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ORIGINAL ARTICLE

Comparison of Degree of Agreement Between MRI and Histopathology in T Staging of Cervical Carcinoma

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ABSTRACT

Introduction: Cervical cancer is a common disease with significant mortality and morbidity. It is due to the abnormal growth of cells that have the ability to invade or spread to other parts of the body.

Objective: The main objective of the study is to compare the degree of agreement between MRI and histopathology in T staging of cervical carcinoma.

Material and Methods: This cross sectional study was conducted in the department of radiology, Mayo Hospital Lahore for 12 months i.e. 12 Feb 2019 to 11 Feb 2020. MRI of the pelvis performed using a 1.5 tesla MRT 1580 scanner. All the results were interpreted by our senior radiologist and T-stage was noted according to MRI findings. All histopathological examinations performed. Both MRI and histopathology were separately place.

Results: The mean age of patients was 46.45±13.38 years, 25(25%) patients were with underweight BMI and obese BMI patients were 36(36%). In our study the agreement between the MRI and histopathology was found in 77(77%) patients.

Conclusion: According to our study results the MRI had good agreement with histopathology in T staging of cervical carcinoma.

INTRODUCTION

Cervical cancer is a common disease with significant mortality and morbidity. Accurate preoperative staging is the most important factor in determining appropriate management of cervical cancer because the therapeutic method chosen and prognosis depend on clinical findings and radiologic stage at presentation.[1] Various diagnostic methods including bimanual examination with the patient anesthetized, biopsy, computed tomography and magnetic resonance imaging are being used for preoperative staging of cervical carcinoma.[2]

Shweel et al., have reported variable diagnostic accuracy of MRI for different staging of tumor. MRI features demonstrated 100% in stage IB, 83% in stage IIA, 75% in stage IIB and 100% in stage IV. MRI staging of cervical carcinoma was in concordance with histopathologic staging in stages IB and IVA and over-staging in IIA and IIB stages.[3]

Magnetic resonance imaging has good soft tissue resolution and multiplanar capabilities and this accompanied by recent advances in Magnetic resonance imaging has results in more accurate staging. According to Balkes et al, apparent diffusion coefficient magnetic resonance imaging has an important role in diagnosis and preoperative assessment in differentiating different stages of cervical carcinoma.[4-7]

The clearest advantages of MRI over CT is the ability to determine the presence of muscle invasion and extra cervical disease and is preferred modality for local T staging prior to definitive radical treatment from muscle invasive cervical cancer. This study will evaluate the diagnostic performance of MRI for pre-treatment assessment and T-staging of cervical carcinoma. Literature is also evident that magnetic Resonance imaging (MRI) is currently one of the most accurate modality in preoperative staging of cervical carcinoma and guides clinicians to decide the correct type of surgery.[8] MRI obviates the use of invasive procedures such as cystoscopy and proctoscopy. It is an important tool in staging of cervical cancer to distinguish early disease (stage IIA) from advanced disease (stage IIB or greater) by assessment of tumor size, parametrial invasion and lymph node status.[9] MRI has been gaining increasing use of pretreatment staging of uterine cervical carcinoma; however, it is not yet accepted as a gold standard. Unfortunately trend of using MRI in staging of cervical carcinoma is low in Pakistan due to unawareness; also no local study is available regarding diagnostic accuracy of MRI in assessment and staging of cervical carcinoma.[10-12]

Objective: The main objective of the study is to compare the degree of agreement between MRI and histopathology in T staging of cervical carcinoma.

MATERIAL AND METHODS

This cross sectional study was conducted in the department of radiology, Mayo Hospital Lahore for 12 months i.e. 12 Feb 2019 to 11 Feb 2020. MRI of the pelvis performed using a 1.5 tesla MRT 1580 scanner. Sample size of 100 cases was calculated with 95% confidence level, 8% margin of error and taking expected percentage of agreement.

Inclusion Criteria

1. Gender female with age group 25 to 70 years with diagnosis of cervical carcinoma referred from other departments for MRI staging.
2. Patients with early cervical carcinoma planned for primary surgery.

Exclusion Criteria

1. Patients who underwent preoperative long-course radiotherapy or chemotherapy.
2. Patients who underwent primary surgery or having history of recurrence.
3. Patients with implanted cardiac prostheses, metallic cardiovascular electronic devices, intravascular stent and filters, cochlear implants, bullets.

Data Collection Procedure: 100 patients referred from the departments of Sir Ganga Ram Hospital Lahore for MRI t-staging of cervical carcinoma and fulfilling the inclusion criteria was included in this study. Informed consent was taken from the patients. The demographic information like name, age and address was obtained. MRI of the pelvis performed using a 1.5 tesla MRT 1580 scanner (Toshiba Excerlart Vantage). A compliant cervical cancer imaging protocol included T1, T2 weighted, FAT SAT and contrast enhanced sequences in the sagittal, axial and coronal planes. All the results were interpreted by our senior radiologist and T-stage was noted according to MRI findings. All histopathological examinations performed by a single histopathologist. Both MRI and histopathology were separately place the patients in one of the T-stage of the disease using TNM staging system for cervical carcinoma. All information was collected through specially designed performa.

Data Analysis: Data was entered and analyzed by using SPSS software version 14. Continuous variable like age was presented as mean + standard deviation. Categorical variable like agreement between MRI and histopathology for the T-staging of cervical carcinoma was presented as frequency and percentage.

RESULTS

In this present study total 100 cases participated. The mean age of the patients was 46.45±13.38 years with minimum and maximum

ages of 25 & 70 years respectively. In our study 25(25%) patients were with underweight BMI, the patients with normal BMI were 39(39%) and the overweight and obese BMI patients were 36(36%).

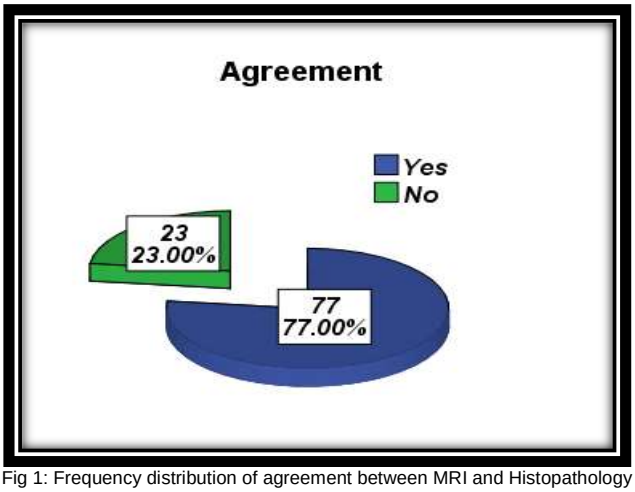

Fig 1: Frequency distribution of agreement between MRI and Histopathology

In this study the MRI report diagnosed stage T-1 in 32(32%) patients, T-2 stage was diagnosed in 24(24%) patients, T-3 stage diagnosed in 18(18%) patients and T-4 stage diagnosed by MRI in 26(26%) patients. The study results showed that the histopathology report diagnosed stage T-1 in 26(26%) patients, T-2 stage was diagnosed in 24(24%) patients, T-3 stage diagnosed in 27(27%) patients and T-4 stage diagnosed by histopathology in 23(23%) patients.

Table 1: Frequency distribution of outcome MRI with histopathology

		Histopathology				Total
		T-1	T-2	T-3	T-4	
MRI	T-1	23	5	2	2	32
	T-2	1	18	5	0	24
	T-3	1	0	16	1	18
	T-4	1	1	4	20	26
Total		26	24	27	23	100

Measure of agreement Kappa=0.694 Approximate p-value=0.000*

Out of 100 patients the agreement between the MRI and histopathology was found in 77(77%) patients and it was not found in 23(23%) patients. In this study by applying Kappa statistics a good agreement was observed between the MRI and histopathology. i. e Kappa statistics=0.694.

Table 2: Comparison of agreement with age (years)

		Agreement		Total
		Yes	No	
Age (years)	≤ 50	50	11	61
	> 50	27	12	39
Total		77	23	100

Chi value=2.18 p-value=0.140 NS

Table 3: Comparison of agreement with BMI

		Agreement		Total
		Yes	No	
BMI	Under weight	19	6	25
	Normal	32	7	39
	Overweight & Obese	26	10	36
Total		77	23	100

Chi value=1.040 p-value=0.595 NS

The study results showed that ≤ 50 years patients were 61 in which agreement was found in 50 cases and it was not found in 11 cases, similarly the >50 years patients were 39 in which agreement was noted in 27 cases and it was not found in 12 cases. Statistically insignificant difference was found between the agreement of MRI and histopathology with age. i. e p-value=0.140.

The study results showed that underweight BMI patients were 25 in which agreement was found in 19 cases and it was not found in 6 cases, normal BMI patients were 39 in which agreement was noted in 32 cases and it was not found in 7 cases, similarly in overweight and obese BMI patients were 36 in which agreement was noted in 26 cases and it was not found in 10 cases. Statistically insignificant difference was found between the agreement of MRI and histopathology with BMI. i. e p-value=0.595.

DISCUSSION

This present cross sectional study was carried out in the department of radiology, Sir Ganga Ram Hospital Lahore/Fatima Jinnah medical college to determine the degree of agreement between MRI and histopathology in T staging of cervical carcinoma. Cervical cancer is the third most common malignancy in women worldwide.[13] Accurate staging of the disease is crucial in planning the optimal treatment strategy. Carcinoma of the cervix is a major cause of death, especially in Third World countries, where Pap smear screening is often not routinely performed. Important prognostic factors include volume and histological grade of tumor. Magnetic resonance imaging (MRI) is widely accepted in the preoperative assessment of patients with cervical carcinoma to optimize the therapeutic strategy.[14]

In our study the agreement between the MRI and histopathology was found in 77(77%) patients. In this study by applying Kappa statistics a good agreement was observed between the MRI and histopathology. i. e Kappa statistics=0.694.[15-18] Some of the studies are discussed below showing the results in favour of our study as MRI is the preferred imaging modality for evaluating local extent of cervical cancer due to its high contrast resolution which enables differentiation between cancerous and normal tissues. MRI is safe with high sensitivity (86%-91%) and specificity (94%-96%) values for evaluating tumor extension to the corpus uteri.[19-22]

A study by Sahdev A et al showed that for patients without prior cone biopsy to MRI, the inter-observer agreement on tumor stage was generally good (K = 0.68–0.78). In patients having performed cone biopsies prior to MRI, agreement was moderate or close to good (K = 0.58–0.62). The sensitivity for detecting presence of tumor was higher among the conizised versus non-conizised patients (57% versus 43%), while the specificity was 94% versus 100%.[23]

A study by Kraljević Z et al In selected patients the surgical procedure was done and the correlation of clinical findings according to FIGO classifications, MRI and histopathological findings was completed. They showed that the MRI examination proved better than clinical examination in staging of cervical carcinoma with 90.9% versus 79.0% accuracy rate[24-25].

CONCLUSION

It is concluded that the MRI had good agreement with histopathology in T staging of cervical carcinoma.

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