ORIGINAL ARTICLE

Diagnostic Accuracy of MRI for Diagnosing Malignancy of Cervixtaking Histopathology as Gold Standard

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ABSTRACT

Objective: Toexamine the diagnostic accuracy of MRI for diagnosing carcinoma of cervix taking histopathology as gold standard.
Study Design: Retrospective
Place and Duration: Study was carried out at department of Radiology, MTI Lady Reading Hospital, Peshawar for duration of one year from June 2018 to June 2019.
Methods: Sixty women clinically diagnosed to have carcinoma of cervix were included. After taking written consent, patients' detailed demographics were recorded. All the patients underwent MRI of pelvis to detect the malignancy. Biopsy specimen were taken and sent to laboratory for histopathological examination. Sensitivity, specificity, PPV, NPV and diagnostic accuracy of MRI were examined. Data was analyzed by SPSS 24.0.
Results: Mean age of patients was 48.46±10.62 years. Hypertension was the commonest co-morbidity in 14 (23.33%) patients. Post-menopausal bleeding was the commonest clinical presentation found in 25 (41.66%) patientsfollowed by irregular vaginal bleeding in 21 (35%) patients.By MRI 45 (75%) patients found to have malignancy and 15 (25%) had negative findings. The sensitivity, specificity, PPV, NPV and diagnostic accuracy of MRI were 94.62%, 92.59%, 97.78%, 87.33% and 94.17% respectively.
Conclusion: Magnetic resonance imaging is very useful diagnostic tool for diagnosing carcinoma of cervix and should be used as an alternate to histopathological examination.
Keywords: Cervix Carcinoma, Magnetic Resonance Imaging, Accuracy.

INTRODUCTION

The most common malignancy in women is cervix carcinoma of cervix[1]. It is estimated that a total of 371,200 cases worldwide are diagnosed as carcinoma of cervix and constitute 9.8% of all forms of female cancer [2]. Invasive cervical cancer, like Pakistan [2], is most prevalent in developing nations. However, 65 new cases are reported annually in a single institutional study in Pakistan with no reliable data regarding the incidence of cervix ca. [3]. Per year, there are about 190,000 deaths worldwide and the leading cause of death is invasive cervical cancers worldwide.

The uterine cervical Carcinoma control (such as uterine surgical removal (hysterectomy), chemotherapy and radiotherapy is subject to three treatment choices. For precise management preparation and selection[4], a correct stage of cervical cancer is important. The stage of cervical carcinoma avd subsequent treatement is characterized by parametrial invasion [5]. Roughly 73% of patients with cervical carcinoma have parametrial invasion [5]. Patients with non-parametrium-invasive cervical cancer will be labelled as stage IIA or lower and hysterectomic treatment is possible. Cervical cancer patients who have been diagnosed as invaders of parametrium are described as stage IIB or higher and can best be treated with radiation and chemotherapy only (not with hysterectomy)[7-8].

The FIGO classification is based on the latest staging method of cervical cancer [5]. This system is based on the outcomes of the clinical diagnosis or assessment of the patient. The estimates of the tumor size was very difficult in clinical evaluation of cases with cervical cancer having parametrial and pelvic sidewall invasion, assessment of lymph nodes of distant metastasis. Methods of pictured cervical cancer include ultrasound scan, barium enema, excretional urography, computed tomography (CT), lymphangiography and magnetic resonance imaging, positron emission tomography (MET) (MRI).

The tumour location, scale, depth of parametric invasion and lower segmental extension of the uterus are accurately diagnosed by MRI [9-10]. 80 and 96% respectively were found to be susceptible to and unique to MRI in the diagnosis of parametrial invasion [11]. MRI is a good diagnostic tool in the assessment of lymph node metastases.

The present study was conducted aimed to examine the diagnostic performance of MRI for diagnosing cervical carcinoma.

MATERIALS AND METHODS

This retrospective observational study was conducted at department of Radiology, MTI Lady Reading Hospital, Peshawar for duration of one year fromJune 2018 to June 2019. Total 60 patients with ages between 25 to 70 years clinically diagnosed to have cervical carcinoma were enrolled. Patients' detailed demographics including age, co-morbidities and clinical presentation were recorded after taking written consent. Diagnosed cases of cervical carcinoma, patients on radiotherapy and chemotherapy treatment, patients with uterus carcinoma and those with no consent were excluded.

MRI was done to all the patients. The MRI f pelvis of chosen patients was performed on 1.5 T MRI machine by a prepared MRI specialist having over 3 years experience.

Sagittal pictures of T2 weighted, hub pictures of T1W and T2W and coronal pictures of T1W and T2 fat sat groupings of the influenced district were taken. X-ray sweep of pelvis of the patients in the wake of being analyzed as having highlights of Ca cervix on reassure during MRI assessments were additionally assessed and dissected for having various examples of association of the cervix. Biopsy specimen was obtained to examine histopathologically. We took histopathological examination as a gold standard. Sensitivity, specificity, PPV, NPV and diagnostic accuracy of MRI were examined.All the data was analyzed by SPSS 24. Chi-square test was done to compare the MRI and histopathological examination. P-value <0.05 was taken as significant.

RESULTS

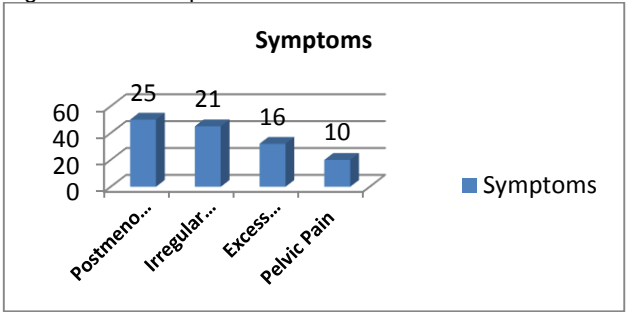
Mean age of patients was 48.46±10.62 years. Mean BMI was 23.44±1.57 kg/m^2. Hypertension was the commonest co-morbidity in 14 (23.33%) patients followed by diabetes mellitus in 12 (20%) patients, anemia was found in 11 (18.33%) patients and 4 (6.67%) patients had cardiovascular disease. (Table 1)

Table 1: Demographics of all the patients

Variable	No.	%
Mean age (yrs)	48.46±10.62	-
Mean BMI (kg/m^2)	23.44±1.57	-
Co-morbidities		
Hypertension	14	23.33
Diabetes	12	20
Anemia	11	18.33
CVD	4	6.67

Post-menopausal bleeding was the most common symptom found in 25 (41.66%) followed by irregular vaginal bleeding in 21 (35%), offensive watery discharge in 16 (26.67%) and pelvic pain found in 10 (16.67%) patients. (Figure 1)

Figure 1: Clinical presentation



45 (75%) patients had malignancy and 15 (25%) had negative by MRI. By histopathological examination 47 (78.33%) had positive and 16 (22.5%) had negative. On comparison of MRI finding with histopathology, 44 (73.33%) were true positive, 1 (1.67%) were false positive, 3 (5%) were false negative and 12 (20%) were true negative. The sensitivity, specificity, PPV, NPV and diagnostic accuracy of MRI were 94.62%, 92.59%, 97.78%, 87.33% and 94.17% respectively. (Table 2)

Table 4: Comparison of MRI with histopathology

MRI	Histopathology		Total
	Positive	Negative	
Positive	44	1	45
Negative	3	12	15
Total	47	13	60

Sensitivity=94.62%, Specificity=92.59%, PPV=97.78%, NPV=87.33%, Accuracy=94.17%.

DISCUSSION

Cervical carcinoma is one of the most common diseases with high morbidity and mortality rates. In the management of this malignant disorder, early and correct diagnosis is very critical. Many diagnostic techniques have been used in this respect, in which ultrasound and magnetic resonance imaging play a crucial role in diagnosing malignancy. Histopathological analysis, however, was seen as a form of choosing [9-10]. We conducted present study to examine the diagnostic accuracy of MRI in detection of cervical malignancy. In this regard 60women clinically diagnosed to have cervical carcinoma were analyzed. Majority of patients about 42% were ages between 41 to 50 years and mean age was 48.46±10.62 years. These results showed similarity to many of previous studies regarding cervical or endometrial carcinoma, in which majority 75% patients were ages 40 to 60 years [11-12].

In our study we found that Hypertension was the commonest co-morbidity in 14 (23.33%) patients followed by diabetes mellitus in 12 (20%) patients, anemia found in 11 (18.33%) patients and 4 (6.67%) patients had cardiovascular disease. We found that Post-menopausal bleeding was the most common symptom found in 25 (41.66%) followed by irregular vaginal bleeding in 21 (35%), offensive watery discharge in 32 (26.67%) and pelvic pain found in 10 (16.67%) patients. 40 patients had more than one symptoms. A study conducted by Asad M et al [13] regarding reported that irregular vadinal bleeding was the most frequent clinical presentation found in 62.9% patients in cervical carcinoma suspected cases.

Tabassum et al [14] reported that irregular vaginal bleeding was most common symptom associated with cervical carcinoma found in 62.9% patients followed by Post menopausal bleeding in 96 (31.4%), Vaginal discharge in 64 (20.9%) and post coital bleeding in 56 (18.3%). 103 (33.7%) were having more than one symptom. Some other studies showed similarity in which post-menopausal bleeding was the common presentation of cervical carcinoma [15-16].

In present study we found that 90 (75%) patients had malignancy and 30 (25%) had negative by MRI. By histopathological examination 93 (77.5%) had positive and 32 (22.5%) had negative. On comparison of MRI finding with histopathology, 88 (73.33%) were true positive, 2 (1.67%) were false positive, 5 (4.17%) were false negative and 25 (20.83%) were true negative. The sensitivity, specificity, PPV, NPV and diagnostic accuracy of MRI were 94.62%, 92.59%, 97.78%, 87.33% and 94.17% respectively. A study by Raja R et al [17] regarding diagnostic accuracy of MRI for diagnosing parametrial invasion in cervical carcinoma and they reported that MRI had sensitivity 84.5%, specificity was 85.2%, NPV was 86.9%, PPV was 81.3% and accuracy was 84.3%.

A study conducted by Masroor I et al[21] reported that the sensitivity, specificity, diagnostic accuracy, positive and negative predictive values of MRI in the detection of cervical invasion were 92.85%, 88.09%, 89.28%, 72.22% and 97.36%, respectively.

Dakshit et al[22] regarding carcinoma of cervix, in which they reported that in comparison of MRI with histopathology in detection of stromal invasion of >2/3RD sensitivity of MRI was 94.4%, specificity of MRI – 88.8%, positive predictive value- 89.47% and negative predictive value – 94.12%. p value - <0.0001. Ali Jet al[23] reported that the sensitivity was 81.7%, specificity 77.1%, and accuracy of MRI was 81.9%.

CONCLUSION

Cervical carcinoma is a malignant disease known to be present in women of all age, particularly in older women who are at high risk of developing cervical carcinoma. Early and precise diagnosis is very necessary for cervical carcinoma therapy. We concluded that magnetic resonance imaging is an extremely useful tool for diagnosing cervical carcinoma more sensitivity and precision and for making it more accurate.

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