

Diagnostic Accuracy of MRI Pelvis in Detection of Cervical Invasion in Patients of Endometrial Carcinoma Taking Histopathology as Gold Standard

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ABSTRACT

Objective: To assess the diagnostic accuracy of MRI pelvis in detection of cervical invasion among patients of endometrial carcinoma presented at tertiary care Hospital by taking histopathology as gold standard.

Materials and Method: This cross-sectional study was done at Radiology department of LUMHS Jamshoro during six months from June 2020 to November 2020. All the cases of endometrial carcinoma and underwent hysterectomies with either age, were included in the study. After taking informed consent all the study subjects underwent MRI pelvis to detect the cervical invasion and all cases were followed till hysterectomies. Histopathological assessment was done of each patient's specimen of the surgically removed uterus. Data were collected by the self-made proforma. SPSS version 21 was used for the data analysis.

Results: Total 38 individuals were studied. The mean age of the cases was 53.97±9.93 years and mean duration of symptoms was 15.07±5.99 months. Post-menopausal women were in the majority 28(73.7%) and premenopausal women were 10(26.3%). Cervical invasion of endometrium carcinoma was diagnosed among 57.9% of the females by MRI and among 55.3% diagnosed by histopathology. In the detection of cervical invasion, MRI showed 90% sensitivity and 82% specificity, followed by 86% positive predictive value (PPV) and 97% negative predictive value (NPP) and diagnostic accuracy 86%.

Conclusion: Magnetic resonance imaging of the pelvis, observed to be a safe, reliable, feasible and quick diagnostic tool to detect the cervical invasion among females of endometrium carcinoma.

Keywords: Endometrium cancer, MRI, sensitivity, specificity

INTRODUCTION

Endometrial cancer (EC) of the uterus is a most prevalent **malignancy in** gynecology and a major cause of both morbidity and mortality. Although, it is usually believed that EC has a good prognosis, more than 20% of females with EC die because of their condition, with an expected rise in both mortality and the prevalence over next several decades.¹ Histologically, EC has been characterized as either estrogen-dependent malignancy with a favorable result or estrogen-independent malignancy with a poor prognosis.² In the third world nations, the prevalence of EC is 5.9 per 0.1 million women, making it the second most prevalent gynecological cancer.³ Endometrial malignancy is most commonly diagnosed in women of age group 60-70 years.^{3,4} In addition to endometrial hyperplasia, obesity, uncontrolled estrogen therapy, diabetes, late menopause, and early menarche are the significant risk factors of endometrial cancer.⁵ Endometrial carcinoma prognosis are determined by several parameters, such as stage, myometrial invasion depth, nodal status, histologic grade, and lymphovascular invasion.⁷ The assessment of these prognostic markers before to surgery helps a subspecialist in treatment planning.^{6,7} In EC cases, the most significant prognostic factors are myometrial invasion depth, histological subtype, tumor grade, tumor size, cervical involvement, status of lymph node, and lymphovascular invasion.⁸ Gross cervical invasion necessitates either preoperative radiation treatment or a

modified surgical strategy, namely radical hysterectomy rather than total abdominal hysterectomy. The distinction between stages 1a and 1b in the former staging method, as well as glandular invasion of the cervix, posed some difficulties. It is expected that the updated 2009 FIGO grading would improve MRI staging accuracy.⁹ In terms of evaluating myometrial invasion and cervical tumor expansions, MRI outperforms CT and sonography.^{6,10} Although evidence on the significance of MRI in the grading of EC, especially in the cervical invasion identification, is inadequate in our nation.³ Hence, this study has been conducted to determine the diagnostic accuracy of MRI pelvis in detection of cervical invasion in endometrial carcinoma taking histopathology as gold standard.

MATERIALS AND METHODS

This cross-sectional study was done at Radiology department of LUMHS Jamshoro during six months from June 2020 to November 2020. All the cases of endometrial carcinoma and underwent hysterectomies with either age, were included in the current study. All patients with the history of hysterectomies and participants who refused to participate in the study were not included in the study. After taking informed consent, all the study subjects underwent MRI pelvis to detect cervical invasion and all the cases were followed till hysterectomies and the histopathology of each patient's specimen of surgically removed uterus. Data were collected by the self-made study proforma. SPSS

version 21 was used for the data analysis. The table 2X2 was used in calculating the sensitivity (SE), specificity (SP), negative & positive predictive values (NPV and PPV), and accuracy of MRI pelvis by taking histopathology as gold standard.

RESULTS

Total 38 patients of with endometrial carcinoma were studied. Patient's average age was 53.97±9.93 years and mean duration of symptoms was 15.07+5.99 months. Post-menopausal women were in the majority 28(73.7%) and premenopausal women were 10(26.3%). Table .1

Cervical invasion of endometrium carcinoma was diagnosed among 57.9% of the females by MRI and among 55.3% of the women by histopathology. Table 2.

In the diagnosis of cervical invasion, MRI showed 90% sensitivity and 82% specificity, followed by 86% positive predictive value (PPV) and 97% negative predictive value (NPP) and diagnostic accuracy 86%. Table 3.

Table 1: Descriptive statistics of age, symptom's duration and menopausal status n=38

Variables		Statistics
Patient's age (Mean ± SD)		53.97±9.93 years
Duration of symptoms (Mean±SD)		15.07+5.99 Months
Menopausal status	Pre-menopausal	10(26.3%)
	Post-menopausal	28(73.7%)
	Total	38(100.0%)

Table 2: Frequency of cervical invasion according to MRI and Histopathology n=38

Variables	Frequency	Percentage
MRI findings		
Yes	22	57.9%
No	16	42.1%
Histopathological findings		
Yes	21	55.3%
No	17	44.7%

Table 3: Diagnostic accuracy of MRI in detection of cervical invasion by taking histopathology as gold standard n=38

MRI findings	Histopathological findings		Total
	Positive	Negative	
Positive	19	3	22
Negative	2	14	16
Total	51	9	60

Sensitivity: 90%, Specificity: 82%, PPV: 86%, NPV: 87%

DISCUSSION

Endometrial cancer (EC) is the most common gynecologic cancer seen in women today. It affects a significant number of older women. Although in this study, the average age of the study subjects was 53.97±9.93 years. Consistently in the study of Zamani F et al⁹ reported that the average age of the patients 53.31+11.52 years. However, in the study of Malik TY et al¹¹ reported that the average age of the study subjects was 56.66±10.51 years and 61.08±6.69 years with type I and type II endometrial carcinoma. In another study of Takreem A et al⁵ reported that patients with endometrial hyperplasia presented with age range of 45–53 years. The difference in the average of the age may be due to

difference in the sample size of the studies and selection criteria.

In this study post-menopausal women were in most 28(73.7%) and premenopausal women were 10(26.3%). Consistently other studies, it has been reported that most of the patients assessed at the early stage of the disease and 75% occur among postmenopausal females with vaginal bleeding being the commonest symptom.^{12,13} Although in the study of Masroor I et al³ also reported that the majority of the females were of post-menopausal status and mostly were presented with the symptom of post-menopausal bleeding. Adequate pre-operative evaluation of invasiveness of EC is essential for surgical planning.¹⁴ MRI is actually the best method for preoperatively assessing the local invasiveness of uterine cancers.^{14,15} In this study, in the diagnosis of cervical invasion, the MRI showed 90% sensitivity and 82% specificity, followed by 86% positive predictive value (PPV) and 97% negative predictive value (NPP) and diagnostic accuracy 86%. In agreement with our findings, Masroor I et al³ also reported that in the detection of cervical invasion, the MRI showed diagnostic accuracy 89.28% with sensitivity and specificity were 92.85% and 88.09% respectively, while PPV and NPV were 72.22% and 97.36% respectively. On other hand in the study of Zamani F et al⁹ showed lower positive predictive value of 50%, while they showed accuracy 74.07% of MRI in the detection of cervical mucosal involvement. In a study of Seki et al¹⁶ demonstrated that the MRI overall accuracy in detection of cervical infiltration was 90-92%, with the 75-80% sensitivity and 94-96% specificity. Although Savelli L et al¹⁶ observed that the diagnostic accuracy of MRI in the diagnosis of cervical invasion was 79%, followed by sensitivity was 87%, specificity 58%, PPV 95% and NPV 85%. Several methods have been utilized in studies as preoperative EC staging tools. The accuracy of MRI in determining the depth of cervical infiltration has been established. In EC type I cases, MRI has been recommended by the European Society of Urogenital Radiology (ESUR) to identify stage-1A patients who would have no benefit of lymphadenectomy, to diagnose extrauterine spread in type II cancer, and to identify endometrium-confined cancer in endometrioid adenocarcinoma grade 1 patients of reproductive age who could benefit from fertility-sparing intervention.^{17,18} At the time of diagnosis, cervical extension of endometrial cancer accounts for roughly 10–15% of cases.^{19,20} Cervical invasion is thought to increase the likelihood of nodal metastasis, and patients with it have an even worse prognosis versus those who do not have it.¹⁹

CONCLUSION

Magnetic resonance imaging of pelvis was observed to be a reliable, non-complicated, quick and feasible diagnostic tool to detect cervical invasion among females of endometrium carcinoma. This was a single-center study with an uncertain sample size; therefore, further large sample size studies are recommended.

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