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Role of MRI in detecting the recurrence of carcinoma cervix in patients treated with radiotherapy

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Abstract

Aim: To study the role of MRI in detecting the recurrence of carcinoma cervix in patients treated with radiotherapy.

Materials and methods: A Prospective study done in Department of Radio diagnosis, Trichy SRM medical college hospital and Research Centre, Trichy during June 2019 to June 2021.

Methodology: Carcinoma cervix patients who were referred to our department for MR imaging diagnosed post radiotherapy treatment follow up.

Result: From our study, it is evident that post radiation complications are more common to develop after 2-3 years of radiotherapy which also corresponds with the average time of recurrence.

Conclusion: The most common post radiotherapy changes were fatty replacement of bone marrow followed by cystitis and proctitis.

Keywords: Carcinoma cervix, post radiotherapy complications, MRI

Introduction

MR imaging of cervix has evolved over the past two decades as the most useful imaging. It is not only useful for preoperative staging but it also helps in identification of recurrent / residual tumors in treated patients. The prevalence of cervical carcinoma has increased in recent years due to early screening programs. The screening programs prompt the patients to undergo further evaluation. MR imaging proves to be the next best level of modality in cervical carcinoma. MRI accurately stages the carcinoma which is better than clinical staging.

Objectives of the study

- To study the role of MRI in detecting the recurrence of carcinoma cervix in patients treated with radiotherapy.
- To evaluate the validity of MRI in detection of treatment response and recurrence in treated patients of carcinoma cervix.

Materials

From June 2019 to June 2021, around 70 patients who were histopathological proven cases of carcinoma cervix and referred for MRI pelvis to the Department of Radio diagnosis, Trichy SRM medical college hospital and Research centre, Trichy were included in the study.

Study methodology

Histopathologically diagnosed cases of carcinoma cervix who were referred to the Department of Radio diagnosis were included. In this study, two groups of patients were included– newly diagnosed and post treatment cases. After obtaining permission from the institutional medical research ethics committee and taking informed consent from the patients, they were subjected to MRI pelvis using a 1.5 – Tesla system.

Different MRI sequences like TRUF1 coronal, axial and sagittal T2WTSE, axial and sagittal T1WTSE, STIR axial, DWI – MRI with ADC and contrast enhanced oblique axial, coronal and sagittal FST1 WTSE were used. The contrast gadolinium DTPA was given at a dose of 0.1 mmol / kg at a rate of 1 ml / second.

Table 1: Show the MRI non contrast scans

MRI sequences	Non contrast scans		Fat suppressed scans	
	T1 w FSE	T2 w TSE	Stir	FS t1 W TSE (contrast)
Imaging plane	Axial and Sagittal	Axial and Sagittal	Axial	Sagittal axial coronal
TR/ TE (m sec)	633/ 11	6320/ 116	9060/14	500/ 11
FOV	1785*847	1785*847	1785*847	1785*847
Section thickness (mm)	4 mm	4 mm	4 mm	5 mm
Matrix	768*768	512*512	512*360	768*768

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.

Results

Table 2: Distribution of cases

Category	No of patients	Percentage
Newly diagnosed	26	37%
Recurrent	44	63%

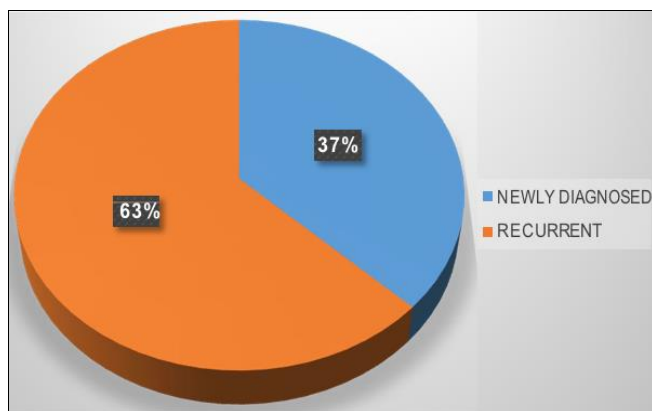


Fig 1: Category of patients

Table 3: Interval between RT and imaging

Duration post RT (N=39)	No of patients	Percentage
< 6 months	11	28%
6-12 months	10	26%
1-5 yrs	13	33%
> 5 yrs	5	13%

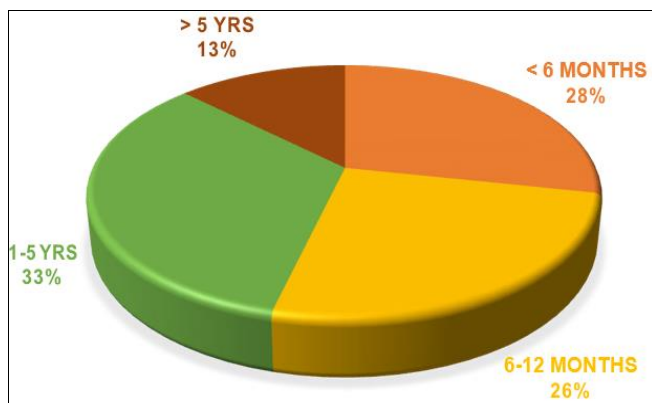


Fig 2: Duration Post RT

Table 4: Correlation between post RT complication and mean duration after RT

Post radiation complications	Mean duration after RT
Present	3.11
Absent	2.13

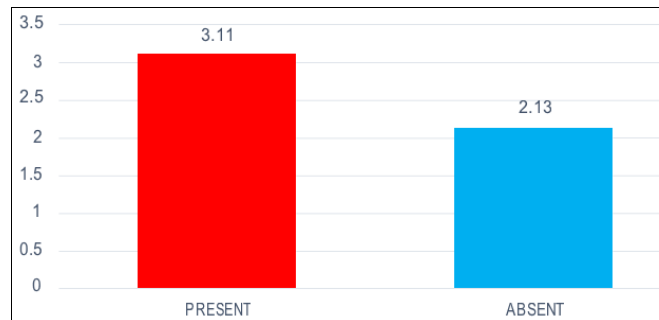


Fig 3: Mean Duration after RT VS Complication

Table 5: Post Radiation Complications

Post radiation Complication	No of cases	Percentage
Bone marrow changes	8	20.5%
Cystitis	8	20.5%
Proctitis	8	20.5%
Pelvic lipomatosis	2	5%
Free fluid	2	5%
Vesico vaginal fistula	1	2.5%
Ureteric stricture	1	2.5%
Pyosalpinx	1	2.5%

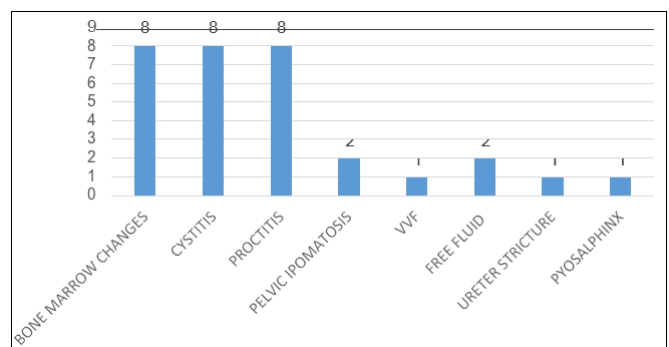


Fig 4: Post radiation complication

Table 6: Comparison between clinical assessment and MRI

Clinical Assesment vs MRI	New	Recurrent
Sensitivity	88%	88.89%
Specificity	0%	30%
Positive predictive value	92.59%	53.33%
Negative predictive value	95.65%	75%
Accuracy	88.19%	57.89%

A total of 70 patients who are biopsy proven cases of carcinoma cervix are included in the study. Both newly diagnosed and patients treated with chemo radiotherapy are

included. FIGO stage is assigned both clinically and with MRI and the parameters are compared.

Categories of patients

- Two categories of patients are considered for study- 26 newly diagnosed patients (37% of study population) and 44 treated cases (63% of study population). (Table 2, Figure 1)

Timing of imaging after radiotherapy

- Radiotherapy was given for 39 patients totally and most of them (13 patients, 33%) were symptomatic and referred for MRI during the period of 1- 5 years followed by less than 6 months and during the period of 6- 12 months. (Table 3, Figure 2)
- From our study, it is evident that post radiation complications are more common to develop after 2-3 years of radiotherapy which also corresponds with the average time of recurrence. Since most of the patients are referred during this time to look for recurrence of tumor, more complications are also diagnosed during this time. The most common post radiotherapy changes are fatty replacement of bone marrow followed by cystitis and proctitis.

Conclusion

Usefulness of MRI staging in 70 patients of biopsy proven cases of carcinoma cervix were assessed in the study. Both newly diagnosed and patients treated with chemo radiotherapy were included. FIGO stage was assigned both clinically and with MRI and the parameters were compared. 26 newly diagnosed patients and 44 treated cases were included.

From our study, it was evident that post radiation complications were more common to develop after 2-3 years of radiotherapy which also corresponded with the average time of recurrence. The most common post radiotherapy changes were fatty replacement of bone marrow followed by cystitis and proctitis.

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