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MRI as a Monitoring Tool for Detecting Therapeutic Response in the Recurrence of Carcinoma Cervix

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ABSTRACT

Background: Carcinoma cervix recurrence is difficult to assess clinically, and MRI offers superior soft tissue evaluation.

Methods: A hospital-based observational study was conducted on 44 post-treatment cases using T2W, DWI, and contrast MRI sequences. Clinical findings were correlated with imaging to determine diagnostic accuracy.

Results: MRI identified 22 recurrent lesions, including cases missed clinically. Sensitivity, specificity, and accuracy were 88.89%, 30%, and 57.89% respectively. The T2W+DWI combination diagnosed all recurrences and excluded false positives, while contrast had limited added value. MRI also detected nodal recurrence in one case without a pelvic mass.

Conclusion: MRI, especially T2W with DWI, is a reliable tool for post-treatment surveillance of carcinoma cervix, aiding early detection of recurrence and avoiding overtreatment.

Keywords: *Cervix carcinoma, MRI, recurrence*

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1. INTRODUCTION

Cervical carcinoma is one of the most common malignancies affecting women in developing countries and remains a leading cause of cancer-related morbidity and mortality. Despite advances in surgery, radiotherapy, and chemotherapy, recurrence continues to pose a major clinical challenge, often influencing prognosis and treatment outcomes. Clinical examination alone is frequently limited in differentiating post-therapeutic changes from residual or recurrent disease.

Magnetic Resonance Imaging (MRI), with its excellent soft tissue resolution and multiplanar capability, has emerged as a non-invasive imaging modality for monitoring therapeutic response and detecting recurrence. Among various MRI techniques, T2-weighted imaging (T2W) and diffusion-weighted imaging (DWI) have shown promise in improving diagnostic accuracy, while contrast-enhanced studies play a supplementary role. This study was undertaken to evaluate the validity and efficacy of MRI in assessing treatment response and detecting recurrence in carcinoma cervix.

2. AIM AND OBJECTIVES

- To evaluate the validity of MRI in the detection of treatment response and recurrence in treated patients of carcinoma cervix.

3. METHODOLOGY

This is a hospital-based observational study done in the Department of Radio Diagnosis, Indhira Gandhi Medical College and Research Institute, Puducherry, during February 2024 to February 2025.

INCLUSION CRITERIA:

- • Carcinoma cervix patients who were referred to our department for MR imaging, both newly diagnosed and those who were on post-treatment follow-up.

EXCLUSION CRITERIA:

- • Patients with cardiac pacemakers, new implants, clips within the body, and other contraindications of MR imaging, like claustrophobia, were excluded.

4. RESULTS

Table 1: Clinically Suspected Masses In Recurrent Cases

RECURRENT CASES (N=44)		
CLINICALLY SUSPECTED MASS	**NO OF PATIENTS**	**PERCENTAGE**
PRESENT	30	68%
ABSENT	8	18%
NOT ASSESSED	6	14%

Table 2: Clinically Suspected Mass With MRI Correlation In Recurrent Cases

	MRI FINDINGS	
CLINICALLY SUSPECTED MASS	**PRESENT**	**ABSENT**
PRESENT	16	14
ABSENT	2	6
NOT ASSESSED	4	2

Clinical staging vs MRI staging in recurrent cases:

In our study, considering the 44 post-treatment cases, clinical mass was suspected in 30 patients (68% cases). But MRI showed the presence of a mass lesion in only 16 patients. Eight patients were referred for routine follow up and they had no clinically identifiable mass lesion. Among these 8 patients, two showed a lesion on MRI. In another 6 patients, the cervix couldn't be clinically examined due to practical difficulties. Among these 6 patients, four showed the presence of a mass lesion. The accuracy, sensitivity, specificity, positive and negative predictive values of MRI in recurrent cases are 57.89%, 88.89%, 30%, 53.33% and 75% respectively.

Table 3: Pre-Treatment Histopathological Types In Recurrent Cases

HISTOPATHOLOGY	**NO OF PATIENTS**	**PERCENTAGE**
SQUAMOUS CELL CARCINOMA	41	93%
ADENOCARCINOMA	3	7%

Table 4: Lymph Node Involvement In Recurrent Cases

LYMPH NODES	**NO OF PATIENTS**	**PERCENTAGE**
ILIAC	5	15%
PARAMETRIAL	3	9%
INGUINAL	2	6%
OBTURATOR	2	6%
PARAAORTIC	1	3%

Table 5: MRI Findings In Various Sequences

FINDINGS PRESENT	NO OF PATIENTS
T2W	24
DWI	22
CONTRAST	18

Table 6: Overall Efficiency Of MRI Sequences

FINDINGS PRESENT	NEW(N=26)	RECURRENT(N=44)
T2W	25	25
DWI	25	22
CONTRAST	23	18
T2W+DWI	24	21
T2W+CONTRAST	23	17

Efficacy of various MRI sequences in post-treatment cases:

In our study, altogether 22 patients showed a lesion on MRI. All cases showing diffusion restriction on MRI were diagnosed as recurrent lesions. So, the number of patients showing lesions on T2 W, DWI, and contrast studies are 24, 22, and 18 respectively. 4 patients showed T2 hyperintensity and diffusion restriction in the cervix. However, in contrast study, there was poor enhancement of the tumor in these cases. Three patients showed the T2 shine-through effect on post-radiation therapy MRI. They were imaged after 1 week, 3 months, and one year of radiotherapy, but no diffusion restriction was noted. Another patient who came for routine follow-up and had no clinical features of recurrence showed mild enhancement of the cervix on contrast. However, no lesion was detected on T2 W or diffusion weighted images. In one case, imaging was done 2 months after radiotherapy to assess the residual tumor, which was clinically suspected. MRI of the patient showed no obvious lesion in T2 W images, whereas diffusion restriction was noted with early arterial phase enhancement in dynamic contrast studies. Thus, a diagnosis of residual tumor was made for the patient. A combination of T2 W imaging and DWI can diagnose all 22 cases and also excludes the 2 false positive cases in T2 W imaging. A combination of T2 W imaging and contrast study failed to diagnose 4 lesions showing diffusion restriction.

5. CONCLUSION

In this study, MRI proved to be a valuable imaging modality in the post-treatment evaluation of carcinoma cervix. Most recurrent cases occurred in the 41–50 year age group, highlighting the need for vigilant follow-up in this subset, where life expectancy is higher and the risk of recurrence correspondingly increases. MRI demonstrated high sensitivity (88.89%) in detecting recurrence, with the combination of T2W and DWI sequences emerging as the most efficient approach for accurate diagnosis. Contrast studies had limited routine value but were helpful in problem-solving when findings between T2W and DWI were inconclusive. Importantly, MRI not only detected clinically unsuspected recurrences but also excluded false positive clinical suspicions, thereby guiding appropriate patient management and preventing overtreatment. Thus, MRI should be considered an essential follow-up tool in the post-treatment surveillance of carcinoma cervix, enabling timely detection of recurrence and improved therapeutic decision-making.

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