ORIGINAL ARTICLE

MRI's Diagnostic Reliability in Cervical Cancer Screening Detecting Cancer using Magnetic Resonance Imaging is a Reliable Method (MRI) A Single Center Study

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ABSTRACT

Aim: to evaluate the diagnostic efficacy of magnetic resonance imaging (MRI) for cervical cancerdetection in patients with cervix carcinoma who had received a clinical diagnosis.

Study Design: A Single Center Study

Place and duration Department of Radiology Qazi hussain ahmad medical complex Nowshera from january 2018 to December 2019.

Methods: In all, 75 individuals between the ages of 31 and 62 with clinically suspected cervical cancer were recruited in this research. After obtaining written agreement, extensive patient demographic information was gathered, including their age, place of residence, socioeconomic status, co-morbidities, and clinical presentation. An MRI of the pelvis was performed on each patient to find the malignancy. Histopathology was used as the standard.

Results: Patients' ages ranged from 31 to 41 years for 15 (21%) patients, 42 to 52 years for 26 (34%) patients, 53 to 63 years for 21 (28%) patients, and beyond 61 years for 13 (18%) patients.The most prevalent symptom, post-menopausal bleeding, was seen in 32 (42%) patients, followed by atypical vaginal bleeding in 25 (34%) patients, foul-smelling watery discharge in 18(24%) patients, and pelvic discomfort in 15 (21%) patients. By MRI, 53 patients (71%) had positive results, while 22 patients (29%) had negative findings. By histological examination, 56 patients (75%) had positive findings, while 19 patients (24%) had negative. The diagnostic accuracy of MRI was 90%, 87, 96, 74%, and 87%, respectively. Sensitivity, specificity, PPV, and NPV were also high.

Conclusion: For cervical cancer diagnosis, magnetic resonance imaging is a beneficial diagnostic technique.

Keywords: Cervical Carcinoma, Accuracy, Magnetic Resonance Imaging

INTRODUCTION

The most enduringly harmful condition affecting women is endometrial cancer. The average age of a decisive person is 61. It is assumed that the recent increasing recurrence discovered is necessary for raising future and extending heftiness rates1. The third most frequent cause of gynecological weakening is cervical carcinoma. The average age at a startup is 47 years old. Free Papanicolaou screening and effective in situ carcinoma therapy have significantly dropped dangerous cervical development in developed nations. 2. The harmful effects of abnormal vaginal bleeding are experienced by 91% of patients with risky endometrial development, most of whom are post- menopausal. Emptying will generally start to happen early in the course of the sickness. 3

Human papillomavirus (HPV) infection is the leading risk factor for unfavorable cervix development, particularly subtypes 16 (usually associated with SCC) and 18 T. (generally adenocarcinoma-related). Other slanting factors include low financial establishment, early sexual conjunction, numerous companions, safe concealment, and smoking4. The most often used clinical decision-making tool for harmful cervical development depends on the International Federation of Gynecology and Obstetrics

(FIGO) to determine structure5. This orchestrating framework has various limitations and causes the patient some difficulty. It focuses on clinical assessment and basic tests such as chest radiography, barium gut cleansing, intravenous urography, cystoscopy, and recto sigmoidoscopy. Ionizing radiation is used in these fundamental tests in a heavily examiner-dependent portion. The estimation of tumor size, examination of the parametrial interruption and pelvic side dividers, and assessment of nearby organ commitment and lymphadenopathy are significant clinical evaluation roadblocks in diagnosing cervical disease6, 7. The noninvasive imaging technique known as X-beam has limitations in assessing cervical tumors, their parametrial disruption, tumor size, and lymph node metastases. Thus, MRI offersthe best alternative to choosing a treatment approach and evaluating the components of the rule-based prognosis. If MRI is performed, it may provide a significant benefit by avoiding the necessity for an evaluation under sedation and the need to carry out several examinations for a primary illness becauseof the affectability and specificity of MRI in evaluating metastases9,10. The current research aimed toassess the diagnostic precision of MRI for the detection of cervical cancer.

MATERIALS AND METHODS

The Department of Radiology Qazi hussain ahmad medical complex Nowshera from January 2018 to December 2019.carried out this Single Center Study research. A total of 75 individuals between the ages of 31 and 63 with clinically suspected cervical cancer were recruited. After obtaining the written agreement, specific patient details, such as age, place of residence, socioeconomic status, co-morbidities, and clinical presentation, were documented. Patients with uterine cancer, those receiving radiation or chemotherapy, those with cervical carcinoma, and those without permission wereeliminated.

All of the patients had MRIs. A trained MRI expert with more than three years of experience conducted the MRI output of the pelvis of the selected patients using an Archieva Nova double Philips [1.5] teslaMRI machine. Coronal images of [T1W and T2] fat sat groupings of the impacted district, hub imagesof [T1W and T2W], and sagittal images of [T2] weighted groups were also obtained. The patients' X- ray pelvic scans were also evaluated and dissected for numerous indications of cervix association after the patients' MRI scans revealed Ca cervix highlights on the image. A biopsy sample was taken for histological analysis. Our gold standard is histopathology analysis. We looked at the sensitivity, specificity, PPV, NPV, and diagnostic reliability of MRI. SPSS 26 was used to analyze all the data. A chi-square test was used to compare the results of the MRI and the histological analysis. P-values below 0.05 were considered significant.

RESULTS

Patients with ages between 31 and 41 were represented by 15 (21%) of the total, 42 to 52, 26 (34%) of the total, 53 to 63 by 21 (28%) of the total, and above 63 by 13 (17%) of the total. 40 (54%) of the patients lived in cities compared to 35 (47%) in rural areas. 20 (27%) patients had a low socioeconomicposition, 41 (55%) had a

tolerable level, and 14 (19%) had a high level. 10(12%) had anaemia, 15(21%) had diabetes, 16(23%) had hypertension, and 10(03%) had cardiovascular disease (Table 1).

Table 1: all patients' demographics

Variable	No.	%
Age (years)		
31 to 41	15	21
42 to 52	26	34
53 to 63	21	28
Above 63	13	16
Co-morbidities		
Diabetes	15	19.
Hypertension	10	03
Anemia	16	23
CVD	10	03
Residence		
Urban	40	54%
Rural	35	45
SocioeconomicSocioeconomic status		
Low	20	26
Middle	42	55
High	14	19

Table 2: Malignancy rates by MRI

MRI	No.	%
Positive	52	71
Negative	23	29

Table 3: Positive Histopathology Findings

MRI	No.	%
Positive	56	75
Negative	19	25

Table 4: MRI and histology are contrasted.

MRI	Histopathology		Total
	Positive	Negative	
Positive	50	03	53
Negative	06	17	22
Total	56	18	75

Table 5: Comparison of sensitivity with specificity

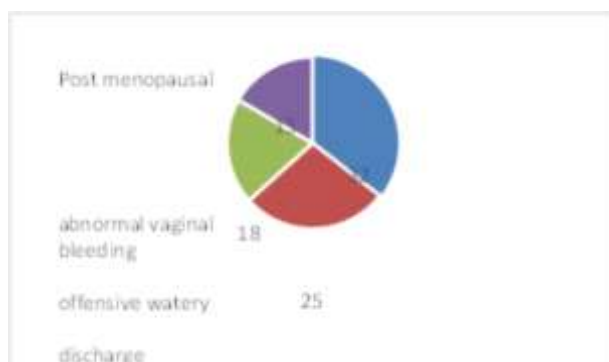|	Value	95% CI
Sensitivity	89%	83.04 to 95.34%
Specificity	87%	72.92 to 96.60%
+veLikelihood Ratio	07	02.97 to 15.41
-likelihood Ratio	0.22	0.06 to 0.22
Disease prevalence (*)	75%	65.95 to 81.42%
+ve Predictive Value (*)	96%	89.82 to 96.83%
-ve Predictive Value (*)	74%	62.38 to 81.63%
Accuracy (*)	89%	81.49 to 94.27%

Figure 1: The patients' overall clinical profiles

The most prevalent symptom in 32 (42%) patients was post-menopausal bleeding, which was followed by atypical vaginal bleeding in 25 (34%), foul-smelling watery discharge in 18 (24%), and pelvic discomfort in 15 (21%) individuals. Twenty

patients had several symptoms (Fig. 1). Using MRI, 23 patients had negative results, and 52 patients (71%) had good results (Table 2). According to histological analysis, 19% of the 56 people got adverse effects (Table 3). When MRI results were compared to histology, 50 (67%) of the results were real positives, 3 (3% false positives), 6 (9% false negatives), and 17 (21%) were real negatives. According to Table 4, the sensitivity, specificity, PPV, NPV, and diagnostic accuracy of MRI were correspondingly 90%, 87%, 96%, 74%, and 89%.

DISCUSSION

One of the most prevalent gynecological disorders, cervical cancer, has a high incidence of morbidity and death. An early and precise diagnosis is necessary for this cancerous condition to be managed. In this view, MRI- A Helpful Instrument for Diagnosing malignancy, various diagnostic technologies, including magnetic resonance imaging and ultrasonography, have been utilized to diagnose malignancy. Yet, a technique of choice is histological examination. 11,12. This research was also carried out to assess the diagnostic efficacy of MRI in detecting cervical cancer. In this context, 75 female patients with a cervical cancer diagnosis based on clinical suspicion were examined. Most patients were between the ages of 42 and 52 (34%), followed by 53 to 63 (28%). These findings were consistent with several other studies on cervical or endometrial cancer, where the majority of patients (76%) were aged 42 to 62 years13,14. In our investigation, we discovered that 35 patients (47%) lived in rural areas, whereas 40 patients (53%) did. 14 (19%) patients had a high socioeconomicsocioeconomic level, 20 (27%) had poor socioeconomic status, and 41 (55%) had intermediate socioeconomic status. 15 (21%), 18 (23%), 10 (14%), and 3 (3%), respectively, had diabetes, hypertension, and anemia. These outcomes were similar to those of a few other studies15,16. The most prevalent symptom, post-menopausal bleeding, was seen in 32 (44%) patients, followed by atypical vaginal bleeding in 25 (34%) patients, foul-smelling watery discharge in 17 (21%) patients, and pelvic discomfort in 15 (21%) patients—twenty Patients presented with a variety of symptoms. A study by Tabassum et al.17 found that irregular vaginal bleeding was the most common. After post-menopausal bleeding in 63% of patients, vaginal discharge in 32%, post-coital bleeding in 19%, and post-menopausal bleeding in 46% of patients were symptoms related to cervical malignancy. Fifty-two people (or 34% of them) had several symptoms. Post-menopausal bleeding was the most typical manifestation of cervical cancer, according to specific additional studies18–20. In the current research, we discovered that 23 patients had negative results by MRI, whereas 52 patients (71%) had good results. On histological examination, 19 (24%) had adverse effects, and 56 (76%) had positive results. When MRI results were compared to histopathological results, 50 (67%) of the results were true positives, 3 (3%) were false positives, 6 (9%) were false negatives, and 17 (21%) were true negatives. MRI's sensitivity, specificity, PPV, NPV, and diagnostic accuracy were 89%, 87%, 96%, 74%, and 87%. According to research by Masroor I et al.21, MRI had sensitivity, specificity, diagnostic accuracy, and positive and negative predictive values of 93%, 89%, 89%, 73%, and 97% in the identification of cervical invasion. Respectively. Another research by Dakshit et al.22 on cervical cancer revealed that when comparing MRI and histology for the title of stromal invasion of >2/3RD, MRI had a 95% sensitivity rate, an 89% specificity rate, an 89% positive predictive value, and a 95% negative predictive value. P value: 0.0001. The sensitivity was 71%, specificity was 92%, positive predictive value (PPV) was 89%, and negative predictive value (NPV) was 81%, according to Nagar et al.

CONCLUSION

Cervical carcinoma is a known gynecological malignant disease found in women of any age, especially older women at high risk for developing cervix carcinoma. Early and accurate diagnosis is

essential forthe management of cervical carcinoma. We concluded that magnetic resonance imaging is a handy diagnostic tool for detecting cervical carcinoma with better sensitivity and specificity and a high accuracy rate.

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