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ULTRASONOGRAPHICAL AND HISTOPATHOLOGICAL DIAGNOSIS OF FEMALE PELVIC MASSES AND ITS CLINICAL IMPORTANCE IN A TEACHING HOSPITALS

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Abstract: Background and Objectives: he objective of this current study was to assess the ultrasonographic characteristics of pelvic masses and establish correlations with histopathological diagnoses in patients who underwent surgical intervention.
Materials and Methods: A crosssectional prospective study was conducted in the Department of Obstetrics and Gynaecology, and Radiology The study cohort comprised 113 female patients who presented with symptoms indicative of pelvic masses. The final diagnoses were subsequently correlated with histopathological findings, with the cytohistopathology diagnosis considered definitive. Results: A total of 113 female patients underwent ultrasonography (USG) scans, in concurrence with a clinical history and examination of pelvic masses. The predominant age group was 40-50 years. The most frequently reported chief complaint among the female patients in our study was pelvic pain followed by a combination of pain and palpable mass. Menstrual irregularities, menorrhagia, post-menopausal bleeding, infertility, and amenorrhea were among the less common complaints presented by female patients in our study.
Conclusion: Ultrasonography emerges as the foremost imaging modality for evaluating gynaecological masses. Proper differentiation between gynaecological and non-gynaecological masses on sonographic assessment is vital for precise patient management.

Keywords: Ultrasonography, Radiology, Pelvic Pain, Infertility, Amenorrhea,menorrhagia.

INTRODUCTION

Pelvic mass lesions constitute a frequent occurrence in gynecological practice, affecting women across all age groups. These masses can originate either from gynecological or non-gynecological sources and may possess benign or malignant characteristics. Accurate diagnosis and differentiation of these masses are crucial for clinicians before embarking on surgical interventions, such as laparotomy or laparoscopy (1,2). A comprehensive assessment of mass features, particularly with regard to malignancy potential, is essential.

The evaluation of adnexal masses involves a comprehensive approach encompassing medical history, clinical examination, and various imaging modalities, such as USG, computed tomography scan, magnetic resonance imaging, and tumor markers (1). Among these, ultrasonography serves as

the standard diagnostic tool for pelvic mass evaluation, effectively distinguishing between uterine and adnexal origins and offering insights into malignancy indications (3). Notably, the widespread use of ultrasound during pregnancy has led to the incidental discovery of adnexal masses, with most regressing spontaneously, while only a few are malignant (1). Experienced ultrasound examiners can effectively differentiate between benign and malignant adnexal masses, providing specific histological diagnoses like endometrioma, dermoid cyst, or hydrosalpinx (4,5).

Transvaginal sonography (TVS) supplemented by color Doppler imaging yields superior outcomes for assessing ovarian morphology and vascularity (6). Pelvic ultrasonography has become a common practice for visualizing the adnexa and uterus among symptomatic and asymptomatic women in both reproductive and menopausal age groups. While highly sensitive in detecting adnexal masses, the specificity of pelvic ultrasound in detecting malignancy remains relatively lower. Additionally, distinguishing between functional and nonfunctional ovarian masses holds significant implications for patient counseling and management (7,8). Proper identification of various adnexal cysts, such as endometriomas, mature cystic teratomas, and paraovarian cysts, is crucial as they can impact fertility, associate with significant pelvic disease, or pose risks of ovarian torsion (7,8).

Hence, the accurate utilization of pelvic ultrasonography has evolved into an integral aspect of gynecological evaluation and examination (7,8). With the prevalence of space-occupying lesions in the female pelvis spanning a wide age range, a precise diagnosis based solely on clinical examination remains challenging. Trans-abdominal and transvaginal ultrasonography play pivotal roles in identifying the origin of masses, distinguishing between uterus, ovarian, adnexal, or extra-genital structures, and revealing internal anatomy and physiology not readily discernible during laparoscopy or laparotomy (9, 10).

The present study's primary objective involved evaluating the sonographic characteristics of pelvic masses and establishing correlations with histopathological diagnoses in patients who underwent surgical intervention.

MATERIAL & METHODS

In this cross-sectional prospective study conducted in the Department of Radiology 113 female patients presenting with clinical suspicion of pelvic mass or chronic pelvic pain were included. Written consent was obtained from all participants. Post-operative patients and non-gynecological female pelvic masses were excluded from the study.

The pelvic sonography methods employed in this research comprised transabdominal real-time scanning and transvaginal real-time scanning. Transabdominal scanning utilized a 3 MHz transducer at a depth of 10-15 cm through the urinary bladder to visualize the uterus and ovaries. In contrast, transvaginal sonography visualized the same structures at depths of 1-8 cm using 5-7 MHz transducers. In each case, transabdominal sonography was performed, and in some cases, the findings were correlated with transvaginal sonography. Comprehensive sonographic evaluations were conducted for the uterus, endometrium, both adnexa, ovaries, bladder, anterior pelvic structures, pelvic walls, cul de sac, rectum, small bowel, and posterior pelvic structures.

Sonographic findings for each lesion were assessed based on echogenicity, shape, borders, size, composition, calcifications, septation, locularity, laterality, presence of invasion of the capsule, and fixation of the mass. Echogenicity categories included markedly hypoechoic, isoechoic, hyperechoic, and anechoic. The size of the lesion was determined by its maximal dimensions. Composition was categorized as solid, cystic, or mixed. Borders were classified as smooth or irregular. Calcifications were categorized based on their location within the nodule (central or peripheral) or their absence. The presence of posterior shadowing was required to consider the finding as present. Furthermore, the presence or absence of ascites or other metastatic lesions was recorded in each case.

Detailed clinical histories were collected, and general and local pelvic examinations were performed for all patients with palpable pelvic masses on bimanual pelvic examination. Histopathological evaluation was conducted for all identified lesions.

RESULTS

The majority of the patients in the study fell within the age group of 40-50 years, with a mean age of 34.9 years. Conversely, the lowest number of patients was observed in the age groups below 20 and above 60 years (Table 1).

Table 1: Clinico-demographic details of patients

Age group (in years)	N	%
< 20	2	1.77
21-30	9	7.96
31-40	29	25.66
41-50	61	53.98
51-60	10	8.85
≥ 60	2	1.77
Patients		
Premenopausal	79	69.91
Postmenopausal	34	30.09
Symptoms		
Pelvic cavity pain	40	35.40
Pain + palpable mass	19	16.81
Menorrhagia and menstrual irregularities	16	14.16
Pain + vaginal bleeding	11	9.73
Infertility	11	9.73
Postmenopausal bleeding	9	7.96

The most frequently reported chief complaint among the female patients in our study was pelvic pain followed by a combination of pain and palpable mass. Menstrual irregularities, menorrhagia, post-menopausal bleeding, infertility, and amenorrhea were among the less common complaints presented by female patients in our study. Among the 113 patients evaluated by USG, majority exhibited uterine masses followed by ovarian pathologies (Table 2).

Table 2: Clinico-demographic details of patients

Types of cases	N	%
Uterine mass	49	43.36
Ovarian/adnexal mass	32	28.32
Fallopian tube pathology	24	21.24
Vaginal pathology	8	7.08
Total	113	100.00

In our study, we observed that the most prevalent gynaecological masses in females were related to the uterus, followed by the ovaries/adnexa, fallopian tubes, and vagina. Among uterine masses, fibroids were the most frequently encountered. Among the ovarian lesions, the majority were benign cystic lesions. Within this category, tubo-ovarian masses were the most common, followed by follicular cysts, serous cystadenomas, and mucinous cystadenomas, respectively. Malignant ovarian masses were detected in 11.50% (13/113) of patients, with serous cystadenocarcinoma being the most frequently observed. Mucinous cystadenocarcinoma and endometrial sinus tumor were each found in 2.65% of cases [Table 3].

Table 3: Distribution of pelvic masses with histopathological diagnosis

Type of Lesion	Diagnosis by USG	Diagnosis by Histopathology
Uterine Fibroid	44	44
Uterine Fibroid + pregnancy	2	2
Uterine Adenomyosis	2	2
Uterine Adenocarcinoma	3	2
Carcinoma of cervix	2	2
Benign Ovarian lesions		
Tubo-ovarian mass	16	15
Follicular cyst	12	11
Luteal cyst	5	5
Serous cystadenoma	5	5
Mucinous cystadenoma	5	5
Benign cystic teratoma	3	5
Hydrosalpinx	0	1
Ovarian cyst + torsion	0	1
Malignant Ovarian lesions		
Serous cystadenocarcinoma	8	7
Mucinous cystadenocarcinoma	3	3
Endometrial sinus tumor	3	3

DISCUSSION

The assessment of pelvic masses is of paramount importance due to the concerns and anxiety associated with the potential risk of missing malignancies. This study aimed to explore the clinicopathological spectrum of gynecological pelvic masses, encompassing both uterine and adnexal lesions. A major challenge in the diagnostic evaluation of incidental findings on ultrasound lies in accurately characterizing the malignant potential of these lesions. Ovarian cancer, being a heterogeneous disease, comprises various tumor types derived from different cell lines, exhibiting diverse behaviors and clinical-pathological characteristics (11). Several scoring systems have been proposed, based on ultrasound morphology of adnexal cysts, to distinguish benign lesions from malignant adnexal masses (12,13).

In our study, we observed characteristics consistent with adenomyosis, though these cases exhibited only uterine enlargement with normal endometrial and myometrial echotexture, without any definitive mass (14). The common sonographic findings of adenomyosis in our study included globular uterine enlargement, cystic anechoic spaces within the myometrium, uterine wall thickening, heterogeneous echotexture, and thickening of the transition zone (15). Adenomyomas typically demonstrate an indistinct margin from the adjacent myometrium, unlike leiomyomas or fibroids, which exhibit a well-defined margin (16). According to Bezjian et al., leiomyomas are one of the most commonly encountered pelvic masses during pregnancy (17).

Lesions exhibiting echogenic solid areas, irregular walls, thick septations, mural nodules, papillary excrescences, bilaterality, and ascites, along with evidence of neoangiogenesis on color Doppler, suggest a possible malignancy (18).

All ovarian cystadenomas in our study were found to be anechoic with well-defined walls. A study by Fleischer et al. also reported the presence of septation in all 18 cases of serous cystadenomas. Additionally, mucinous cystadenomas may contain low-level echoes due to their mucin content, which was consistent with our observations. Walsh, Taylor et al. also reported occasional weak internal echoes in cases of mucinous cystadenomas. Therefore, a cystic ovarian mass with septation and internal echoes is more likely to be a mucinous cystadenoma.

Among the cases of ovarian malignancy reported on USG, all cases were confirmed to be malignant on histopathological examination (HPE) in our study. Malignant ovarian tumors typically presented as cystic masses with ill-defined walls and solid components, accompanied by ascites. Irregular and solid components in a cystic mass were suggested to indicate gross malignant changes. The accuracy of diagnosing malignant ovarian masses and tubo-ovarian masses in our study was 100% and 74.23%, respectively. The lower specificity of ultrasound is attributed to the overlap in the

sonographic characteristics of benign pelvic masses, such as endometriomas, pedunculated leiomyomas, borderline tumors, and ovarian malignancies. Serial monitoring was found to be helpful in such cases, demonstrating the resolution of the lesion on subsequent sonographic examinations.

Our findings were consistent with the studies conducted by Lawson et al. (19), Fleischer et al. (20), and Walsh et al. (21), which reported accuracies of 91%, 91%, and 94%, respectively. In our study, fibroids were the most common uterine masses, accounting for approximately 42% of cases. Uterine fibroids are one of the most important and common causes of female gynecological pelvic masses. Ultrasonography, both transabdominal and transvaginal, has a well-established role in the initial evaluation of a pelvic mass, being easily available, relatively inexpensive, and non-ionizing. Leiomyomas are easily diagnosed on USG, as demonstrated in the study by Shobha S. Pillai, with a sensitivity of 95.5% and specificity of 61.4%. Another study by Eze JC et al. (22) showed a sensitivity of 94.5% and specificity of 62.5% for TVS in diagnosing uterine leiomyomas. The accuracy of ultrasonography in diagnosing uterine and cervical malignancies was 100% in our study.

CONCLUSION

USG is a highly accessible, non-invasive, and cost-effective imaging modality for evaluating gynaecological pathologies. Its real-time imaging, lack of radiation hazards, and good patient tolerance make it the first-line choice. Serial monitoring of functional lesions aids in management, avoiding unnecessary surgeries. For suspicious adnexal masses, pelvic transvaginal US is preferred, and seeking a second opinion from an experienced sonographer in oncology imaging is advised for any uncertainties.

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