



## ROLE OF ULTRASONOGRAPHY AND MAGNETIC RESONANCE IMAGING IN EVALUATION OF GYNECOLOGICAL PATHOLOGIES

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### ABSTRACT

Gynecological cancers are among the most common cancers in women and hence an important public health issue. Due to the lack of cancer awareness, variable pathology, and dearth of proper screening facilities in developing countries such as India, most women report at advanced stages, adversely affecting the prognosis and clinical outcomes. In our study on 60 patients, 24 patients (40%) were diagnosed to have benign lesions & 36(60%) malignant pathologies. Ca cervix was the most commonly encountered malignant pathology & benign ovarian lesions were most common benign pathology. USG remains the examination of choice for initial assessment of patients with suspected gynecological disease. The transabdominal scans allow assessment of ascites, adenopathy, large tumor implants, hydronephrosis, and liver metastases, whilst transvaginal ultrasound allows detailed morphological evaluation of the pelvic structures. MRI can offer supplemental diagnostic information in cases of suboptimal or equivocal ultrasound examination. MRI is superior in the detection of the organ of origin, loco-regional extent of pelvic cancer. MRI is considered the next step in the imaging assessment of disease of the uterus and adnexa and is becoming the primary imaging modality for evaluating & staging gynecological malignancies

### KEYWORDS :

#### INTRODUCTION

Gynecological cancers are among the most common cancers in women and hence an important public health issue. Due to the lack of cancer awareness, variable pathology, and dearth of proper screening facilities in developing countries such as India, most women report at advanced stages, adversely affecting the prognosis and clinical outcomes. The 5 main types of gynecologic cancers are cervical, ovarian, uterine (endometrial cancer and uterine sarcoma), vaginal, and vulvar. Ovarian cancer has emerged as one of the most common malignancies affecting women in India and has shown an increase in the incidence rates over the years. Although cervical cancer is on a declining trend, it remains the second most common cancer in women after breast cancer.[1] USG, as a diagnostic tool, is cheap, easily available easily accepted by patients. It is the first line of investigation in a patient suspected to have gynecological malignancy. Transabdominal & transvaginal USG have their pros n cons in evaluation of pelvic masses. MRI is next investigation for assessment of lesion.

#### AIM AND OBJECTIVES

1. Characterization of uterine, cervical and adnexal masses as benign or malignant on USG and MRI.
2. To determine the origin, tissue content and characterization of sonographically indeterminate uterine, cervical and adnexal masses on MRI.

#### MATERIAL AND METHOD

The comparative study was carried out in Government Medical College, Nagpur over duration of 2 years.60 patients were included in the study.

#### Inclusion criteria:

- Patients with clinical suspected cases of gynecological malignancies.
- Patients with incidental detection of gynecological malignancies on USG.
- Patients of all age groups will be included in the study.

#### Exclusion criteria:

- Patients who have underwent treatment for gynecological malignancies.
- Patients with metallic implants, cardiac pacemakers, cochlear implants.
- Patients who are claustrophobic.
- Patients who are unwilling for imaging.

Trans-abdominal and trans-vaginal(in selected patients) examinations were performed to evaluate the masses. TAS was done with full bladder and curvilinear probe of medium (5MHz) frequency was used. The full urinary bladder was required to provide an acoustic window and to displace the bowel loops. Trans-vaginal probe insonate at higher frequency i.e. 7-9MHz was used with consequent improved spatial resolution over the lower frequency TAS probes. MRI Imaging was be done with 1.5 tesla Philips Achieva machine using abdominal surface coils. The following sequences were selected as required.T1WI, T2WI AND T1 SPIR (in axial plane),T2WI (in coronal plane),T2WI ,T2W SPAIR,T1W SPIR (in sagittal plane).<sup>3</sup> Gadolinium was used in all cases as intravenous contrast material in a dose of 0.1 mmol/kg body weight. Post contrast study includes T1W FAT SUPPRESSED Sequence (in axial and sagittal planes). Additional MRI imaging included selective application of fat saturation imaging. It was done to differentiating fat, blood and proteinaceous fluid in hyper intense lesions in T1W images.

Patient was imaged by USG first than MRI (performed within a short interval of 1-2days to avoid any change in the mass that might occur as a result of cyclical bleeding) to look for the various features; which form the mainstay of the differential diagnosis of the pelvic masses.

#### OBSERVATION AND RESULTS

Study was conducted on 60 patients out of which, 24 patients (40%) were diagnosed to have benign lesions & 36(60%) malignant pathologies. All the 10 patients with fibroid, mean age 39 yrs, were diagnosed with comparable accuracy on USG & MRI, one out of it

was categorized as leiomyoma on USG & MRI however came out to be malignant on histopathology correlation. Out of the 16 cases of Ca Cervix, between 30-70 years, USG was not conclusive in 1 case of CA cervix stage Ib, which was confirmed on MRI. MRI is superior in the detection of the loco-regional extent & involvement of parametrium & lateral pelvic walls. Out of 3 cases of Ca Endometrium, aged 40-65 years, one showed endometrial growth on USG, other two showed non specific finding of thickened endometrium & endometrial collection. MRI was confirmatory in all three cases & cervical invasion was additionally diagnosed in one case. The case of gestational trophoblastic disease, 22year old female, who had previous history of molar pregnancy 6 months back was diagnosed accurately on USG with possibility of myometrial invasion which was confirmed on MRI. The 14 patients with benign ovarian neoplasm, between 20-50 years, were all diagnosed well on USG. 6 out of which were dermoid cysts. By MRI, presence of fat was detected in these cases which were heteroechoic on USG and could not be diagnosed correctly. 2 of the lesions were categorized as benign on USG, came out to be malignant on MRI. Out of 16 patients with ovarian malignancies, aged 15-70 years, malignant neoplastic nature of lesion was clearly understood on USG however MRI was necessary to evaluate the site & side of origin, involvement of adjacent structures, peritoneal & pouch of doglous deposits. Regarding the accuracy of USG and MRI for the diagnosis of pelvic masses, on USG correct evaluation of site of origin and morphology was possible in 42% cases while on MRI it was possible in 93.75% cases. MRI provided new information in 48% cases. This information is related to the origin of mass, spread of tumour and internal consistency (such as fat or hemorrhagic contents within the lesion) in most of the cases. In 24 benign lesions 7 lesions (29%) were less than 4 cm and 17 were (70.8%) more than 4cm. In 36 malignant lesions 9 lesions (25%) were less than 4 cm and 27 were (75%) more than 4cm. All the benign lesion showed maintained fat plane with the surroundings whereas the 3 malignant lesions showed loss of fat plane with the surrounding structures. Most common presenting complain was abdominal pain in 41 patients(68.33%) followed by vaginal bleeding in 31 cases (51.66%).

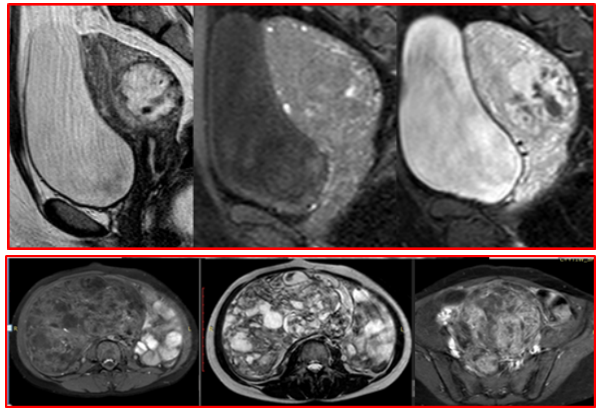
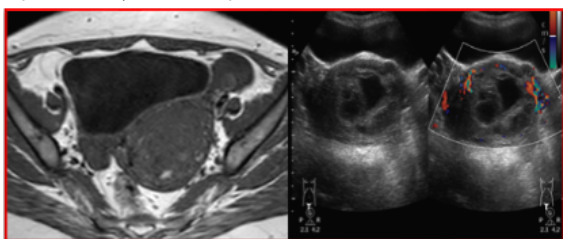
**DISTRIBUTION OF NEOPLASM:**

TYPE OF NEOPLASM	NO OF NEOPLASM	PERCENTAGE
Ca cervix	16	26.7
Ca Endometrium	3	5
Fibroid	10	16.67
Benign ovarian neoplasm	14	23.33
Malignant ovarian neoplasm	16	26.67
Gestational trophoblastic neoplasm	1	1.66
TOTAL	60	100

Pelvic mass	USG			MRI		
	Benign	Malignant	Total	Benign	Malignant	Total
< 5	7	9	16	7	9	16
>5	19(2 FP)	25	44	18(1FP)	26	44
Histopathology	24	36	60	24	36	60

	Benign	Malignant	Total
USG	26(2FP)	34	60
MRI	25(1FP)	35	60
Histopathology	24	36	60

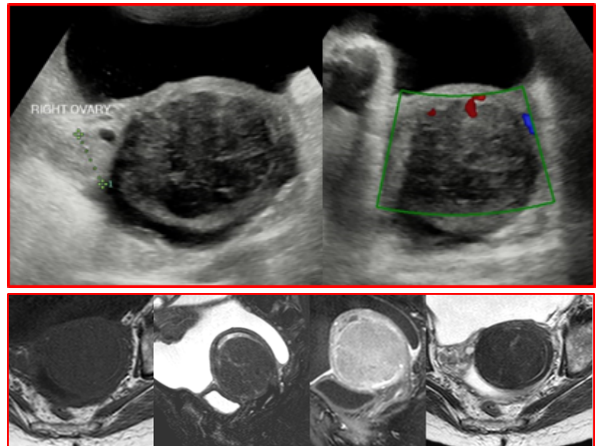
**CASE 1- INAVISE MOLE-**Lesion noted in endometrial cavity invading the posterior myometrium, possible serosal invasion.



**CASE 2:- IMMATURE TERATOMA OF RIGHT OVARY-** large heterogeneous lesion in pelvis with fat containing areas.



**CASE 3:Ca ENDOMETRIUM:-** heterogeneously enhancing lesion in endometrial cavity, bilateral ovaries separately visualised gross ascites.



**CONCLUSION**

USG remains the examination of choice for initial assessment of patients with suspected gynecological disease. The transabdominal scans allow assessment of ascites, adenopathy, large tumour implants, hydronephrosis, and liver metastases, whilst transvaginal ultrasound allows detailed morphological evaluation of the pelvic structures. The accuracy for diagnosing lesions of the adnexa, uterus and cervix varies for the different imaging modalities. In the adnexa, ultrasound is accurate in predicting benignity however not same is the case with malignant lesions[2]. Ultrasound is poor in diagnosing malignancy in the uterus and cervix.

MRI, on the other hand, having superior soft tissue contrast and large field of view offer distinct advantages over both USG. MRI can offer supplemental diagnostic information in cases of suboptimal or equivocal ultrasound examination, and in patients in whom there is discrepancy between sonographic findings and physical examinations. MRI is superior in the detection of the organ of origin, loco-regional extent of pelvic cancer. MRI is considered the next step in the imaging assessment of disease of the uterus and adnexa and is becoming the primary imaging modality for evaluating & staging gynecological malignancies. [3]

We could also conclude, more complexity and larger the cystic adnexal masses greater there are increased chances of malignancy. Dermoids are correctly diagnosed by MRI due to confidently detecting of fat so as the hemorrhagic cyst or intraligamentary hemorrhages. Staging of malignancies is better done by MRI. Adnexal masses are usually cystic while the uterine masses are solid in texture.

#### REFERENCES

1. Amita Maheshwari, Neha Kumar, and Umesh Mahantshetty; Gynecological cancers: A summary of published Indian data; © South Asian Journal of Cancer
2. P. Balan, Centre for MRI, University of Hull and Hull and East Yorkshire NHS Trust, UK, Ultrasonography, computed tomography and magnetic resonance imaging in the assessment of pelvic pathology; Received 10 May 2005;
3. Tushar Prabha, Sunny Goyal, Hemant Kumar Mishra, Ankur Aggarwal. Role of MRI in Evaluation of Female Pelvic Masses in Comparison to Ultrasonography. Journal of Evolution of Medical and Dental Sciences 2014; Vol. 3, Issue 59, November 06; Page: 13330-13334, DOI: 10.14260/jemds/2014/3775