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Role of Ultrasonography in Assessment of Uterine Leiomyomas With Figo Staging

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Abstract
The most frequent benign tumors in premenopausal women are uterine fibroids, which can cause significant morbidity if left untreated. The aim of this study was to assess the type and stage of uterine fibroid in women undergoing transabdominal ultrasound scans. A total of hundred women were evaluated between January-October 2023, using a trans-abdominal approach. The range of the patients' ages was 25-50 years and majority of cases were between 30-40. The majority, 54% of the fibroids were intramural next being subserosal. Most common FIGO staging was 4. The growth and incidence of these frequent tumors are thought to be caused by a number of variables, but their exact cause is yet unknown. They may be detected incidentally when performing ultrasonography for other reasons and are usually easily recognizable. The most prevalent type of uterine fibroid is an intramural fibroid. They develop within the uterus's musculature. Knowledge of the various appearances of fibroids enables an accurate diagnosis and proper treatment.

INTRODUCTION

Uterine leiomyomas are a common gynecological problem that affects women of reproductive age. These benign tumors develop within the smooth muscle of the uterus and vary in size, location number. Uterine leiomyomas can cause a range of symptoms, including abnormal uterine bleeding, pelvic pain infertility, depending on their location and size. Staging and assessment of uterine leiomyomas are critical to determine the most appropriate treatment options whether to do hysterectomy or polypectomy. Ultrasonography is one of the most common imaging techniques used for the diagnosis and assessment of uterine leiomyomas. There are two types of ultrasonography: transabdominal ultrasonography and transvaginal ultrasonography. Transabdominal ultrasonography is a non-invasive imaging technique that involves placing a transducer on the patient's abdomen it is commonly used in the initial diagnosis of uterine leiomyomas.

Conversely, transvaginal ultrasonography is a more invasive imaging technique that involves placing the transducer through the vagina, allowing doctors to obtain images from close range. Transvaginal ultrasonography provides a more accurate assessment of the size and location of fibroids and is typically used for routine follow-up investigations. Furthermore, color Doppler ultrasonography can provide information about the blood supply of the tumors, which can assist in the assessment of tumor growth and potential treatment options. The technique can also differentiate between uterine leiomyomas and other uterine masses and help in identifying the size, location number of tumors. There are several advantages of ultrasonography over other imaging techniques in the assessment of uterine leiomyomas. Ultrasonography is cost-effective, non-invasive has no harmful effects on the patient, unlike other imaging methods that may involve radiation exposure. For these reasons, ultrasonography remains the primary imaging modality for screening and surveillance of uterine leiomyomas.

Fibroids can be seen on ultrasound in a variety of echo patterns, including hypo-iso-hyper-mixed echo patterns. Currently, current staging systems only evaluate fibroids based on their location, not on their size or quantity. Uterine fibroids can be classified as pedunculated, submucosal, intramural, or subserosal according to the FIGO classification system.

Aims and Objectives:

- To assess the most common age group of women with uterine leiomyoma
- To assess the ultrasonographic findings and FIGO staging of uterine leiomyoma which further helps in the treatment options.

MATERIALS AND METHODS

A trans abdominal pelvic ultrasound scan was utilized to assess the uterine fibroid features in 100 women using a prospective study design. The study was conducted at the Radiology Department of the Sree Mookambika Institute of medical sciences, Kulasekharam. The investigation was carried out in the period between January-October 2023. Patients were women over the age of 25 and under the age of 60. Additionally, each participant's consent was sought.

All patients were positioned supine on the examination couch in order to collect data. After exposure, ultrasound gel was added to the suprapubic area systematic scanning started by moving the transducer over it. During the study period, all pelvic ultrasound images produced at the centers were analyzed and reviewed. This was used to compile and analyze the data that had been obtained.

Calculated descriptive statistics were used. The age of respondents and their fibroid features were evaluated using chi-square. Tables, bar charts, pie charts charts were also used to summarize the data. A $p<0.05$ was considered significant for all two-tailed tests.
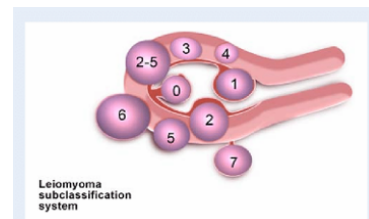
RESULTS AND DISCUSSIONS

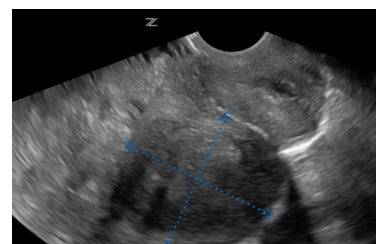Fig 1: Figo staging of uterine fibroids

Fig 2: A subserosal fibroid (yellow arrow) Subserosal fibroids grow off the surface of the uterus and can extend to impinge on surrounding pelvic structures

Fig 3: A transverse transabdominal scan of a intramural leiomyoma (arrows). U-uterus, UB-urinary bladder

Table 1:

	<40	40 and above	Total	
	N	N	N (%)	
Fibroid classification				
Intramural	24	30	54 (54%)	52 (57.8)
Subserosal	14	15	29(29%)	6 (6.7)
Pendunculated	0	2	2 (2%)	4 (4.4)
Mixed	6	8	14(14%)	24 (26.7)
Submucosal	1	0	0 (0)	4 (4.4)
Total	48	56	100	90 (100.0)

One hundred (100) patients were evaluated by this study. The age range of patients were 25-50 years. The age distributions of participants are shown in Fig.

The sonographic patterns of uterine fibroids in terms of classification represented in the following table, showing that intramural fibroids were predominant (54%) among the sampled population.

Uterine leiomyomas are common benign tumours that typically arise from the smooth muscle of the uterus. Ultrasonography is commonly used as a diagnostic imaging technique for the detection and assessment of uterine leiomyomas. The purpose of this research paper is to review the literature and discuss the importance of ultrasonography in the staging (FIGO) and assessment of uterine leiomyomas.

According to the current study, women under the age of 40 had the highest prevalence of fibroid cases. This implies that sonographic identification of uterine fibroid in women in their late 30s and 40s is relatively prevalent that these fibroid typically diminish following menopause. Hormonal alterations may be responsible for this discovery. An extensive family history may be connected to developing fibroids much earlier in life. Infertility and childbearing issues may arise in the younger age range as a result of this.

One of the previous studies reviewed for this research paper is by which compares the accuracy of ultrasonography and computed tomography (CT) in the diagnosis of uterine diseases. The study concluded that ultrasound is more accurate than CT in detecting uterine leiomyomas. This finding supports the use of ultrasonography as the primary imaging tool for the staging and assessment of uterine leiomyomas due to its higher accuracy and cost-effectiveness compared to CT.

Another relevant study is by Guo[1], which investigated whether intratumoral blood flow can predict the tumor growth rate of uterine leiomyomas. The study used ultrasonography to assess the vascularity of uterine leiomyomas and concluded that higher blood flow could predict a faster tumor growth rate. This finding emphasizes the importance of incorporating ultrasonography in the assessment of uterine leiomyomas to evaluate the tumor's potential to progress and inform treatment decisions.

Furthermore, Yassaee[2] conducted a study to evaluate the efficacy of transvaginal sonography in diagnosing uterine abnormalities in women with abnormal uterine bleeding. The study concluded that transvaginal sonography is a reliable and accurate imaging technique for the diagnosis of uterine abnormalities. These findings support the use of transvaginal ultrasonography, which provides more detailed images of the uterus and can be used to assess the size, location number of uterine leiomyomas accurately.

The most prevalent type is known to be intra-mural fibroids, which are totally contained within the uterine wall. The current investigation consistently came to this conclusion. The least common type of uterine fibroids, sub-mucosal fibroids are found beneath the mucosa or endometrial lining of the uterus, which is indirectly next to the uterine cavity. They are frequently noted clinic all as being the main culprit for irregular bleeding and poor reproductive outcomes because of their proximity to the endometrium. The second-highest frequency was seen in sub-serosal fibroids. Due to their location at the uterus' exterior layer, where the serosa lies, they have a tendency to alter the uterus' outer form. 2% of all fibroid instances were of the pedunculated variety, it was reported.

Several studies have evaluated the use of contrast-enhanced ultrasonography (CEUS) in the diagnosis and assessment of uterine leiomyomas. CEUS uses a contrast agent injected into the bloodstream, which enhances the visibility of blood vessels and improves image texture in ultrasonography. A study by Moriya[3] compared the use of ultrasound and CEUS in diagnosing uterine leiomyomas and concluded that CEUS could improve the detection rate and accuracy of diagnosis of uterine leiomyomas. Another study by Jeba[4] investigated the use of CEUS in assessing the efficacy of uterine artery embolisation (UAE) in the treatment of uterine leiomyomas. The study concluded that CEUS could be used to monitor the reduction of blood flow to the leiomyomas after UAE, indicating effective treatment.

Additionally, the use of three-dimensional ultrasound (3D-US) has been investigated for the assessment of uterine leiomyomas. A study by Kim[5] evaluated the utility of 3D-US in measuring the volume of uterine leiomyomas and concluded that 3D-US is a useful tool for estimating the size and shape of leiomyomas. The authors noted that 3D-US could provide more accurate measurements of leiomyomas

compared to traditional 2D-US.

One of the potential limitations of ultrasonography in the staging and assessment of uterine leiomyomas is the inability to differentiate between submucosal and intramural leiomyomas accurately. However, the use of sonohysterography, a type of ultrasonography that involves the injection of saline solution into the uterus to enhance the visibility of the uterine cavity, can improve the detection of submucosal leiomyomas (Exacoustos[6]).

CONCLUSION

Ultrasonography is an effective imaging technique for the diagnosis, staging assessment of uterine leiomyomas. The technique provides detailed information regarding the size, location number of tumors, as well as their blood supply and potential complications. The use of ultrasonography can aid in the identification of appropriate treatment options, minimizing the risks and side effects to the patient.

The study participants ultrasound examinations revealed a variety of sonographic patterns, but the majority of the fibroids were intramural. The majority of the fibroids were found in more than one place in the uterus. As a result, they are a medical ailment that needs to be treated.

Adequate understanding of the fibroids sonographic patterns among doctors and radiologists is necessary to increase the accuracy of diagnosis and to establish the kind of quality control procedures that will help deliver high-quality therapy.

REFERENCES

1. Benson, R.C., J.G. Kereiakes and R. Weinstein,et al 1980. Ultrasonography in diagnosis and management of leiomyomas of the uterus. Obs Gyne., 1: 81-85.
2. Guo, J., X. Huang and Q. Wang, et al 2019. Sonographic features of uterine fibroids: can intratumoral blood flow predict tumor growth rate? J. Ultras. Med., 3: 705-712.
3. Takano, Y., Y. Yamamoto and H. Mizunuma,at al 2017. Diagnosis and management of uterine leiomyoma: standardization of terminology, imaging and treatment. J. ObstetGyn. Res., 5: 886-894.
4. Yassaee, F., S. Abdi and M. Mirshamsi, 2014. Efficacy of transvaginal sonography in diagnosis of uterine abnormalities in women with abnormal uterine bleeding. J. Res. Heal. Sci., 2: 107-112.
5. Jeba, J., Ho SY and J.M. Monaghan, 2019. Contrast-enhanced ultrasound to monitor the efficacy of uterine artery embolisation for leiomyoma. Cardio.Inter. Radi., 4: 573-579.
6. Kim, M.J., S.S. Shim and J.S. Lee,at al 2008. The clinical utility of three-dimensional ultrasound for evaluation of uterine leiomyoma volume. Acta. Radi., 5: 556-561.
7. Abegunde, D., I.A. Kabo, W. Sambisa, T. Akomolafe and N. Orobaton,at al 2014. Availability, utilization, and quality of emergency obstetric care services in bauchi state, Nigeria. Int. J. Gynecol. & Obstet., 128: 251-255.
8. Hoke, T.P., H. Goldstein, E.K. Saks and B. Vakili, 2018. Surgical outcomes of paravaginal repair after robotic sacrocolpopexy. J. Minimally Invasive Gynecol., 25: 892-895.