DIAGNOSTIC VALUE OF TRANSVAGINAL ULTRASOUND IN COMPARISON TO MAGNETIC RESONANCE IMAGING IN CERVICAL CANCER STAGING

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Introduction

Cervical cancer is the second most common cancer in women worldwide, with developing countries accounting for 75 percent of cases. It has a reported incidence of 7.9 per 100,000 women, with an overall 5-year relative survival of 90.9 percent for patients with local stage disease and 16.1 percent for patients with advanced stage disease, respectively

Almost all 99.7 percent cervical cancer cases are caused by a persistent infection with a high-risk type of HPV. There are 15 high-risk (oncogenic) HPV strains, with just two, 16 and 18, accounting for 70 percent of all cervical cancers.

HPV immunization can prevent up to 70 percent of HPV-related cervical cancer cases and 90 percent of genital warts.

MRI is now widely recognized and used as the most reliable imaging modality for assessing tumor volume, parametrial invasion, and metastases to regional lymph nodes and adjacent pelvic organs.

In recent years, researchers have looked into the role of ultrasound (TVUS) in the staging of cervical cancer. In comparison to MRI, the US has the advantages of being less expensive, noninvasive, and widely available

Aim of the work

The aim of this study was to detect the diagnostic value of transvaginal ultrasound in comparison to magnetic resonance imaging in cervical cancer staging depending on histopathological result.

Subjects and Methods

Subjects:
Inclusion criteria:
•Patients proved to have cancer cervix by prior cervical biopsy and histopathological examination.
 Exclusion criteria :
•Swelling that infiltrate the lower 1/3 of the vagina making difficult to introduce the vaginal probe.
• History of prior Pelvic radiation.

Methods: A prospective, observational, cross-sectional study was conducted and included 64 patients with histopathological diagnosis of cervical cancer (obtained by cervical biopsy in all cases).

All the patients were staged according to FIGO criteria and underwent a systematic physical examination (which include bimanual pelvic abdominal speculum and per rectal examination) and gynecological examination under anesthesia. They were subjected to MRI and transvaginal ultrasound examinations. In our study, we used MRI findings as the gold standard.

Pelvic MRI was carried out in Alexandria University Hospital. For this study, the examiner of the MRI had access to the patient history but was blinded to the FIGO staging and ultrasound finding.

Pelvic transvaginal sonography was performed only for research purposes. The ultrasound examiner had access to the patient's history but he was blinded to the FIGO staging and MRI finding.

Results

Table 1: Distribution of the studied cases according to different parameters (n = 64)

	No. No	No %	Yes No.	Yes %
Uterine body invasion				
US	25	39.1	39	60.9
MRI	27	42.2	37	57.8
vaginal invasion				
US	35	54.7	29	45.3
MRI	32	50.0	32	50.0
Vesicovaginal septum invasion				
US	52	81.3	12	18.8
MRI	52	81.3	12	18.8
Rectovaginal septum invasion				
US	57	89.1	7	10.9
MRI	51	79.7	13	20.3
Parametrium invasion				
US	15	23.4	49	76.6
MRI	13	20.3	51	79.7
Iliac LNS metasets				
US	49	76.6	15	23.4
MRI	14	21.9	50	78.1
Para Aortic LNS metasets				
US	64	100.0	0	0.0
MRI	62	96.9	2	3.1

Table 2: Agreement between TVUS and MRI according to Tumor volume **(cm³)**

Tumor volume (cm3)	US	MRI	t	p
Mean ± SD	55.85 ± 35.14	72.99± 71.24	2.969*	0.004*

t: Paired t-test
 *: Statistically significant at p ≤ 0.05

Table 3: Agreement between transvaginal ultrasound and magnetic resonance imaging (MRI) with regard to presence or absence of Parametrium invasion by the tumor (kappa Test, sensitivity, specificity and accuracy) (n = 64) using MRI as gold standard

Parametrium	MRI No (n = 51)	MRI Yes (n = 13)	χ^2	FEp	κ	Sensitivity	Specificity	PPV	NPV	Accuracy
US										
No	11	4	34.026*	<0.001*	0.726	92.16	84.62	95.92	73.33	90.63
Yes	2	47								

χ^2: Chi square test
FE: Fisher Exact κ: kappa test
p: p value for association between different categories
*: Statistically significant at p ≤ 0.05
PPV: Positive predictive value
NPV: Negative predictive value

Kappa	Interpretation
< 0	Poor agreement
0.0 − 0.20	Slight agreement
0.21 − 0.40	Fair agreement
0.41 − 0.60	Moderate agreement
0.61 − 0.80	Substantial agreement
0.81 − 1.00	Almost perfect agreement

Conclusion

- Using TVUS could reasonably be proposed as a method for assessing tumor volume in small to medium size tumors and infiltration of uterine body, vaginal walls, vesicovaginal septum, rectovaginal septum and parametrium by cervical cancer with a moderate to perfect agreement with MRI.
- TVUS could be used in addition to MRI for local staging of invasive cervical cancer in the hands of a skilled examine.