

Comparison of Transvaginal and Transabdominal Ultrasound in the Diagnosis of Adnexal Masses

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ABSTRACT

Objective: Our research aims to compare the diagnostic efficacy of transvaginal and transabdominal ultrasonography for detecting adnexal masses.

Study Design: A Comparative study

Place and Duration: Conducted at Central Park Medical College, Lahore, during from the period August 2021 to January 2022.

Methods: This study included 84 women. Once written consent has been obtained, we involve consideration such as aging, gender, menstrual abnormalities (Oligomenorrhea / Menstrual periods), infertility, recurrent multiple miscarriages, series of acts, acne vulgaris, and obesity. The ultrasound data included the location, size, borders, hypoechoic and dilatation of ovary lesions. Group M had 42 patients and underwent for transvaginal ultrasound, whereas group N had transabdominal ultrasound with MRI. Using histological results (positive/negative), frequency of adnexal mass among all cases were compared. SPSS 20.0 analyzed all data.

Results: In group M mean parity was 3.5 ± 2.13 and in group N parity was 2.9 ± 4.13 . Most common complaint among all cases was infertility and irregular cycle. We found that frequency of adnexal mass in group M was lower than that of group N. It was determined that the specificity, positive predictive value, and negative predictive value of transvaginal sonography were all lower than those of transabdominal sonography.

Conclusion: In this study, we came to the conclusion that abdominal ultrasonography combined with MRI was superior in terms of its usefulness and efficacy in identifying adnexal masses with genuine levels of both specificity and sensitivity.

Keywords: Accuracy, Transvaginal ultrasonography, Transabdominal ultrasonography, Adnexal Masses, Complications,

INTRODUCTION

Ultrasound is the primary and most popular imaging method for pelvic diseases[1]. At the moment, the most common forms of pelvic sonography are transvaginal sonography (TVS) and transabdominal ultrasound imaging (TAS). For TAS, a full urinary acts as an acoustic window, allowing a 3–5 MHz transducer to see the ovaries and uterus at a depth of 10–15 cm. For TVS, the same transducer is utilised to visualise the very same tissues at a depth of 1–8 cm. Without a doubt, TVS delivers an accurate representation of the pelvic region[2]. The TVS has been helpful in investigating a wide range of pelvic diseases, including polycystic ovary syndrome, polyp size and texture, infertility (follicular monitoring and endometrium investigations), endometriosis, and the staging of gynaecological cancers. TAS can be used to distinguish between normal and malignant growths, which is useful in many situations [3-6]. In the case of big masses or fluid collections, evaluation of soft indicators (such as the degree of ovarian movement, discomfort, or obliterated pouches of Moore) may be more specific and sensitive than TAS. [7] Patients who are overweight, those whose uterus is retroverted, and those who have complications such a gas-filled bowel or broad pelvic adhesions all benefit more from TVS.

Due to a lack of trained professionals and their unavailability in certain areas, many ultrasound-based prediction algorithms have been created to reliably distinguish between malignant tumors [8]. Serum cancer antigen (CA) -125 levels, postmenopausal state, and ultrasound results all factor into the Result of Malignancy Score (RMI), a prediction model endorsed by several national recommendations. However, the RMI's diagnostic performance is subpar, and the processes employed to generate it are time-consuming [9]. Other diagnostic models, such as the Logistic Regression model 2 [11], the Simple Rules (SRs) model, and the Evaluation of Separate NEoplasias in the adneXa (ADNEX) model, were developed and validated after the International Ovarian Tumor Assessment (IOTA) group's 2000 presentation of a consensus statement on the ultrasound character traits of adnexal tumours [10]. Previous objective evaluation studies have demonstrated that the Requirement specification model has a high diagnostic performance and is simple to

implement, but that it is not appropriate with all adnexal masses.[8-10]

Ultrasound is being used to confirm or rule out ectopic pregnancies. An algorithm based on abdomen sonographic research results is suggested by authors, which would seem useful for the clinical assessment of suspected ectopic pregnancies[4]. Ultrasound is a low-cost, widely-available, simple, rapid, and noninvasive diagnostic mechanism of action for the rapid detection, presence, and location of pregnancy. Obesity, an underfilled bladder, and gas in the pelvis may all obscure structures and throw off the precision of an abdominal ultrasonogram [13-15]

The purpose of the current investigation was to compare the accuracy of transvaginal and transabdominal ultrasonography in the identification of pelvic masses.

MATERIAL AND METHODS

This cross-sectional comparative study was conducted at Central Park Medical College, Lahore, during from the period August 2021 to January 2022 and comprised of 84 females. After getting informed written consent detailed demographics of enrolled cases were recorded. Adnexal mass surgery patients, those with a verified biopsy report, those with a history of sensitivity with contrast agents, those with a contraindication to difference enhanced magnetic resonance, and those with any chronic disease were excluded.

The ages of the women were 20-50 years. Ovarian lesions were graded according to their position, size, borders, echogenicity, soft tissue component, septations, and nodularity. In group M, 42 patients had transvaginal ultrasound, whereas in group N, 42 patients underwent transabdominal ultrasonography and MRI was used in both groups. Ovarian masses with papillary projection and solid components including extensive septations (more than 3 mm), loculations, free fluid, and metastatic deposit accumulations were categorised as malignant lesions based on their echo patterns and characteristics. If the calcification was contained inside a mass that was at least 3mm in thickness, or if there was fat present, it was classified as noncancerous. When determining whether an anomaly was malignant, we looked for

characteristics indicative of cancer, such as high signal intensity on T1 images and low signal intensity on T2 images, papillary projection, solid component septations greater than 3mm, and free fluid. A consulting radiologist reviewed and analysed all of the data (with at least 5 years post-fellowship experience). After undergoing surgery in the appropriate surgical ward, all patients had a specimen taken for histology, and a consultant pathologist reviewed the results.

The frequency and percentage distribution of qualitative characteristics were analysed. Sensitivity, specificity, predictive value, negative prediction value and diagnostic performance of malignant and benign adnexal masses were evaluated between transvaginal ultrasonography and transabdominal sonography. The whole data set was analyzed using SPSS version 22.0.

RESULTS

We found that 40 (47.6%) cases had age 20-30 years, 28 (33.3%) patients were aged between 31-40 years and 16 (19.4%) had age >40 years.(figure 1)

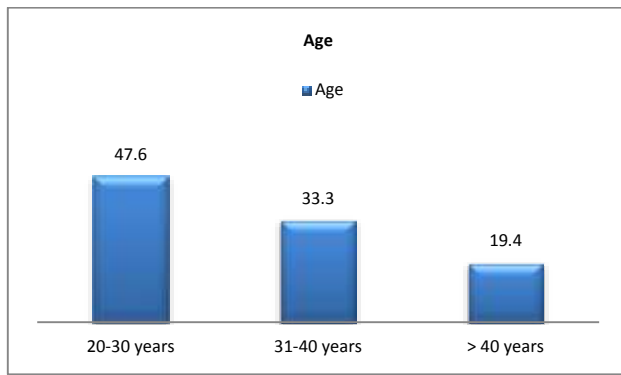


Figure-1: Age of the included females

Mean BMI in group M was 25.3±13.64 kg/m² while in group N mean BMI was BMI 25.4±12.50 kg/m². In group M mean parity was 3.5±2.13 and in group N parity was 2.9±4.13. Most common complaint among all cases was infertility and irregular cycle.(table 1)

Table 1: Included cases with baseline details

Variables	Group M (42)	Group N (42)
Mean BMI (kg/m ²)	25.3±13.64	25.4±12.50
Mean Parity	23.5±2.13	2.9±4.13
Complaints		
Infertility	22 (50%)	20 (45.5%)
Irregular cycles	13 (30.9%)	12 (28.6%)
Amenorrhea	4 (9.5%)	9 (21.4%)
Recurrent pregnancy loss	3 (7.1%)	4 (9.5%)

We found that frequency of adnexal mass in group M was lower found in 23 (54.8%) cases than that of group N in 27 (64.3%) patients.(Figure 1)

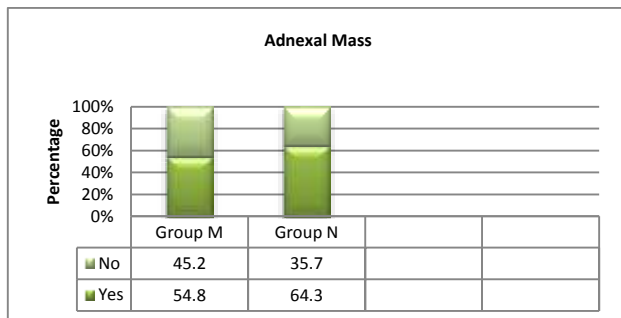


Figure-2: Comparison of frequency of adnexal mass

As per histopathological results, true positive in group M was 21 and false negative was 7 while in group N 27 cases were true positive 5 were false positive and the remaining cases among both groups were true/false negative. (table 2)

Table 2: Results of histopathological findings among both groups

Histopathological	Group M	Group N
Positive		
True	21	27
False	7	5
Negative		
True	4	3
False	10	7

It was determined that the specificity, positive predictive value, and negative predictive value of transvaginal sonography were all lower than those of transabdominal sonography.(table 3)

Table 3: Evaluating accuracy with relation to specificity and intensity

Variables	Group M	Group N
specificity	80%	90%
positive predictive value	89.3%	93%
negative predictive value	81%	95.1%
Accuracy	82.7%	88.7%
intensity	85.6%	95.9%

DISCUSSION

When assessing the female pelvis, transabdominal sonography has always been considered a top option. The need to go through the abdomen and subcuta- of like tissues, however, degrades the clarity of the final picture. As a novel method of pelvic imaging, transvaginal sonography [16] is able to circumvent several of the drawbacks of the more commonplace transabdominal scanning. An incomplete abortion, ectopic pregnancy, or early embryo may all be diagnosed with precision with a transvaginal transducer [17]. The infertile patient's workup and the tracking of follicular growth may benefit greatly from its usage. Recently, transvaginal sonography has been used in foetal cephalocentesis for acute hydrocephalus and transvaginal cyst aspirations. [18]

In current study 84 females were presented. We found that 40 (47.6%) cases had age 20-30 years, 28 (33.3%) patients were aged between 31-40 years and 16 (19.4%) had age >40 years. Results were comparable to the previous studies.[19] Most common complaint among all cases was infertility and irregular cycle. Our results were consistent with those of other research showing that infertility and cycle irregularity were the most often reported symptoms. Some of the patient's symptoms include an absent or irregular menstrual cycle, abnormal vaginal bleeding, pimples, hirsutism, and obesity. Recurrent miscarriages, infertility, type Type 2 diabetes, hypertensive, and endometrial cancer are all much more likely to occur in this population.[20] Transabdominal sonograms were superior than transvaginal sonograms in delineating the inner structure of the mass in 64.3% of women in our study. Particularly useful was the transabdominal method in distinguishing solid from cystic tumours (including simple and complex cysts). In six women, ovarian cysts were identified thanks to a transvaginal sonogram alone. Transvaginal sonography confirmed the diagnostic of a simple cyst in 10 individuals when transabdominal scans had just indicated it. Surgical removal of a pelvic mass may be unnecessary if further testing reveals that the tumour is, in fact, a cyst. Transvaginal sonography has the potential to be of great therapeutic use in this context.

As per histopathological results, true positive in group M was 21 and false negative was 7 while in group N 27 cases were true positive 5 were false positive and the remaining cases among both groups were true/false negative. It was determined that the specificity, positive predictive value, and negative predictive value of transvaginal sonography were all lower than those of transabdominal sonography Marret H claims that the specificity of acoustic and molecular features is 80% and 93%, respectively. [21] When it comes to identifying adnexal malignant tumours, trans-

abdominal ultrasonography has a sensitive of 100%, specific of 97%, and a positive predictive value (PPV) = 1.5%. A study found that magnetic resonance imaging (MRI) was 95% sensitive and 94% specific for identifying adnexal masses, indicating that MRI is an effective diagnostic tool for this purpose (benign versus malignant). [22] Among 91 normal and 96 aggressive adnexal masses, Gadolinium-enhanced MRI was found in 94% of cases, with an accuracy rate of 93% in a separate study. [23] Yogini KD et al. conducted a study on the use of laparoscopic adnexal mass ectomy in 96 adolescents. Laparoscopic surgery and ultrasound, both shown to be golden standards in pre examinations to evaluate whether an item is benign in origin, may be used to treat adolescent adnexal masses successfully and safely. [24]

Transvaginal ultrasonography has been shown to have a 96% sensitivity, 88% specificity, and 95% positive predictive value in earlier research [25] by Hopp H. et al. Transvaginal ultrasonography was shown to have a 100% sensitivity rate, a 98.2% specificity rate, a 98% positive predictive value rate, and a 100% negative predictive value rate in a research by Timor-Tritsch[26]. Transvaginal transducer probes with a higher operating frequency are increasingly being used.

It has been shown that preoperative abdominal Doppler ultrasonography is the noninvasive technique of choice with a high clinical diagnosis for differentiating malignant from benign ovarian tumours, sparing surgeons time and money by preventing needless procedures.

CONCLUSION

In this study, we came to the conclusion that abdominal ultrasonography combined with MRI was superior in terms of its usefulness and efficacy in identifying adnexal masses with genuine levels of both specificity and sensitivity.

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