Archives of Women's Health & Gynecology

doi: 10.39127/AWHG:1000103

Rafeek MES. Arch Women Heal Gyn: 103

Research Article

Assessment Preoperative Ultrasound Versus Magnetic Resonance Imaging In diagnosis of Parametrial Infiltration with regard to histopathology in Cancer Cervix: A Comparative study

Mohamed El Sayed Rafeek*

Department of Obstetrics and Gynecology, Zagazig University, Sharkia, Egypt

***Corresponding author:** Mohamed El Sayed Rafeek, Lecturer of obstetrics and gynecology, faculty of medicine, Zagazig University, Sharkia, Egypt.

Citation: Rafeek MES (2018) Assessment Preoperative Ultrasound Versus Magnetic Resonance Imaging In diagnosis of Parametrial Infiltration with regard to histopathology in Cancer Cervix: A Comparative study. Arch Women Heal Gyn: 103.

Received Date: 05th January, 2018; **Accepted Date:** 11th January, 2018; **Published Date:** 18th January, 2018

Abstract

Cervical cancer is the second most common cancer in women worldwide. The overall 5-year survival rate has been reported to be 73% but the prognosis for patients with locally advanced cervical cancer is poor. The choice of treatment for cervical cancer depends on the International Federation of Gynecology and Obstetrics (FIGO) stage which is based mainly on clinical findings at gynecological examination. The staging system is associated with overstating in up to two thirds of cases of advanced FIGO stages. Therefore, international cancer society's now encourage the use of MRI and 2D, 3D US to evaluate tumor volume, local extent of the tumor and metastatic disease.

The aim of this study: to compare the diagnostic accuracy of 2D, 3D US and MRI, in detection of parametrial infiltration in cervical cancer with regard to histopathology. The study was on 72 patients of cervical cancer with parametrial infiltration: with clinical FIGO staging stage IIB or more.

It was cross sectional study, all patients underwent (full history taking, general examination, examination under anesthesia, biopsy from the mass, 2D, 3D US and MRI).

The result was statistically analyzed and sensitivity, specificity and significant (P value) were calculated. In this study Agreement beyond chance between ultrasound and MRI with regard to parametrial infiltration of cervical cancer, without taking into account the location of the infiltration, was moderate. with sensitivity of US regard to parametrial infiltration 75%, while MRI are 100 % and PR in EUA are only 20 % with high significant of US (P value = 0.039). regarded to grad of parametrial infiltration US become less significant with P value = (0.12) with sensitivity to GI, GII, GIII are 25%,15%,55% respectively.

The issues of costs, availability and dedicated radiological training call for the evaluation of imaging approaches other than CT and MRI. Given the great advances in ultrasound technology and equipment documented in recent decades, and considering its low cost, fast and wide availability, it is reasonable to consider ultrasound as a potential diagnostic tool for cervical cancer staging.

Introduction

Although effective screening programs decreased mortality of patients with carcinoma of the cervix, cervical cancer is the second most common malignancy in women and a major cause of morbidity and mortality. With 5-year survival rate about 73%, but the prognosis unsatisfactory (1). With 5-year survival rate about 73%, but the prognosis unsatisfactory (2). Clinical staging system for cervical carcinoma has been recommended by The International Federation of Gynecology and Obstetrics (FIGO) based on findings from physical examination performed under anesthesia, colposcopy with biopsies of the lesion, chest radiography, cystoscopy, sigmoidoscopy (3). Thus, it is important to know if carcinoma of the cervix extended into the parametrium. Which is often inaccurate by clinical examination (4).

Now we use Ultrasound (US), Computed Tomography (CT) and Magnetic Resonance Imaging (MRI), as a routine practice, even if these methods are not obligatory in the assessment of clinical staging according to FIGO (5).

MRI offered significant improvement in the evaluation of tumor size, stromal invasion, local and regional extent of the disease in pretreatment imaging for cervical cancer (6).

Patients with tumor confined to the cervix undergo surgical treatment, whereas patients with parametrial involvement or more advanced disease are referred for radiation therapy (7).

MRI had a high rate of accuracy in diagnosing parametrial carcinoma status than clinical examination (8). Ultrasound (US) and Magnetic Resonance Imaging (MRI) had almost similar sensitivity and specificity with regard to the parametrial infiltration .US has advantages over MRI that ultrasound is cheaper and more available relatively faster procedure than MRI and should be considered in the preoperative work up (9).

Patients and Methods

Subjects included in study: it was cross section study that carried out in duration from December 2014 to May 2017 in Department of Obstetrics and Gynaecology - EL GAHRA Hospital - Kuwait. 72 Patients included in this study with histologically confirmed cervical cancer, with examination under anaesthesia have Parametrial infiltration.

Exclusion criteria: Patients undergoing a cervical cone biopsy.

All patients will undergo:

- Full history taking:

Each woman was asked about the following full history taken:

- Personal history, including age of the patient, age of marriage and its duration.
- Main complaint which is post contact bleeding and its duration.
- Menstrual history.
- Obstetric history.
- Contraceptive history including the type and duration of use.
- Past history of medical problems and surgical procedures she had, especially cervical surgery as previous cauterization.
- Family history of similar condition or cancer cervix.
- Husband history for smoking and venereal diseases.
- History of sexually transmitted diseases as HPV
- Physical examination. (general, abdominal and local examination)
- Gynaecological (local) examination under anaesthesia: the participant moved to the examination table to be examined by the researcher, a bivalve disposable speculum was inserted into the vagina, and the vulva, vaginal walls and the cervix were inspected with comment on the morphology and any apparent lesion seen, bimanual examination to detect size of cervix, mobility and extend to uterus, PR examination to detect Parametrial infiltration and rectal infiltration.
- Biopsy from the mass.
- **Sonography:** All patients were examined with transvaginal US in lithotomy position with empty bladder, Early tumors will not be ultrasonographically identifiable. Slightly more advanced tumors may be evidenced by cervical enlargement with a variable alteration in echotexture. At this stage, the tumor may be mistaken for a cervical fibroid. signs of parametrial invasion include extension of cervical tumor beyond the cervical stroma and presence of hypoechoic irregular tissue infiltrating the pericervical tissue, irregular lateral tumor margins, vascular enhancement or both. Generally, the uterine body and endometrial canal will appear normal. However, when cervical stenosis results from tumors infiltration of the cervical canal, an obstruction of the cervical canal and endometrial cavity may result in a collection of fluid.
- Abdominal pelvic magnetic resonance imaging by many techniques Include both anatomical MRI sequence (T1&T2 weighted sequence) place sequence that characterized tissue on the basis of physiologic feature (diffusion –weight MRI).
- Routine investigation: (CBC, liver function, renal function, fasting blood sugar, urine analysis ….).
- Recording the presence and the extent of parametrial invasion.
- Investigation of metastasis (chest X ray, bone X ray, brain CT & MRI).
- Consent of the patient.

All the data will be collected and analysed statistically

Result

50% of cervical cancer patients >53 y while 37.5% are between 45 :52 y, 62.5% are married and 70.8% are young married before age of 18 years old, all cases have only 1 sexual partners (single marriage), 12.5% are heavy cigarette smoking ,95.8% are multipara while only 4.1% are nulliparous, 50% reach menopause while 50% are still menstruated and 25% of them are using compound contraceptive (pills, injection), 8.3 % are using IUCD and 66.66% not use any method, menarche occurs before 15 in 91.67% which was regular in duration and frequency in 100% of cases table (1).

		Frequency	Percent
Age	40:44	9	12.5
	45:52	27	37.5
	>53	36	50.0
Marital status	Currently married	45	62.5
	Divorced	12	16.66
	Widow	15	20.83
History of more than 1 marriage	Single	72	100.0
	Multiple	0	0
Age of marriage	< 18	51	70.83
	≥18	21	29.16
Special habit (Smoking)	No	63	87.5
	Yes	9	12.5
Age of menarche	10,11	15	20.83

	12	18	25.0
	13	21	29.16
	14	12	16.66
	15	6	8.33
Frequency in menstruated (9 patients)	Normal (21:35)	27	37.5
Duration in menstruated (9 patients)	Normal (2:7)	27	37.5
Parity	.00	6	8.33
	1.00	6	8.33
	3.00	18	25.0
	4.00	21	29.16
	5.00	21	29.16
	Multipara	69	95.83
	Nulliparous	3	4.1
Menopause	No	36	50.0
	Yes	36	50.0
History of using Contraceptive	Compound contraceptive	18	25.0
	IUCD	6	8.33
	No	48	66.66
Mode of delivery	Abdominal	6	8.33
	Vaginal	48	66.66
	Both	12	16.66
	NO	6	8.33
Abortion	1	9	12.5
	3	6	8.33
	NO	57	62.5
	Total	72	100.0

Table 1: Cumulative clinical data of studied cases.

Most common First presentation in the patients is post-menopausal bleeding (45.8 %), then lower abdominal pain (29.16%) then perimenopausal bleeding (16.66%) then post coital vaginal bleeding (8.33%). 12.5% of the patient also complain of dysuria and 15.8% associated with discharge. 50% are hypertensive and or diabetic. 16.66% of the patient has family history of cancer table (2).

		Frequency	Percent
First presentation	Lower abdominal pain	21	29.16
	Perimenopausal bleeding	12	16.66
	Post coital vaginal bleeding	6	8.33
	Post-menopausal vaginal bleeding	33	45.83
Other complain	No	51	70.83
	Dysuria	9	12.5
	Post- coital bleeding & watery discharge	9	12.5
	Yellowish discharge streaked with blood	3	4.16
Past history	No	33	45.83
Medical	DM	6	8.33
	HTN	12	16.66
	HTN, DM	9	12.5
	HTN, DM, HCV	3	4.16
	Renal stone	3	4.16
	RT hydronephrosis	3	4.16
Surgical	Subtotal hysterectomy	3	4.16
(Family History of cancer	Cancer stomach (father)	3	4.16
	Cancer prostate (father)	6	8.33
	Cancer colon (sister)	3	4.16
	Cancer breast (sister)	3	4.16
	Yes	12	16.66
	No	60	83.33
	Total	72	100.0

Table 2: Clinical presentation of studied group.

By examination under anesthesia 62.55% have normal vulva, 75% of the patients have abnormal vagina (bleeding, discharge), 58.33% of uterus are enlarged 45.8% are immobile cervix. By speculum examination 95.8% are ectocervical lesion while 4.16% are endocervical lesion. In parametrial extension79.16% not reaching to lateral pelvic wall and 20.83% reach to lateral pelvic wall. 29.16% left lateral parametrial infiltration, 54.16% right lateral parametrial infiltration and 16.66% bilateral parametrial infiltration (table 3).

		Frequency	Percent
Vulva	Normal for her age	45	62.5
	White thick discharge	18	25.0
	Yellowish discharge	12	12.5
Vagina	Grayish discharge bleed on touch	21	29.16
	Mass bleed on touch	33	45.83
	Normal for her age	18	25.0
Bimanual examination cervix	Enlarged mobile	33	45.82
	Enlarged immobile	42	54.18
Uterus	Normal size uterus	27	37.5
	enlarged uterus	42	58.33
	uterus is absent	3	4.16
Speculum	Ecto cervical nodular cervical lesion	9	12.5
	Ecto cervical - ulcertive cervical lesion (endophytic)	12	16.66
	Ecto cervical soft cauliflower cervical mass (exophytic)	48	66.66
	Endo cervical infiltative mass	3	4.16
PR (per rectal) for Parametrial infiltration	bilateral Parametrial infiltration not reaching to lateral pelvic wall	9	12.5
	bilateral Parametrial infiltration reaching to lateral pelvic wall	3	4.16
	LF lateral Parametrial infiltration not reaching to lateral pelvic wall	9	12.5
	LF lateral Parametrial infiltration reaching to lateral pelvic wall	12	16.66
	RT lateral Parametrial infiltration not reaching to lateral pelvic wall	39	54.16
PR	Not reaching to lateral pelvic wall	57	79.16
	Reaching to lateral pelvic wall	15	20.83
	Total	72	100.0

Table 3: Examination under anesthesia (clinical staging) of studied group.

By ultrasound (US) 20.8% of uterus are enlarged, 29.16% of myometrium are abnormal (mass extension, fibroid) thickness of endometrial line 5mm (29.16%), 6mm (41.66%), 7mm (12.5%), ≥8mm (12.5%). Endometrium can differentiate from myometrium in 70.8% of the cases while 29.16% not distended cavity in 20.83 % of cases. there is cervical mass in 100% of cases 70.8% well defined with US 79.2% of cases have parametrial infiltration while 20.83% are not. 24.99% LF lateral parametrial infiltration, 50 % Rt lateral parametrial infiltration and 4.16 % bilateral parametrial infiltration. Grad I of parametrial infiltration was 16.66 %, GII of parametrial infiltration was 66.66%, GIII of parametrial infiltration was 4.16% and GIV of parametrial infiltration was 0%. Only 4.16%of the cases have associated ovarian lesion,25% associated with urinary bladder infiltration, 12.5% associated with rectum infiltration, 25% associated with vaginal infiltration, 41.66% spread to LN (50% of them to external iliac LN ,20% to internal iliac LN, 20% to common iliac and 10% to inguinal LN) (table 4) (Figure 1,2).

		Frequency	Percent
Position uterus	AVF	72	100.0
Size uterus	Bulky	15	20.83
	Normal dimension	54	75.0
	Absent (subtotal abdominal hysterectomy)	3	4.16
Contour	Regular	72	100.0
Myometrium	Mass extend to lower uterine part (isthmus)	3	4.16
	fibroid	18	25.0
	Normal	51	70.83
Endometrium	thickness of endometrial line 5mm	21	29.16
	Thickness of endometrial line 6 mm	33	45.81
	Thickness of endometrial line 7 mm	9	12.5
	Thickness of endometrial line ≥ 8mm	9	12.5
Endometrial Myometrial interface	Cannot differentiate endometrium from myometrium	21	29.16
	Endometrium can differentiate from myometrium	51	70.83

Cavity	Empty	57	79.16
	Filled with fluid	15	20.83
Cervix	Well defined mass	21	29.16
	Ill-defined mass	51	70.83
Parametrial infiltration	No	15	20.83
	LF lateral parametrial infiltration extend to pelvic fat but not to pelvic wall GII	12	16.66
	LF lateral parametrial infiltration with disruption of pelvic fascia without spread to fat GI	6	8.33
	RT & LF lateral parametrial infiltration with disruption of pelvic fascia without spread to fat GI	3	4.16
	RT lateral parametrial infiltration extend to pelvic fat but not to pelvic wall GII	30	41.7
	RT lateral parametrial infiltration with disruption of pelvic fascia without spread to fat GI	3	4.16
	RT lateral parametrial infiltration extend to pelvic wall GIII	3	4.16
PARA	No	15	20.83
	G I	12	16.66
	G II	42	66.66
	G III	3	4.16
	GIV	0	0
PARA	Not Extended to lat pelvic bone	69	95.83
	Extended	3	4.16
Ovaries	Cystic lesion 4.5x3cm? complicated RT ovarian cyst	3	4.16
	Normal for her age	27	37.5
	Not seen	52	58.33
U.B infiltration	YES	18	25.0
	No	54	75.0
Rectum infiltration	Contact rectosegmoid colon	12	12.5
	No	63	87.5
Vaginal infiltration	Extend to upper 1/3 of vagina	18	25.0
	No	54	75.0
LN	Bilateral external iliac L.N	15	20.83
	Bilateral COMMON iliac L. N	6	8.33
	Few internal iliac L.N	6	8.33
	Bilateral inguinal L.N	3	4.16
	No	42	66.66
	Total	72	100.0

Table 4: US of studied group.

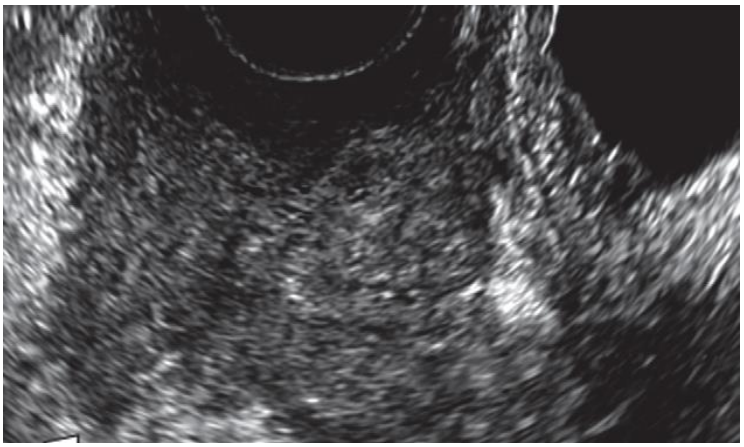

Figure 1: Two-dimensional ultrasound. showing cancer cervix with parametrial infiltration

Figure 2: Hypoechoic cervical tumor shown by 2 D ultrasound.

By MRI 16.6% of uterus are enlarged, 41.66% of myometrium are abnormal (mass extension, fibroid) thickness of endometrial line 5mm (33.3%), 6mm (41.6%), 7mm (8.33%), ≥8mm (16.66%) Endometrium can differentiated from myometrium in 66.66% of the cases while 33.33% not distended cavity in 16.66 % of cases. there is cervical mass in 100% of cases with MRI 100% of cases have parametrial infiltration, 37.5% of parametrial infiltration were LF lateral while 54.2% were RT lateral and 8.3 % were bilateral parametrial infiltration .Grad I of parametrial infiltration 12.5 % of all parametrial infiltration, GII of parametrial infiltration 62.5% of all parametrial infiltration, GIII of parametrial infiltration 20.8% of all parametrial infiltration and GIV of parametrial infiltration 4.2% of all parametrial infiltration 37.5% associated with urinary bladder infiltration, 25% associated with rectum infiltration, 4.16% associated with Intestinal loop infiltration 29.17% of cervical cancer extend to upper 1/3 of vagina, Only 4.16%of the cases have associated ovarian lesion, 8.3% of the cases associated with free pelvic fluid, 8.3% of the cases associated with pelvic bone pathology, 50 % spread to LN (16.67% of them to external iliac LN ,41.67% to internal iliac LN ,33.33% to common iliac and 8.33% to inguinal LN) (table 5) (Figure 3).

		Frequency	**Percent**
Size of the uterus	Bulky	12	16.66
	Normal dimension	57	79.16
	Surgically removed	3	4.16
Myometrium	Normal	42	66.66
	enhanced intra-mural uterine fibroid	18	25.0
	Mass Infiltrated lower segment	12	8.33
Endometrium	Thickness of endometrial line 5mm	24	33.33
	Thickness of endometrial line 6mm	30	41.66
	Thickness of endometrial line 7mm	6	8.33
	Thickness of endometrial line ≥8mm	12	16.66
Endometrial Myometrial interface	Can diff Endometrium from Myometrium.	48	66.66
	Can't diff Endometrium from Myometrium.	24	33.33
Cavity	Distended with hemorrhagic fluid	12	16.66
	Empty	**60**	**83.33**
Cervix	Enlarged cx. With well-defined mass	24	33.33
	Enlarged cx. ill- defined mass	48	66.66
	Total	72	100.0
Parametrial Infiltration	LF lateral parametrial infiltration extend to pelvic fat but not to pelvic wall GII	18	25
	RT & LF lateral parametrial infiltration with disruption of pelvic fascia without spread to fat GI	6	8.33
	RT lateral parametrial infiltration extend to pelvic fat but not to pelvic wall GII	27	37.5
	RT lateral parametrial infiltration extend to pelvic wall GIII	9	12.5
	RT lateral parametrial infiltration with disruption of pelvic fascia without spread to fat GI	3	4.16
	LF lateral infiltration extend to pelvic wall GIII	6	8.33
	LF lateral parametrial infiltration extend to pelvic wall and distal metastases GIV	3	4.16

Parametrial INF	G I	9	12.5
	G II	45	62.5
	G III	15	20.83
	GIV	3	4.16
UB infiltration MRI	YES	27	37.5
	No	45	62.5
Rectum INF	YES	18	25.0
	No	54	75.0
Intestinal loop INF	No	69	95.8
	Yes	3	4.16
	Total	72	100.0
Vaginal infiltration	extend to upper 1/3 of vagina	21	29.17
	No	51	70.38
Adnexal mass	Mass at RT region about 2.5x5 cm? overian mass	3	4.16
	No	69	95.83
Free Fluid in pelvic peritoneum	Minimal amount	6	8.33
	No	66	91.67
LN	No	36	50.0
	Bilateral external iliac LN	6	8.33
	Bilateral COMMON iliac LNs ,	12	16.67
	Few RT. enlarged internal iliac L.N	15	20.83
	Inguinal LN	3	4.16
Pelvic bone	First degree spondyiollsthesis of L4 over L5 vertebra	3	4.16
	Metastatic bony deposit of S2 vertebra	3	4.16
	Normal	66	91.67
	Total	72	100.0

Table 5: MRI of studied group.

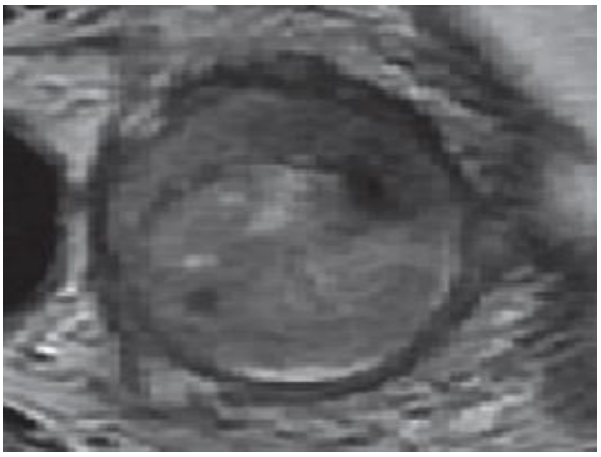

Figure 3: Transverse sections through the pelvis obtained by MRI showing cervical cancer with parametrial infiltration (Grade 1, i.e. incipient infiltration).

83.3% of the cases are squamous cell carcinoma (10% of them are GI, 55% of them are GII, 35% of them are GIII) and adenocarcinoma are 16.67% (75 % are moderately differentiated and 25% are poorly differentiated) (table 6).

		Frequency	Percent
Pathology	Adenocarcinoma Poorly differentiated	**3**	**4.16**
	Adenocarcinoma moderately differentiated	**9**	**12.5**
	Well differentiated sq.cell.carcinoma of cx GI.	**6**	**8.33**
	Invasive cervical squamous cell carcinoma moderately differentiated GII	**33**	**45.83**
	Poorly differentiated squamous cell carcinoma GIII	**21**	**29.17**
	squamous cell carcinoma	**60**	**83.33**
	Adenocarcinoma	**12**	**16.67**
	Total	**72**	**100.0**

Table 6: Pathology of studied group.

US is significant in detection of parametrial infiltration but according to Grad of parametrial infiltration US become less significant with Sensitivity of US in detection of parametrial infiltration are 75% while in EUA: PR is insignificant in detection of grad of parametrial infiltration with Sensitivity 20% (table 7) (Figure 4).

			PARA INF MRI				TOTAL	X^2	Kappa	p
			G I	G II	G III	G IV			agreement	
PR	NOT	NO.	12	36	12	0	57	0.058	0.01	0.97
		%	75.0%	80.0%	80.0%	0.0%	79.2%			
	Reached	NO.	3	9	3	0	15			
		%	25.0%	20.0%	20.0%	0.0%	20.8%			
INF US	Infitration	NO.	0	6	9	0	15	6.26	0.38	0.041*
		%	.0%	80.0%	80.0%	0.0%	79.2%			
	NoT	NO.	12	39	6	0	57			
		%	100.0%	86.7%	40.0%	0.0%	75.0%			
INF US	NO	NO.	0	6	9	3	18	10.01	0.14	0.33
		%	0.0%	13.3%	60.0%	100.0%	25.0%			
	G I	NO.	9	18	0	0	27			
		%	50.0%	13.3%	0.0%	0.0%	15.0%			
	G II	NO.	6	27	6	0	42			
		%	50.0%	60.1%	40.0%	0.0%	55.0%			
	G III	NO.	0	6	0	0	6			
		%	0.0%	13.3%	0.0%	0.0%	5.0%			
	G IV	NO.	0	0	0	0	0			
		%	0.0%	0.0%	0.0%	0.0%	0.0%			
Total		**NO.**	**9**	**45**	**15**	**3**	**72**			
		%	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**			

Table 7: Agreement between MRI and US, EUA regard infiltration.

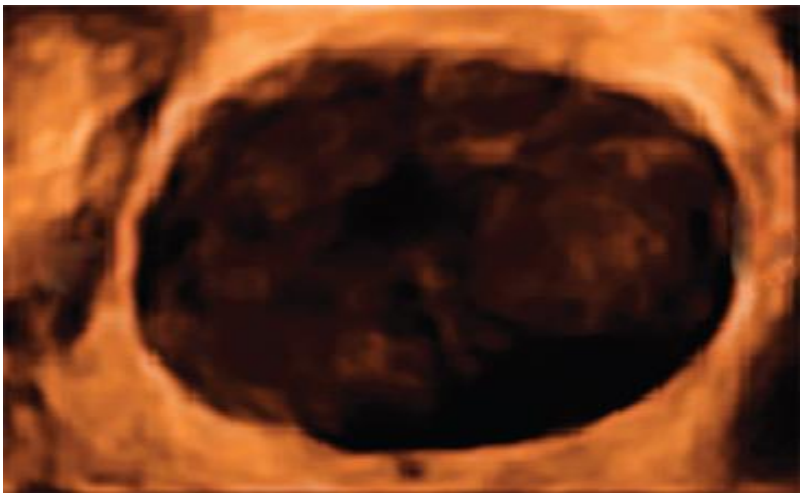

Figure 4: Transverse sections through the pelvis obtained using 3D US Showing (Grade 2) Parametrial infiltration of cervical cancer Grade 2, i.e. depth of infiltration intermediate between Grade 1 and Grade 3.

Discussion

Cervical cancer is a serious health problem, with nearly 500,000 women developing the disease each year worldwide. Most cases occur in less developed countries where no effective screening systems are available. However, early detection and treatment of preinvasive disease became possible. Incidence and mortality rates for

cervical cancer in US had declined dramatically during the remainder of the 20th century, with 12,900 new cases and 4,400 deaths estimate in 2001 (10). So, this study was done to do radiological assessment of cases of cervical cancer with parametrial infiltration.

The radiological assessment was done by using both 2D,3D US and MRI the aim of this study: to compare the diagnostic accuracy of ultrasound and MRI, in detection of parametrial infiltration in cervical cancer and its degree of extension with regard to histopathology.

This study was cross sectional study and included 72 patients with cervical cancer with parametrial infiltration whom by examination under anesthesia were stage IIB or more by clinical FIGO staging This study included (21 cases stage IIB, 21 cases stage IIIA, 6 cases stage IIIB, 21 cases stage IVA, 3 cases stage IVB). According to histopathological examination: 60 cases were squamous cell carcinoma (6 cases were well differentiated sq.c.c,33 cases were moderately differentiated sq.c.c and 21 cases were poorly differentiated sq.c.c) and 12 cases are adenocarcinoma (9 cases were moderately differentiated adenocarcinoma and 3 cases were poorly differentiated adenocarcinoma).

In this study 42 cases underwent Chemoradiotherapy while 24 underwent radiotherapy. The age of the patients ranges between 40:80 and mean of age is 55.85y, the mean of age of marriage 15.9y and the mean of age of menarche 12.45y. In this study the most common presenting symptom was post-menopausal bleeding (45.8 %), followed by lower abdominal pain (29.16%) followed by perimenopausal bleeding (16.66%) followed by post coital vaginal bleeding (8.33%). 12.5% of the patient also complain of dysuria and 15.8% associated with watery or Yellowish offensive streaked with blood discharge. There was no statistically significant correlation between cervical cancer, hypertensive and or diabetes. 16.66% of the patients have family history of cancer (stomach, colon, prostate and breast).

The use of sophisticated radiological examinations, such as magnetic resonance imaging (MRI), has entered into routine practice, even if these methods are not regarded as obligatory in the assessment of clinical staging according to FIGO. Although acceptable figures of diagnostic accuracy have been reported for each of these procedures, there is still no general consensus on which represents the best option in the assessment of the extent of the disease. The issues of costs, availability and dedicated radiological training call for the evaluation of imaging approaches other than CT and MRI. Given the great advances in ultrasound technology and equipment documented in recent decades, and considering its low cost and wide availability, it is reasonable to consider ultrasound as a potential diagnostic tool for cervical cancer staging (11).

In comparison with surgico pathologic findings, FIGO clinical staging has been shown to result in under- or over staging in many patients, with an estimated error rate of 25% for stage I and II disease and up to 40% for more advanced disease, (12)
Furthermore, the inter- and intraobserver variation in clinical pelvic examination is high and depends on the investigators' experience in an effort to improve the precision of preoperative staging and thereby its prognostic value, several authors have suggested inclusion of cross-sectional imaging in routine pretreatment staging (13).

US is highly significant in detection endometrial, myometrial interface with sensitivity 87.5% and specificity 100.0% the stage of a cervical cancer is the most important factor in choosing treatment. As if the stage IA, IB or IIA the case is operable but if the stage is IIB or more the case is inoperable.

In this study Agreement beyond chance between ultrasound and MRI with regard to parametrial infiltration of cervical cancer, without taking into account the location of the infiltration, was moderate. with US 79.2% of cases (57 cases) have parametrial infiltration while 20.83% (15 cases) have not, with MRI 100% of cases (72 cases) have parametrial infiltration with sensitivity of US regard to parametrial infiltration 75%, while MRI are 100 % with high significant of US (P value = 0.039) .

Regarding to the grad of parametrial infiltration US become less significant with P value = (0.12) , In this study by US number of cases in GI were 12 cases (16.7%) while in MRI were 9 cases (12.5%) with agreement (75%) , number of cases in GII were 42 cases (58.3 %) while in MRI were 45 cases (62.5%) with agreement (93%), number of cases in GIII were 3 cases (4.2%) while in MRI were 15 cases (20.8%) with agreement (2%), and number of cases in GIV were 0 (0%) while in MRI were 3 cases (4.17%) with agreement (0%), the sensitivity to GI, GII,GIII,GIVwere25%,15%,55% and 0% respectively.

V. CHIAPPA, 2015 was in agreement with our results as he conducted a prospective comparative study and revealed moderate agreement without taking into account the location of infiltration with sensitivity 89% for US and specificity 55% for US.

But according to agreement in GI, GII, GIII, GIV between US and MRI were 45%, 43%, 82% and 0% respectively (14). Innocenti, 1992 reported accuracy of 83% for staging performed with US, compared with 79% for staging via physical examination. Similarly, in patients who underwent surgical staging for parametrial involvement, researchers reported sensitivity, specificity, and accuracy rates of 52%, 92%, and 84%, respectively, compared with 78%, 89%, and 87% for patients who were staged with US (15).

Gitsch 1993 reported the high specificity of diagnosing parametrial invasion based on sonographic features of stromal reaction (16).

Onother study reported accuracy rates of 95% for ultrasonography,85% for clinical examination, and 90% for MRI for local staging or evaluation of parametrial involvement; not all patients in that study underwent surgical staging. this mean that US is more accurate than MRI in contrast to our study (17).

A. C. TESTA, 2009 in contrast to our results studded Transvaginal ultrasonography and magnetic resonance imaging for assessment of presence, size and extent of invasive cervical cancer and the result of Parametrial infiltration by both ultrasound and MRI had low sensitivity with regard to parametrial infiltration (three of five and two of five, respectively, $P = 1$) and both had a false-positive rate of 11% (7/63). with Agreement for US and MRI 87% and sensitivity of US in detection of parametrial infiltration was 60% while MRI was 40% the discrepancy between this result and ours may be due to small sample size of cases of parametrial infiltration in his study (only 5 cases) (11).

Katharina Hancke, 2010 In contrast to our results as he done study (if Pretreatment Staging of Cervical Cancer: Is Imaging Better Than Palpation?). The estimated sensitivity of both 3D US and MRI for detection of parametrial invasion was poor, and the best diagnostic results were achieved by clinical examination. The sensitivity of clinical examination was 66%, and the calculated sensitivities of 3D US and MRI scan were 43% and 52%, respectively. The specificities of the three diagnostic approaches were 81% for clinical examination, 71% for 3D US, and 63% for MRI. The PPV of clinical examination was 64%, and those of US and MRI examination were 53% and 55%, respectively. The NPV of clinical examination was82% and was again better than that of US and MRI examination, which had NPV values of 62%and 63%, respectively (18).

MRI is preferred imaging modality because of its ability to assess soft tissue in detail, permitting there by better identification of stromal and parametrial infiltration as MRI tell us the exact volume, shape, direction of the primary lesion, local extension of the disease, nodal status accurately, obstruction of the ureter, and lung or liver metastases. T2-weighted MRI provides excellent detail of normal uterine and cervical anatomy and also detects the primary tumor and provides information on its extent. (19).

Ultrasound is fast, inexpensive and readily available; it has no contraindications and is a dynamic tool. Recent studies have shown that a skilled examiner using transvaginal or transrectal ultrasound can estimate tumor volume and local extent of the tumor with good accuracy (20).

An interesting tool is three-dimensional (3D) ultrasound which allows the examiner to analyze countless sections in any direction through an ultrasound volume containing an organ or a tumor. This means that views of an organ or tumor impossible to obtain with two-dimensional (2D) ultrasound can be assessed (21).

The mean limitation in our study is small sample size and study was cross sectional study which not allowed follow up the cases for knowing future management anther important factor investigators experience especially in US.

Conclusion

1-The results of 2D and 3D ultrasound showed similar moderate agreement with MRI; 2D and 3D ultrasound examinations are less costly fast and more readily available than MRI and should be considered in the preoperative work-up for cervical cancer.

2- When comparing the clinical FIGO staging with the surgical and pathological data, there is an underestimation of the extent of the disease in many patients showing over-staging or under-staging, so additional staging Each has been proven to be superior to the conventional FIGO clinical staging system in determining the full extent of the tumor spread.

3- We can save many patients from invasive surgery and its complications and risk of anesthesia if we use US and MRI in addition to clinical staging for correct staging of cancer cervix.

4- Use imaging in addition to clinical FIGO staging in determining the full extent of the tumor spread and a proper management.

References

1. The Gynecologic Cancer Foundation) Publishing. pp. 41–47 2016.
2. Ries LAG, Melbert D, Krapcho M, et al. AMJ Obestet& Gynecol 2010; 202:283.
3. Edge SB, Byrd DR, Compton CC, et al. AJCC Cancer Staging Manual. Cervix uteri. 7th ed. New York, NY: Springer; 2010. 395-402.
4. V. CHIAPPA V. A. DI LEGGE, A. L. VALENTINI, B. GUI, M. MICCO`. *Department of Gynecologic Oncology, National Cancer Institute, Milan, Italy; Agreement of two-dimensional and three-dimensional transvaginal ultrasound with magnetic resonance imaging in assessment of parametrial infiltration in cervical cancer 2015; 31:10-17.
5. Hricak H, Powell CB, Yu KK, et al. Invasive cervical carcinoma: role of MR imaging in pretreatment work-up—cost minimization and diagnostic efficacy analysis. Radiology 1996; 198:403–9.
6. w.patrick Soutter, Soutter WP, Hanoch J, D'Arcy T, et al: Pretreatment tumour volume measurement on highresolution magnetic resonance imaging as a predictor of survival in cervical cancer. BJOG 111:741-747, 1992.
7. Bray F, Loos AH, McCarron P, Arbyn M, Parkin DM. Trends in cervical Sq .C.,(3):677-86. carcinoma 2005.
8. Stenstedt, Collettini, Fridisten S impact of MRI in management and staging of cancer of uterine cervix. Acta oncologica. 2011; 50:420-6.
9. Crofton M and Jenkis, 2010 Gynecological image; RJPBCS:21114-2457.
10. Waggoner SE, cervical cancer. Lanced 2003 Jun. 28;361 (9376):2217-25.
11. Testa AC, Ludovisi M, Manfredi R, Zannonis G, Basso D Transvaginal ultrasonography and magnetic resonance imaging for assessment of presence, size and extent of invasive cervical cancer. 2009; 34:335-44.
12. Narayan K. Arguments for a magnetic resonance imaging– assisted FIGO staging system for cervical cancer. Int J Gynecol Cancer 2005; 15:573–82.
13. Bipat S, Glas AS, van der Velden J, Zwinderman AH, Bossuyt PM, Stoker J (2003) Computed tomography and magne.4 tic resonance imaging in staging of uterine cervical carcinoma: a systematic review. Gynecol Oncol 91:59–66.

14. V. CHIAPPA V. A. DI LEGGE, A. L. VALENTINI, B. GUI, M. MICCO`. *Department of Gynecologic Oncology, National Cancer Institute, Milan, Italy; Agreement of two-dimensional and three-dimensional transvaginal ultrasound with magnetic resonance imaging in assessment of parametrial infiltration in cervical cancer 2015; 31:10-17.
15. Innocenti P, Pulli F, Savino L, et al. Staging of cervical cancer: reliability of transrectal US. Radiology. 1992;185: 201–205.
16. Gitsch G, Deutinger J, Renthaller A, Breitenecker G, Bernaschek G. Cervical cancer: the diagnostic value of recto sonography for the judgment of parametrial invasion in regard of inflammatory stromal reaction. Br J Obstet Gynaecol. 1993; 100:696–697.
17. Potter R, Peter George, Dianal Bergar. Alina SturdzaClinical Outcome of protocol-based image (MRI) guided adaptive brachy therapy; 2011.100(1):116-123.
18. Katharina Hancke, Volker Heilmann, Peter Straka, Rolf Kreienberg, PhD, and Christian Kurzeder, Department of Gynaecology and Obstetrics, University of Ulm, Prittwitzstrasse 43, 89075 Ulm, Germany 2010.
19. Mahajan,R Kuber ,KR Chaudhari- the indian journal of radiology and imaging 2013.
20. Fischerova D.Charles University, Prague, Czech.Ultrasound Scanning of pelvis and abdomen gynecological tumor 2011; 38(3): 246-66.
21. Gaurilcikas A, Vaitkiene D, Cizauskas A, Inciura A, Svedas E, Maciuleviciene R, Di Legge A, Ferrandina G, Testa AC, Valentin L. Early-stage cervical cancer: agreement between ultrasound and histopathological findings with regard to tumor size and extent of local disease. Ultrasound Obstet Gynecol 2011; 38: 707–715. 2011.