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Original article

Imaging Modalities in Assessment of Gynecological Causes of Acute Pelvic Pain at Shifa Medical Complex: A Cross-sectional Study

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Abstract

Background: Acute pelvic pain in women often necessitates prompt and accurate diagnosis to initiate appropriate treatment. Imaging modalities such as ultrasound, MRI, and CT scans play crucial roles in identifying underlying gynecological causes. ***Methods:*** This cross-sectional study was conducted at Shifa Medical Complex, Gaza, Palestine, involving 181 female patients aged 18 years and above presenting with acute pelvic pain. Data collection included demographic details, clinical symptoms, and imaging findings from ultrasound, MRI, and CT scans. Statistical analyses, including chi-square tests and diagnostic performance metrics, assessed the associations and diagnostic accuracy of imaging modalities. ***Results:*** Most participants were young adults (mean age 26.99 ± 5.81 years) predominantly without significant medical conditions (93.3%). Ultrasound revealed normal findings in 34.8% of cases, followed by uterine fibroids (23.2%) and ovarian cysts (17.1%). MRI identified uterine fibroids (31.7%) and endometriosis (26.7%) as predominant, while CT scans highlighted adnexal masses (30.0%) and ectopic pregnancies (22.5%). Significant associations ($p < 0.05$) were found between imaging diagnoses and clinical symptoms such as dyspareunia and dysmenorrhea. Diagnostic accuracy metrics showed ultrasound with sensitivity of 86.4%, specificity of 78.2%, and positive predictive value (PPV) of 81.6%; MRI with sensitivity of 92.5%, specificity of 85.3%, and PPV of 88.7%; and CT scan with sensitivity of 78.9%, specificity of 71.4%, and PPV of 74.6%. ***Conclusion:*** Imaging modalities, particularly MRI, demonstrated high sensitivity and specificity in diagnosing gynecological causes of acute pelvic pain. These findings underscore the importance of utilizing appropriate imaging techniques for accurate and timely management of patients presenting with acute pelvic pain.

Keywords: ***acute pelvic pain, ultrasound, MRI, CT scan, diagnostic accuracy.***

Introduction

Patients of any age may have pelvic discomfort, although it is considered acute if it persists for three months or less. It is critical to get immediate medical attention for acute pelvic pain (APP). Many other gynecologic and non-gynecologic conditions might be considered as possible differential diagnoses for APP [1,2]. Accurately diagnosing APP is difficult because to the close anatomical and physiological linkages of the pelvic systems, the comparable clinical presentation of several illnesses, and the overlapping of symptoms, particularly in an emergency setting [3,4].

A combination of diagnostic imaging, clinical and laboratory results, and anamnesis allows for a more rapid and accurate diagnosis of APP, instilling more trust in the patient's care [5,6]. Due to its relatively high sensitivity and specificity for the diagnosis of pelvic disease, transvaginal and transabdominal ultrasonography are the primary imaging modalities used in emergency settings for the initial examination of patients presenting with APP [7]. Because it does not use ionizing radiation, it is a cheap and readily accessible diagnostic tool [3,4]. Regardless, further diagnostic imaging is necessary for many critical patients.

Whenever ultrasonography results are ambiguous or if disease is suspected in the urinary or gastrointestinal systems, CT is a potent diagnostic technique that is often used in patients with APP [8]. The American College of Radiology has determined that contrast-enhanced CT scans are the best imaging option due to their quick acquisition time, broad availability, and excellent diagnostic performance [5]. More than half of all patients given a CT scan in the emergency department had their referring diagnosis modified, and this had a major impact on treatment planning [6]. When possible, MRI is preferred over other imaging modalities for pregnant and young patients because of the safety concerns associated with ionizing radiation. Depending on the suspected condition, MRI procedures may be customized to be shorter [9,10].

It is possible to classify uterine crises as either obstetric or gynecologic in nature. There may be vaginal bleeding or persistent lower abdomen discomfort, either of which may cause an acute or chronic appearance. The most prevalent symptom seen by one-third of patients after acute pelvic discomfort is abnormal uterine bleeding (AUB) [1]. Despite its transvaginal nature, the US has the major limitation of not being able to show the zonal architecture and characterize tissues, which prevents it from examining the uterus's internal features. When it comes to describing uterine diseases in patients who come to the emergency room with severe pelvic pain and vaginal bleeding, MRI is better than ultrasonography and CT. For several reasons, including its capacity for multi-planar imaging,

characterization, high sensitivity, and absence of ionizing radiation, magnetic resonance imaging (MR) is a rapidly developing modality [1,2]. According to [3], MRI has a sensitivity of 96.6% when it comes to detecting acute uterine diseases. In order for a radiologist to make a diagnosis, they need to be familiar with the symptoms and imaging features of certain urgent uterine disorders. Learn more about how to identify and classify acute uterine crises with the help of this visual MR imaging review. This research aimed to evaluate the effectiveness and utility of different imaging modalities in the assessment of gynecological causes of acute pelvic pain.

Methods and Materials

Study Design

The study employed a cross-sectional design to assess the efficacy of various imaging modalities in diagnosing gynecological causes of acute pelvic pain among female patients at Shifa Medical Complex. The cross-sectional approach allowed for a snapshot evaluation of imaging findings and their correlation with clinical presentations without longitudinal follow-up. This design was suitable for investigating prevalence and patterns of gynecological conditions associated with acute pelvic pain within a defined timeframe.

Study Setting

Shifa Medical Complex, a prominent tertiary care hospital including gynecological services, served as the study setting. Located in Gaza, Palestine, the hospital's well-equipped imaging department facilitated comprehensive diagnostic assessments through ultrasound, MRI, and CT scans. This setting ensured access to diverse patient populations presenting with acute pelvic pain, contributing to the study's robustness in evaluating imaging modalities.

Population

The study population comprised female patients aged 18 years and above who presented with acute pelvic pain at Shifa Medical Complex. This included patients from various demographic backgrounds seeking medical attention for gynecological concerns. By focusing on this specific group, the study aimed to elucidate the diagnostic utility of imaging modalities in identifying underlying gynecological pathologies causing acute pelvic pain.

Sample Size and Sampling Technique

The sample size was determined based on the prevalence of gynecological causes of acute pelvic pain within the hospital's patient population and resource availability. Convenient sampling was employed, where eligible participants were selected based on their availability and willingness to participate in the study. This approach ensured feasibility in data collection while providing sufficient statistical power to draw meaningful conclusions regarding imaging efficacy.

Eligibility Criteria

Inclusion criteria encompassed female patients presenting with acute pelvic pain, regardless of underlying medical conditions, who consented to participate in the study. Exclusion criteria included pregnant patients, individuals with contraindications to imaging procedures, and those unable to provide informed consent due to cognitive or communication barriers. These criteria upheld ethical standards and focused on obtaining reliable data from consenting participants.

Data Collection

Data collection involved a comprehensive review of medical records and imaging reports of eligible participants. Demographic information, medical history, and clinical symptoms were gathered through structured interviews and medical record reviews. Imaging findings from ultrasound, MRI, and CT scans were documented, focusing on specific gynecological conditions associated with acute pelvic pain. This methodical approach ensured a thorough assessment of imaging modalities in diagnosing and characterizing relevant pathologies.

Instruments

The primary instruments used in this study were ultrasound, MRI, and CT scans, which are standard imaging modalities employed for diagnosing gynecological conditions. These instruments provided detailed anatomical and pathological insights necessary for accurate diagnosis and treatment planning. Imaging protocols adhered to established guidelines and were performed by trained radiologists and technicians to ensure consistency and reliability in data interpretation.

Validity

Validity of the study findings was ensured through rigorous adherence to established imaging protocols and diagnostic criteria for gynecological conditions causing acute pelvic pain. Content validity was upheld by using validated imaging techniques and diagnostic criteria recognized in clinical practice. Criterion validity was assessed by comparing imaging results with clinical outcomes and follow-up assessments to validate the accuracy and reliability of imaging modalities in clinical settings.

Reliability

Inter-rater reliability among radiologists and technicians was maintained through standardized training sessions and periodic calibration exercises. This approach minimized variability in imaging interpretations and enhanced the consistency of diagnostic assessments across different observers. Intra-rater reliability was ensured by conducting regular quality assurance checks and revising imaging protocols as needed to maintain high standards of reliability and accuracy in imaging assessments.

Scientific Rigor

Scientific rigor was upheld through meticulous study design, standardized data collection methods, and adherence to ethical guidelines. By employing a cross-sectional design and rigorous data analysis techniques, the study aimed to provide robust evidence on the diagnostic efficacy of imaging modalities in identifying gynecological causes of acute pelvic pain. Peer review and institutional oversight further enhanced the study's credibility and reliability of findings.

Statistical Analysis

Data analysis involved both descriptive and analytical statistics. Descriptive statistics were used to summarize demographic characteristics, clinical symptoms, and imaging findings among study participants. Analytical statistics, including chi-square tests, ANOVA, or regression analyses, were employed to examine associations between imaging results and specific gynecological conditions causing acute pelvic pain. Statistical significance was determined based on predefined thresholds, enhancing the interpretability and applicability of study outcomes.

Ethical Consideration

Ethical considerations included obtaining informed consent from all participants prior to data collection, ensuring confidentiality of patient information, and obtaining ethical approval from the institutional review board (IRB) or ethics committee. Patient autonomy and privacy were prioritized throughout the study process, and ethical guidelines were strictly adhered to in accordance with international standards and institutional policies.

Results

The study included 181 women with a mean age of 26.99 + 5.81 years with median age of 26 years. Age ranged from 17 to 52 years. Most of women included in this study were free of medical

conditions except for 20 participants (6.7%). About two thirds of study participants had university degree (n= 119, 65.7%). Most of study participants had good monthly income (n= 151, 83.4%). In addition, most of study participants are housewives (n= 161, 89%). Table 1 summarizes demographic characteristics of study participants.

Table 1: Demographic characteristics of study participants

Variable		Frequency	Percent
Age group	<20 years	7	3.9
	20-29 years	121	66.8
	30-39 years	47	26
	>=40 years	6	3.3
Education	Illiterate	21	11.6
	School	41	22.7
	University	119	65.7
Income	Low	20	11.1
	Good	151	83.4
	High	10	5.5
Employment	Housewife	161	89
	Self employed	11	6
	Governmental or private sector	9	5

Pregnancy-related disorders present among 26 participants (14.4%). These disorders were gestational diabetes (seven cases), gestational hypertension (five cases), anemia (three cases) and other disorders. Most of women included in the current study attended antenatal care during their pregnancy (n= 166, 91.7%). Obstetric history is presented in table 2.

Table 2: Obstetric characteristics of study participants

Variable		Frequency	Percent
Parity	<4	157	86.7
	4-7	24	13.3
Gravida	Prime	66	36.5
	2-4	79	43.6
	5-7	24	13.3
	8 or more	12	6.6
Previous abortion	No	126	69.5
	Once	34	18.8
	Twice	14	7.7
	Three or more	7	4

Imaging Findings

Ultrasound: Ultrasound examinations were conducted on all 181 participants to assess potential gynecological causes of acute pelvic pain. The findings from ultrasound imaging are summarized in Table 2. The most common findings included normal ultrasound results (34.8%), uterine fibroids (23.2%), ovarian cysts (17.1%), endometriosis (13.8%), and pelvic inflammatory disease (11.0%). These findings provided initial insights into prevalent conditions that could be further evaluated with additional imaging modalities.

Table 3: Ultrasound Findings

Finding	Frequency (n=181)	Percentage (%)
Normal	63	34.8
Uterine Fibroids	42	23.2
Ovarian Cysts	31	17.1
Endometriosis	25	13.8
Pelvic Inflammatory Disease (PID)	20	11.0

MRI: MRI scans were performed on a subset of 120 participants to further investigate complex gynecological conditions detected during ultrasound or suspected based on clinical symptoms. The MRI findings are detailed in Table 3, highlighting conditions such as uterine fibroids (31.7%), endometriosis (26.7%), adnexal masses (23.3%), pelvic inflammatory disease (15.0%), and ovarian cysts (11.7%). MRI provided superior resolution and detailed anatomical information crucial for accurate diagnosis and treatment planning in cases requiring more comprehensive evaluation.

Table 4: MRI Findings

Finding	Frequency (n=120)	Percentage (%)
Uterine Fibroids	38	31.7
Endometriosis	32	26.7
Adnexal Mass	28	23.3
Pelvic Inflammatory Disease (PID)	18	15.0
Ovarian Cysts	14	11.7

CT Scan: CT scans were performed on a subset of 80 participants for cases requiring detailed anatomical evaluation or suspected conditions not fully resolved by ultrasound or MRI. The CT scan findings are presented in Table 4, indicating prevalent conditions such as adnexal masses (30.0%), ectopic pregnancies (22.5%), pelvic inflammatory disease (20.0%), uterine fibroids (15.0%), and ovarian torsion (12.5%). CT scans provided additional clarity in anatomical details and pathologies that necessitated precise surgical or medical interventions.

Table 5: CT scan Findings

Finding	Frequency (n=80)	Percentage (%)
Adnexal Mass	24	30.0
Ectopic Pregnancy	18	22.5
Pelvic Inflammatory Disease (PID)	16	20.0
Uterine Fibroids	12	15.0
Ovarian Torsion	10	12.5

Association Between Imaging Findings and Clinical Symptoms

Chi-square tests were employed to analyze associations between imaging findings (ultrasound, MRI, CT) and reported clinical symptoms among participants. Significant associations ($p < 0.05$) were observed between specific imaging diagnoses (e.g., uterine fibroids, endometriosis) and symptoms such as dyspareunia, dysmenorrhea, and abnormal uterine bleeding. These findings underscored the clinical relevance of imaging modalities in correlating anatomical findings with patient-reported symptoms.

Diagnostic Accuracy of Imaging Modalities

The diagnostic accuracy of ultrasound, MRI, and CT scans in identifying gynecological causes of acute pelvic pain was assessed using sensitivity, specificity, and positive predictive values (PPV). Table 5 summarizes the diagnostic performance metrics for each imaging modality, demonstrating their utility in detecting and confirming various gynecological conditions.

Table 6: Diagnostic Accuracy of Imaging Modalities

Modality	Sensitivity (%)	Specificity (%)	PPV (%)
Ultrasound	86.4	78.2	81.6
MRI	92.5	85.3	88.7
CT Scan	78.9	71.4	74.6

Discussion

The findings of this cross-sectional study provide valuable insights into the diagnostic efficacy of ultrasound, MRI, and CT scans in identifying gynecological causes of acute pelvic pain among female patients at Shifa Medical Complex. This discussion synthesizes the results, interprets their implications for clinical practice, explores the study's strengths and limitations, and outlines avenues for future research.

Ultrasound emerged as a pivotal tool in the initial assessment of acute pelvic pain, detecting a range of conditions from uterine fibroids and ovarian cysts to more complex pathologies like endometriosis and pelvic inflammatory disease (PID). Its accessibility, non-invasiveness, and relatively low cost make it an ideal first-line imaging modality for evaluating gynecological complaints [13-15]. The prevalence of uterine fibroids (23.2%) and ovarian cysts (17.1%) detected by ultrasound underscores their common occurrence among patients presenting with acute pelvic pain. These findings align with previous research highlighting ultrasound's role in providing rapid diagnostic information that guides subsequent management decisions (**Table 3**).

MRI complemented ultrasound by offering enhanced soft tissue resolution and detailed anatomical visualization, crucial for evaluating complex conditions such as deep infiltrating endometriosis and adnexal masses [16-19]. The higher detection rates of endometriosis (26.7%) and adnexal masses (23.3%) by MRI compared to ultrasound illustrate its superiority in characterizing pathology extent and involvement of adjacent structures. Despite its higher cost and longer scan times, MRI proved invaluable in cases requiring precise surgical planning or confirmation of suspected diagnoses (**Table 4**).

CT scans, although less frequently utilized in this study cohort, provided additional diagnostic clarity in conditions necessitating detailed anatomical assessment, such as ectopic pregnancies and ovarian torsion [20-25]. The findings of adnexal masses (30.0%) and ectopic pregnancies (22.5%) underscored CT's utility in emergencies or when ultrasound and MRI were inconclusive or insufficient for definitive diagnosis (**Table 5**). Collectively, these imaging modalities contributed to a comprehensive diagnostic approach, each serving specific roles based on clinical presentation and suspected pathology severity.

The integration of imaging findings with clinical symptoms enabled more accurate diagnosis and tailored management strategies for patients with acute pelvic pain. For instance, the identification of uterine fibroids or ovarian cysts by ultrasound often led to conservative management options such as hormonal therapy or watchful waiting, depending on the size, location, and symptoms. In contrast, MRI-guided diagnosis of endometriosis or adnexal masses facilitated targeted surgical interventions or medical therapies aimed at symptom relief and preservation of fertility where applicable [26-30].

Acute gynecologic diseases in women who are not pregnant are fairly rare in crowded emergency rooms (EDs), but they are less frequent than obstetric concerns. If you suspect a genital illness, ultrasound (US) is the best non-invasive method to investigate it. Nevertheless, multidetector computed tomography (CT) has become the "workhorse" imaging modality in the emergency department (ED) because of its rapid acquisition and 24/7 availability; it reliably diagnoses most acute pelvic and abdominal problems in a short amount of time. Consequently, there has been a rise in the use of urgent CT studies to detect abnormalities of the female genital organs. This is typically done in cases where the symptoms are not specific enough to rule out a gynaecologic disorder as the main cause of pelvic pain, or when there is a need to differentiate between gastrointestinal and urologic conditions, such as acute appendicitis, diverticulitis, pyelonephritis, renal colic, etc. In addition, computed tomography (CT) is the gold standard for diagnosing acute gynaecologic disorders in cases when transvaginal ultrasound (often done by gynaecologists in our nation) is not accessible, does not provide a definitive result, or when genital abnormalities are too large to be seen on sonography or need further characterization. Radiologists play an important role in these cases by informing emergency department doctors that a gynaecologic consultation is necessary because of a suspected or confirmed genital illness [31-34].

For the purpose of characterizing aberrant or inconclusive data from sonographic and CT scans, magnetic resonance imaging (MRI) is the optimal modality to use. In comparison to CT, MRI has several benefits, such as a lower risk of radiation exposure, the ability to acquire images in their original multiplanar format, superior contrast for soft tissues, and the ability to characterize tissues, potentially revealing the presence of fat and blood products. The use of magnetic resonance imaging (MRI) in urgent situations has increased over the last decade, despite limitations in scanner availability, exam time, and expense. This has been especially true in pediatric patients and women of childbearing age who want to avoid the dangers of ionizing radiation to their genitalia [35-38].

Due to contralateral protection from the sigmoid colon, the ovarian vascular pedicle preferentially rotates on the right side in the uncommon adnexal torsion (AT), which accounts for 2-3% of gynaecologic crises. The ovary and the fallopian tube are both potentially affected, with the most typical occurrence occurring simultaneously in as many as 67% of cases [39]. Even in women with typically developing ovaries or in prepubescent girls who have very movable fallopian tubes, AT is rare and often manifests itself in the first 40 years of life. A mature cystic teratoma is the most common aetiology, but between half a dozen and ninety percent of ovarian tumor (AT) cases in reproductive-age women have some sort of underlying ovarian mass a large cyst, endometrioma, hyperstimulated ovary, or benign tumor that serves as a torsion point. On the flip side, attachement to nearby tissues may lead to torsion in rare cases of endometriomas and adnexal cancers [19,40,41].

Adnexal soreness and sudden start of lower abdomen pain that spreads to the ipsilateral flank or groin is the typical manifestation. On the other hand, symptoms including nausea, vomiting, low-grade fever, and intermittent discomfort are common but not always specific. Torsion and detorsion events can be the cause of recurrent attacks. Ovarian edema, congestion, and enlargement are symptoms of early AT, which is characterized by impaired low-pressure venous and lymphatic outflow. Ischemia and hemorrhagic infarction may develop if twisting continues because it gradually reduces arterial circulation. Hence, the length of torsion determines the scope of imaging results [39,41].

Keeping this in mind, keep in mind that the ovary receives blood from two sources: first, the infundibulopelvic ligament, which runs from the pelvic wall to the ovary; and second, the utero-ovarian ligament, which connects the ovary to the uterus; both arteries originate from the abdominal aorta. An ovary twists on its ligamentous supports, the infundibulopelvic ligament and the utero-ovarian ligament, causing ovarian torsion [42]. When evaluating ovarian torsion, ultrasound is the main imaging method. Due to the dual blood supply that is present during ovarian torsion, color Doppler US may still show some arterial vascular activity. Although this adnexal vascularization persists, it does not rule out torsion when there are suggestive clinical and imaging symptoms [43].

Although CT is often used for patients with other presumptive diagnosis, MRI is the superior modality for evaluating suspected AT in premenopausal women after inconclusive US (lesion not clearly portrayed or equivocal results). On computed tomography (CT), the uterus is pulled to the ipsilateral side by the shorter adnexal ligament, and the ovary, which is abnormally enlarged on one side (frequently more than 5 cm), is seen to be displaced from its normal location and to be situated on the midline. Follicle displacement to the periphery may cause the oedematous ovary to thicken its walls in a "target-like" pattern, or it can thicken them eccentrically or concentrically. In most cases, the ovarian blood arteries are congested and enlarged. Keep in mind that the pathognomonic twisted pedicle often appears as a spiral but may also be a solid-like component next to the ovarian mass. It is common to see inflammatory fat stranding and pelvic free fluid. Adnexal contrast enhancement is weak or nonexistent in full-blown AT, and hemorrhage shows up as a hyperattenuating region. Calcifications, fat attenuation foci, and increasing mural nodules are hallmarks of a mature cystic teratoma [19,39,41,43-45].

The unusual occurrence of fallopian tube torsion apart from ovarian torsion also necessitates surgical intervention. Possible risk factors include hydrosalpinx, tubal ligation, solid masses, cysts in the tubal or paratubal regions, and tubes [19]. An adnexal structure separate from the ovary may be seen on CT, especially with multiplanar reformatted pictures. MRI often reveals a thicker and enlarged fallopian tube; the tube may seem twisted, giving it a vortex-like appearance; and the ipsilateral ovary looks normal. Another symptom, known as a whirlpool sign, is a pedicle that is thick and twisted [29,46].

Unilocular cysts called paraovarian cysts or paratubal cysts may be seen in the wide ligament, which connects the ovary to the fallopian tube [47]. It is more common in children than adults, and isolated torsion of paraovarian/paratubal cysts is quite unusual. In most cases, magnetic resonance imaging (MRI) shows a hyperintense cyst on T2-weighted pictures and a hypointense cyst on T1-weighted images, which is separate from the ipsilateral ovary. Because of hemorrhagic changes associated with torsion, the cystic content's signal intensity on T1-weighted imaging may seem rather elevated [19].

The study's findings underscore the importance of multidisciplinary collaboration between gynecologists, radiologists, and other specialists in optimizing patient care pathways. Integrating imaging results into clinical decision-making processes enhances diagnostic accuracy, reduces unnecessary interventions, and improves patient outcomes. This collaborative approach is essential in complex cases where differential diagnoses based solely on clinical examination may be challenging or inconclusive.

A key strength of this study lies in its comprehensive evaluation of multiple imaging modalities within a single institutional setting, providing real-world insights into their clinical applicability and diagnostic yield. The inclusion of a diverse patient cohort enhances the study's external validity, reflecting the demographic and clinical variability encountered in routine gynecological practice at Shifa Medical Complex.

However, several limitations should be acknowledged. The cross-sectional design restricts the establishment of causal relationships between imaging findings and clinical outcomes, necessitating future longitudinal studies to explore disease progression and treatment responses over time. Additionally, the study's reliance on convenient sampling introduces potential selection bias, limiting generalizability to broader patient populations. Variations in imaging interpretation and reporting among radiologists and technicians, despite efforts to ensure inter-rater reliability, may have influenced the consistency and accuracy of diagnostic assessments.

Future research should address several avenues to further enhance the understanding and clinical management of gynecological causes of acute pelvic pain. Longitudinal studies are warranted to investigate the natural history and prognostic implications of specific imaging findings, correlating them with long-term clinical outcomes and patient-reported quality of life. Comparative effectiveness research could evaluate the cost-effectiveness and patient-centered outcomes of different imaging strategies (e.g., ultrasound vs. MRI) in diverse healthcare settings, guiding evidence-based recommendations and resource allocation.

Advancing imaging technologies, such as contrast-enhanced ultrasound or functional MRI, offer promising avenues to improve diagnostic accuracy and therapeutic monitoring in gynecological practice. These modalities provide additional physiological and molecular insights into disease processes, potentially revolutionizing the approach to personalized medicine and targeted therapies for patients with acute pelvic pain.

Furthermore, interdisciplinary research collaborations are essential to explore novel biomarkers and imaging markers that may

augment current diagnostic algorithms. Integrating artificial intelligence and machine learning algorithms into imaging interpretation could enhance diagnostic precision, reduce variability in radiological assessments, and facilitate early detection of gynecological pathologies.

Conclusion

In conclusion, this cross-sectional study at Shifa Medical Complex has elucidated the diagnostic efficacy of ultrasound, MRI, and CT scans in identifying gynecological causes of acute pelvic pain among female patients. Ultrasound proved valuable as an initial screening tool, detecting common conditions such as uterine fibroids and ovarian cysts. MRI provided superior resolution for complex cases like endometriosis and adnexal masses, while CT scans offered detailed anatomical evaluation in specific instances such as ectopic pregnancies and ovarian torsion. The findings underscore the importance of multimodal imaging approaches in clinical practice, facilitating accurate diagnosis and tailored management strategies for patients presenting with acute pelvic pain.

Based on the findings, it is recommended that Shifa Medical Complex enhance its imaging infrastructure and protocols to optimize diagnostic accuracy and patient care outcomes. Specifically, investing in advanced imaging technologies and continuous training for radiologists and technicians can improve the detection and characterization of gynecological pathologies causing acute pelvic pain. Furthermore, implementing multidisciplinary clinical pathways that integrate imaging findings with gynecological consultations can streamline diagnostic processes and enhance treatment planning for affected patients.

Competing Interest

Authors have no conflict of interest

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None

Authors' contribution

Both authors contributed the same for the study

List of Abbreviations

APP - Acute Pelvic Pain
MRI - Magnetic Resonance Imaging
CT - Computed Tomography
US - Ultrasound
PID - Pelvic Inflammatory Disease
AUB - Abnormal Uterine Bleeding
MR - Magnetic Resonance
IRB - Institutional Review Board
ANOVA - Analysis of Variance
PPV - Positive Predictive Value
ED - Emergency Department
AT - Adnexal Torsion

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