as ureteral reimplantation or reanastomosis.

The pleura and diaphragm should not be routinely screened unless there are compatible complaints that raise suspicion of involvement of the organs in question.

During the study of the results of the questionnaire, it was noted that deep endometriosis was diagnosed via USGTVPI in a large number of patients with menstruation disorders and pain complaints. Only 46% of the selected patients had already received a radiological diagnosis prior to ultrasonography for screening for deep endometriosis, showing that early diagnosis is still one of the major challenges of this pathology. Among the patients with a previous diagnosis, infertility, insomnia, pain during bowel movements and pain during/after sexual intercourse were the main symptoms mentioned that motivated the patients to seek medical help. Such symptoms are often related to changes in physical capacity, self-esteem, and changes in study, work, and household activities22, significantly interfering with women's quality of life.

In view of the difficulty in establishing a confirmatory diagnosis and the difficulty of some professionals in being prepared for clinical and radiological diagnosis, professional experience is a key factor in identifying and managing endometriosis. As much as the USGTVPI can be an

accessible and promising method, the presence of an experienced physician is essential to identify the deepest and most difficult to visualize sites of involvement, contributing to an increase in the cost-disease.

According to the Hospital Information System of the Department of Informatics of the Unified Health System (SIH/DATASUS), between 2015 and 2019, hospital costs involving endometriosis reached almost 45 (forty-five) million reais, and an average value of R$ 746.24 per hospitalization, which lasts an average of 2.4 days12.

It is hoped that, in the context of the Unified Health System, the attempt to implement the USGTVPI in endometriosis propaedeutics can shorten the time for diagnosis, which in Brazil is in the order of 4 and a half years from the onset of symptoms23, optimizing the management of cases and reducing the costs related to medications, hospitalization, surgical procedures, exams and additional consultations to diagnose the pathology. in addition to directly affecting the quality of life of this population.

CONCLUSION

Although endometriosis is a predominantly benign disease, it has a great impact on society, since it directly interferes with the quality of life of the female population, especially in menacme, in addition to burdening the Unified Health System. The multifactoriness, the lack of complete clarification of the etiopathogenesis, as well as the difficulty in establishing an early definitive diagnosis make it necessary to search for accessible methods with good accuracy, such as the USGTVPI, even though it should be taken into account that it is a method that requires well-performed bowel preparation and the presence of an experienced professional for a correct performance of the test. There is also the possibility of diagnostic complementation, associating radiological, surgical and clinical methods. It is valid to attempt to implement the USGTVPI in the SUS and to encourage better technical training in the examination, as well as the dissemination of information about the disease among professionals and the general population. New studies should be promoted in order to consider the use of the USGTVPI, even in comparison with other diagnostic methods already available, in order to create new possibilities for prevention, diagnosis and treatment of this significant portion of the population.

REFERENCES

1. Zondervan, K. T., et al. (Year). Title of the article. *New England Journal of Medicine,* Volume(Issue), Page range.

2. Silva, C. D. D. S. (Year). Title of the article. *CIEH: VII Congresso Internacional de Envelhecimento Humano,* Volume(Issue).

3. Duarte, et al. (Year). Title of the article. *Acta Elit Salutis- AES,* Volume(Issue).

4. Pontes CFR, Chamié LP, Aguiar M, Silva EJC, Leite DFB, de Carvalho Silva SAL, Figueiredo JL. (Year). Title of the article. *Journal of Human Growth and Development,* Volume(Issue), Page range.

5. Fernandez, C. F. R. P. (Year). Title of the dissertation. *Universidade Federal de Pernambuco.*

6. FEBRASGO. (Year). Title of the article. Retrieved from URL

7. Cacciatori, F. A., & Medeiros, J. P. F. (Year). Title of the article. *Revista Iniciação Científica,* Volume(Issue), Page range.

8. Kimball, K. J., et al. (Year). Title of the article. *Journal Name,* Volume(Issue), Page range. Retrieved from URL

9. Caraça, D. B., et al. (Year). Title of the article. *Diagn Tratamento,* Volume(Issue), Page range.

10. Moretto, E. E., et al. (Year). Title of the article. *Promoção e Proteção da Saúde da Mulher - ATM 2023/2.* [Edition]. [Location]: Departamento de Ginecologia e Obstetrícia – UFRGS.

11. Yao, A. P. M. S. (Year). Title of the article. *Promoção e Proteção da Saúde da Mulher ATM 2024/1: Endometriose e câncer de ovário: uma revisão.* [Edition]. [Location]: Departamento de Ginecologia e Obstetrícia - UFRGS.

12. Galo Marques Salomé, D., Barbosa Pires Braga, A. C., Moreira Lara, T., & Aparecido Caetano, O. (Year). Title of the article. *Revista De Saúde,* Volume(Issue), Page range. DOI: https://doi.org/10.21727/rs.v11i1.2427

13. Silva et al. (Year). Title of the article. *Femina,* Volume(Issue), Page range.

14. FEBRASGO: Manual de Endometriose 2014/2015. (Year). Podgaec, S. (Ed.). *São Paulo: Federação Brasileira das Associações de Ginecologia e Obstetrícia.*

15. Siqueira, A. C. V., Abich, A., & Oppenheimer, D. (Year). Title of the article. *Title of the journal: Subtitle of the journal.*

16. Pontes, I. F., & Claudino, E. L. (Year). Pelvic pain and indirect findings of endometriosis on pelvic ultrasound: A statistical correlation. *Research, Society and Development,* Volume(Issue), Page range. DOI: 10.33448/rsd-v10i8.17709. Retrieved from URL

17. Carmo, C. O. D. (Year). Title of the article. *Title of the journal: Subtitle of the journal.* Monograph.

18. Guerriero, S., et al. (Year). Title of the article. *Ultrasound in Obstetrics & Gynecology: ISUOG,* Volume(Issue). Systematic Review.

19. Roomaney, R., & Kagee, A. (Year). Salient aspects of quality of life among women diagnosed with endometriosis: a qualitative study. *Journal of Health Psychology,* Volume(Issue), Page range. DOI: http://dx.doi.org/10.1177/1359105316643069

20. Silva, C. M., et al. (Year). Experiências das mulheres quanto às suas trajetórias até o diagnóstico de endometriose. *Esc Anna Nery,* Volume(Issue), Page range. Retrieved from URL

21. Craig, E. V., Shannon, L. M., & Andreotti, R. F. (Year). The complementary role of ultrasound and magnetic resonance imaging in the evaluation of endometriosis: a review. *Ultrasound Quarterly,* Volume(Issue), Page range. DOI: 10.1097/RUQ.0000000000000458

22. Guerriero, S., et al. (Year). Systematic approach to sonographic evaluation of the pelvis in women with suspected endometriosis, including terms, definitions and measurements: a consensus opinion from the International Deep Endometriosis Analysis (IDEA) group. *Ultrasound in Obstetrics & Gynecology,* Volume(Issue), Page range. DOI: 10.1002/uog.15955

23. Martins, L. M., França, A. P., & Kimura, M. (Year). Quality of life of persons with chronic illness. *Revista Latinoamericana de Enfermagem,* Volume(Issue), Page range.

24. Minson, F. P., et al. (Year). Importância da avaliação da qualidade de vida em pacientes com endometriose. *Revista Brasileira de Ginecologia e Obstetrícia,* Volume(Issue), Page range. Retrieved from URL