

CERVICAL EVALUATION IN ENDOMETRIAL CARCINOMA -1.5 T MRI VALIDATED AGAINST HISTOPATHOLOGY

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Abstract

Background: Preoperative cervical invasion by endometrial carcinoma change the prognosis of the disease-Cervical stromal invasion of endometrial carcinoma upgrades the disease from stage 1 to stage 3. The objective of this study was to validate MRI findings of cervical invasion of endometrial carcinoma with diagnostic test evaluation.

Objectives: The objective of this study was to validate MRI findings of cervical invasion of endometrial carcinoma with diagnostic test evaluation.

Materials and Methods: Descriptive study with diagnostic test evaluation - comparing the MRI findings of cervical invasion with postoperative histopathological correlation, the reference standard. Study setting Government Medical College Thiruvananthapuram. Study population consecutive cases of post-menopausal bleeding diagnosed as endometrial carcinoma and send to the Radiology department for preoperative assessment-60 cases recorded over two years. **Results:** In our study, 5 out of 60 had cervical involvement in MRI, of which positive histopathological cases were 7. We got a low sensitivity of 42.9% but a high specificity of 96.2% PPV of 60%, NPV 92.7% and an accuracy of 90% for assessing cervical extension. MRI showed cervical mucosal invasion in 4 cases-6.7%, and cervical stromal invasion in 1 case. In prediction of cervical invasion distinguishing between cervical mucosal (stage I) from cervical stromal involvement (stage II), MRI was found to have a sensitivity of 57.1% specificity of 92% PPV of 66.7% negative predictive value of 94.4% and accuracy of 91.7% hence aiding in the staging of endometrial carcinoma. **Conclusion:** MRI imaging is a reliable tool not only in the assessment of cervical involvement, but also in differentiating cervical mucosal from cervical stromal invasion -thus aiding in the staging of endometrial carcinoma.

INTRODUCTION

Cervical involvement of endometrial carcinoma is one of the most important prognostic factors related to extrauterine spread.^[1,2] Cervical extension of endometrial carcinoma has to be differentiated from cervical invasion of the disease. Mere extension of the lesion into the cervix doesnot qualify as cervical invasion. Histopathological cervical involvement is not equivalent to a stage II tumor. Tumors with endocervical glandular invasion only, are considered stage I tumors and tumors with cervical stromal invasion are defined as stage II tumors.^[3-7] Hence

preoperative assessment of cervical extension versus invasion is important in planning treatment and predicting prognosis.^[8] In this study, the accuracy of assessing the cervix using the various sequences in MRI was compared with histopathology. Cervical involvement as shown by fractional curettage has been shown to be highly inaccurate. Several authors have shown that MRI is useful in evaluating endometrial extension of the cervix.^[9-13] However, to our knowledge, few studies have compared MRI mucosal and stromal invasion in the assessment of tumor involvement of the cervix.^[14] In this study we evaluated cervical extension of endometrial carcinoma- including both mucosal and stromal

invasion and correlated the MR findings with histological findings. Hence determining the value of MRI in evaluating endometrial carcinoma extension into the cervix.

MATERIALS AND METHODS

Study settings and study period This study was done in the department of Radio diagnosis, Government Medical College Thiruvananthapuram after institutional board approval. The patients who came for MRI pelvis as part of preoperative evaluation period of 2years was evaluated

Study design Descriptive study with diagnostic test evaluation

Inclusion Criteria

- Histological proven case of endometrial carcinoma

Exclusion Criteria

- Advanced stage of disease where surgery is not the primary treatment of choice
- Previous history of surgery related to cervix and uterus
- Coexisting lesions in pelvis extending to cervix

Procedure

Informed consent of the patients were taken prior to the study. MRI study was conducted on 1.5T MRI unit using a dedicated phases array pelvic coil. Three plane scout images are obtained in the axial, sagittal and coronal planes of the uterus, taking the uterocervical canal as the reference. Special attention being made to include complimentary sections oriented perpendicular to the plane of the endocervical canal at the region of the cervix. Varying MRI sequences were used, including a high resolution sagittal T2fast spin echo, T2 axial, T2

coronal, Diffusion weighted images, sagittal T1 pre and post contrast images and a delayed 4mins post contrast region of the cervix. The sensitivity, specificity, positive and negative predictive values for gross cervical involvement was calculated. The same was calculated for cervical stromal and mucosal invasion for the purpose of staging of the disease considering cervical stromal invasion as stage 3. Patients were subjected to hysterectomy at Sree Avittom Thirunal Hospital, Thiruvananthapuram and histopathological correlation obtained. The results were compared with the MRI findings. A2x2 table was generated to calculate the sensitivity, specificity, positive and negative predictive values.

Statistical Analysis

The results were expressed in number and percentage. Statistical Package for Social Sciences (SPSS 20.0) version used for analysis. The results were compared with the MRI findings. A2x2 table was generated to calculate the sensitivity, specificity, positive and negative predictive values.

RESULTS

Sensitivity of MRI in assessment of cervical involvement is 42.9%, specificity is 96.2%, positive predictive value is 60%, negative predictive value is 92.7% and accuracy is 90% MRI has got a sensitivity of 57.1%, specificity of 92.2%, positive predictive value of 66.7%, negative predictive value of 94.4% and accuracy of 91.7% in differentiating cervical mucosal invasion-stage 1 from stage II - cervical stromal invasion- in the staging of endometrial carcinoma.

Table 1: Distribution of samples based on histopathological staging

Histopathology	Number (n)	Percentage (%)
No cervical invasion	53	88.30
Cervical invasion	7	11.70
Total	60	100.00

Table 2: Correlation of MRI findings and cervical involvement

Cervical invasion		Histopathology		Total
		Present	Absent	
MRI	Present	3	2	5
	Absent	4	51	55
	Total	7	53	60
Sensitivity				42.90
Specificity				96.20
Positive predictive value				60.00
Negative predictive value				92.70
Accuracy				90.00



Image 1: STIR sagittal image showing myometrial invasion and cervical invasion stage 2 d/s

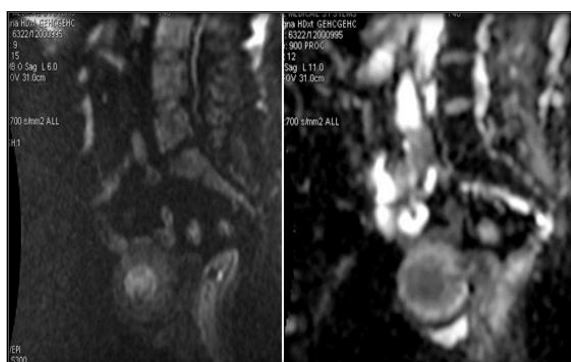


Image 2: DWI and ADC mapping of the same patient showing diffusion restriction and extension of tumour into the myometrium but no extension to cervix. No diffusion restriction in cervix. No cervical canal widening

DISCUSSION

This study was done as diagnostic test evaluation of MRI in preoperative staging of endometrial carcinoma to assess the involvement of the cervix and there by determine the surgical approach to be undertaken. It was a cross sectional study done in 60 consecutive cases of post-menopausal bleeding, prior diagnosed as endometrial carcinoma who came to the radiology department for preoperative MRI assessment.^[15,16] Patients with advanced stage of disease and where surgery was not the primary modality of treatment were excluded from the study. This study was done over a period of two years. In the present study, five out of 60 had cervical involvement in MRI and of which histopathology positive cases were 7. We got a sensitivity of 42.9% which is low, high, specificity of 96.2%, positive predictive value of 60%, negative predictive value of 92.7% and accuracy of 90%. Those included both cervical mucosal and cervical stromal extension. Further for the purpose of staging in relation to extension of tumors to the cervix- currently tumors with endo-cervical glandular invasion only are

considered stage I tumors and tumors with cervical stromal invasion are defined as stage II tumors. MRI showed cervical mucosal invasion in 4 cases (6.7%), cervical stromal invasion in one case (1.7%). Histopathology showed cervical invasion in 7 cases. Based on cervical stromal extension the tumor was staged and statistical analysis done. MRI has got a poor sensitivity of 57.1%, specificity of 92.2%, positive predictive value of 66.7%, negative predictive value of 94.4% and accuracy of 91.7% in staging of endometrial carcinoma. In a retrospective Indian study by Shrivastava et al, MRI showed sensitivity was 83%, specificity was 90% and accuracy was 97% for cervical involvement.^[16] Mubarak et al from Aga Khan university, Karachi in 2009 did a prospective cross sectional study in 50 patients 64% sensitivity, 66% specificity and 65% accuracy for cervical invasion. MRI was found to be 79% sensitive, 85% specific and 80% accurate for staging endometrial carcinoma while PPV and NPV were 97% and 66% respectively.^[17] Cabrita et al in 2008 studied 162 patients and got a 42% sensitivity, 92% specificity and 81% accuracy in determining cervical invasion.^[18] The results were comparable to our study. Anderson et al in 2009 studied 43 patients for determining cervical invasion sensitivity was 57%, specificity was 75% and accuracy was 44.2%.^[19] In an Iranian study for cervical stromal involvement, the sensitivity, specificity, diagnostic accuracy, positive and negative predictive values of MRI were 54.54%, 100%, 90.74%, 100%, 89.58% respectively.^[20] Sala et al in 2009 study in determining cervical invasion sensitivity was 88%, specificity was 100% and accuracy was 98%.^[21] Study by Hori et al found cervical invasion sensitivity 43%, specificity 91% and accuracy 87% which are similar to our study.^[22]

CONCLUSION

MRI imaging is helpful in differentiating cervical extension of endometrial carcinoma from cervical invasion and hence is a valuable aid in the preoperative staging of endometrial carcinoma.

Conflict of interest Nil

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