TO SEPARATELY ASSESS THE DIAGNOSTIC POTENTIAL OF TVS & MRI IN THE TERMS OF SENSITIVITY AND SPECIFICITY BY CORRELATING THE IMAGING FINDINGS WITH HISTOPATHOLOGY

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Abstract

This prospective study was done in the Department of Radio diagnosis Govt. Medical College, Kozhikode. A total of 65 patients who were referred to our department with clinical suspicion of endometrial lesions and incidentally detected endometrial lesions on ultrasonography underwent transvaginal ultrasound and subsequent Imaging evaluation of pelvis MRI has very high sensitivity (95%) and specificity (98%) and is almost as accurate (97%) as histopathology in differentiating benign from malignant lesions. Addition of DWI with ADC mapping to conventional MRI increases its accuracy even more. However, there is inherent limitation to MRI in detecting carcinoma in situ and micrometastasis.

Keywords: TVS, MRI, Sensitivity, Specificity, Histopathology.

Introduction

MR IMAGING OF FEMALE PELVIS

Magnetic resonance imaging (MRI) is a commonly used technique in the workup of obstetric and gynecologic abnormalities and in the pre- and postprocedural evaluation for uterine artery embolization. [1]

MRI techniques

Optimal MRI of the female pelvis and uterus should be performed on a high field-strength MRI system that uses local phased-array coils. The typical imaging protocol for the uterus includes both T1-weighted (T1W) and T2-weighted (T2W) images. Axial T1W images are obtained to evaluate the uterine contour, lymph nodes, and bone marrow. Fat-suppressed T1W imaging is used to differentiate between pelvic masses that contain fat and those that contain protein or haemorrhage [2]. Contrast enhancement is used to determine the extent of endometrial carcinoma invasion or to detect the presence of necrosis in uterine leiomyoma.

In this study, we have attempted to evaluate endometrial lesions by TVS and MRI for better tissue delineation and the same was confirmed by histopathological correlation. Also, the specificity and sensitivity of TVS and MRI are separately assessed in the diagnosis of the endometrial lesions and combination of these two imaging modalities for accurate diagnosis of various endometrial lesions was done especially in suspected endometrial malignancies. [3]

Material & Method

This prospective study was done in the Department of Radio Diagnosis Govt. Medical College, Kozhikode. A total of 65 patients who were referred to our department with clinical suspicion of endometrial lesions and incidentally detected endometrial lesions on ultrasonography underwent transvaginal ultrasound and subsequent Imaging evaluation of pelvis MRI. The data was analyzed by calculating the sensitivity, specificity, positive predictive value, negative predictive value and diagnostic accuracy of the techniques.

INCLUSION CRITERIA

1. Patients referred to the department of Radio diagnosis, MGMMC Indore for radiological evaluation of abnormal uterine bleeding.
2. All Patients detected to have endometrial lesions on transabdominal ultrasound.
3. Patients of above the age of 18 years

EXCLUSION CRITERIA

1. Patients who have previously undergone endometrial resection/ablation
2. Patients with intrauterine contraceptive devices
3. Patients with pregnancy and related causes of vaginal bleeding
4. Patients with active genital infections
5. Unmarried female patients.
6. Severe medical conditions precluding study like uncontrolled Hypertension, Diabetes mellitus, bleeding disease.
7. General contraindications to MRI

HISTOPATHOLOGICAL ANALYSIS

All patients in the study underwent Histopathological examination for confirmation of diagnosis (histology.
obtained from inpatient sampling (hysterectomy, directed biopsy, D&C)).

Results

TVS VS HPE

Table 1: TVS VS HPE

<table>
<thead>
<tr>
<th>MODALITY/DIAGNOSIS</th>
<th>TVS</th>
<th>HPE</th>
</tr>
</thead>
<tbody>
<tr>
<td>SYNECHIAE</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>ENDOMETRITIS</td>
<td>10</td>
<td>7</td>
</tr>
<tr>
<td>POLYP</td>
<td>6</td>
<td>4</td>
</tr>
<tr>
<td>ENDOMETRICAL HYPERPLASIA</td>
<td>19</td>
<td>18</td>
</tr>
<tr>
<td>MALIGNANT</td>
<td>16</td>
<td>22</td>
</tr>
<tr>
<td>SUBMUCOSAL FIBROID</td>
<td>7</td>
<td>6</td>
</tr>
<tr>
<td>ADENOMYOSIS</td>
<td>5</td>
<td>6</td>
</tr>
<tr>
<td>TOTAL</td>
<td>65</td>
<td>65</td>
</tr>
</tbody>
</table>

STATISTICAL ANALYSIS OF TVS IN BENIGN CONDITIONS

Table 2: STATISTICAL ANALYSIS OF TVS IN BENIGN CONDITIONS

<table>
<thead>
<tr>
<th></th>
<th>HPE BENIGN</th>
<th>HPE NON BENIGN</th>
<th>TOTAL</th>
</tr>
</thead>
<tbody>
<tr>
<td>TVS BENIGN</td>
<td>40(TP)</td>
<td>9(FP)</td>
<td>49</td>
</tr>
<tr>
<td>TVS NON BENIGN</td>
<td>3(FN)</td>
<td>13(TN)</td>
<td>16</td>
</tr>
<tr>
<td>TOTAL</td>
<td>43</td>
<td>22</td>
<td>65</td>
</tr>
</tbody>
</table>

SENSITIVITY 93 %
SPECIFICITY 59 %
POSITIVE PREDICTIVE VALUE 82%
NEGATIVE PREDICTIVE VALUE 81%
ACCURACY 82 %

Table 3: STATISTICAL ANALYSIS OF TVS IN MALIGNANT CONDITIONS

<table>
<thead>
<tr>
<th></th>
<th>HPE POSITIVE</th>
<th>HPE NEGATIVE</th>
<th>TOTAL</th>
</tr>
</thead>
<tbody>
<tr>
<td>TVS POSITIVE</td>
<td>13(TP)</td>
<td>3(FP)</td>
<td>16</td>
</tr>
<tr>
<td>TVS NEGATIVE</td>
<td>9(FN)</td>
<td>40(TN)</td>
<td>49</td>
</tr>
<tr>
<td>TOTAL</td>
<td>22</td>
<td>43</td>
<td>65</td>
</tr>
</tbody>
</table>

SENSITIVITY 59 %
SPECIFICITY 93 %
POSITIVE PREDICTIVE VALUE 81%
NEGATIVE PREDICTIVE VALUE 82%
ACCURACY 82 %

Table 4: STATISTICAL ANALYSIS OF MRI (MORPHOLOGY PLUS DWI & ADC) IN BENIGN CONDITIONS

<table>
<thead>
<tr>
<th></th>
<th>HPE BENIGN</th>
<th>HPE NON BENIGN</th>
<th>TOTAL</th>
</tr>
</thead>
<tbody>
<tr>
<td>MRI BENIGN</td>
<td>42(TP)</td>
<td>1(FP)</td>
<td>43</td>
</tr>
<tr>
<td>MRI NON BENIGN</td>
<td>1(FN)</td>
<td>21(TN)</td>
<td>22</td>
</tr>
<tr>
<td>TOTAL</td>
<td>43</td>
<td>22</td>
<td>65</td>
</tr>
</tbody>
</table>

SENSITIVITY 98%
SPECIFICITY 95%
POSITIVE PREDICTIVE VALUE 98%
NEGATIVE PREDICTIVE VALUE 95%
ACCURACY 97 %

Discussion

MRI is now being widely used as an optimal imaging modality as it is non-invasive, has no risk of radiation, and is fewer operators dependent. MRI excels in delineating the anatomy and characterization of the pelvic lesions. In this study diffusion-weighted imaging (DWI) with ADC has been applied to pelvic MRI protocol.

Majority (46%) of the patients in our study belonged to the age group of 50 to 59 years. Most of the cases of the endometrial hyperplasia and malignancies were detected in this age group. This is in accordance with the previous studies. In a population based study Shady MS et al in 2016 [4] found that the incidence of endometrial hyperplasia with and without atypia peaks in the early postmenopausal years and in early 60’s. According to the study of Billingsley CC in 2015 [5] endometrial hyperplasia was most frequent in perimenopausal age group.

The most common presenting complaint of the patients in our study was abnormal uterine bleeding followed by discharge PV, followed by pelvic pain. This is in accordance with the study of Bakir B 2017 [6]

On TVS out of 65 cases 34 cases (52%) had heterogeneous echotexture and 31 cases (48%) had homogenous echotexture. Lesions with heterogeneous echotexture were suspicious for non benign and inflammatory causes. This is according to the study of Mourad MA et al in 2016 [7] that a heterogeneous echogenicity of endometrium was significantly more common in malignant than benign endometrium.

On MRI TWI 17 cases (26%) were hypointense, 3 cases (5%) were hyperintense, 23 cases (35%) were heterogeneous and 22 cases (34%) were isointense. on T2WI, 26 cases (40 %) were hypointense, 5 cases (8%) were hyper intense, 23 cases (35%) were heterogeneous and 11 cases (17 %) were isointense. This is in accordance with the study of Elsammak A in 2017 [8] which showed lesions with hypointense signals at T1WI, heterogeneous signals at T2WI were probably malignant, while those that displayed hypointense signals on T1W images, hyperintense signals on T2W images were probably benign.

Conclusion

MRI has very high sensitivity (95%) and specificity (98%) and is almost as accurate (97%) as histopathology in differentiating benign from malignant lesions. Addition of DWI with ADC mapping to conventional MRI increases its accuracy even more. However there is inherent limitation to MRI in detecting carcinoma in situ and micrometastasis.
References


