Ultrasound Versus Magnetic Resonance Imaging in Diagnosis of Malignant and Surgically Difficult Adnexal Cases

AHMED L. ABOULNASR, M.D.*; AHMED S. NASR, M.D.*; ASHRAF S. SELIM, M.D.**; MOSTAFA S. SALEM, M.D.*** and MOHAMED A. SHALABY, M.D.*

The Departments of Obstetrics & Gynecology*, Diagnostic Radiology** and Pathology***, Faculty of Medicine, Cairo University

Abstract

Background: In this study we aim at detection of the most appropriate tool of imaging in the provisional diagnosis of adnexal malignant and surgically difficult cases to be able to plan the most appropriate management.

Objectives: Evaluation of the role of magnetic resonance imaging and ultrasonography in the provisional diagnosis of adnexal malignant and surgically difficult cases, comparing their results with surgical evaluation and finally with the pathological examination.

Study Design: Thirty cases with adnexal malignant and surgically difficult disorders were all under gone both ultrasonography and magnetic resonance imaging and results for all were compared with surgical evaluation and finally with pathology.

Results: Magnetic resonance imaging matched pathological results in 24 out of 30 adnexal cases (80%), with sensitivity and specificity 93.8% & 89.3% and ultrasound matched only in 16 cases (53.3%), with significant difference, (p.value 0.044).

Conclusion: The results of our study showed the superiority magnetic resonance imaging in provisional diagnosis of adnexal malignant and surgically difficult cases over ultrasonography.

Key Words: Magnetic resonance imaging – Ultrasound – Pathology – Surgery – Adnexal.

Introduction

Now the role of magnetic resonance imaging in the provisional diagnosis of gynecological malignant cases is to be considered [1] and also its superiority to computed tomography in most of cases made it the preferred tool of imaging in this field.

It is also to be considered the important role of ultrasonography with doppler in the provisional diagnosis of malignant and other gynecological cases [2] as for example the detection of nature and vascularity of some adnexal masses may guide for the diagnosis.

So it was the sake of the patients that made us concerning about trying to reach the most appropriate tool of provisional diagnosis of cases of gynecologic malignancies and surgically difficult ones and that will be made by comparing the results of the tools used in this study and correlating the results with the surgical evaluation and with pathological results.

Aim of work:

To evaluate ovarian tumors in addition to suspected surgically difficult cases such as, ovarian endometrioma and chronic pelvic inflammatory disease using magnetic resonance imaging and ultrasound with Doppler and comparing results with surgical evaluation of the cases and finally with the pathological examination results as a gold standard for diagnosis.

Patients and Methods

This is a prospective comparative study done on total 30 patients presenting with malignant and surgically difficult adnexal malignant and surgically difficult disorders.

The study was done in Kasr Al-Ainy Hospital from October 2013 to December 2015 and the research protocol was approved by the relevant Institutional Review Board or Ethics Committee before the study began. The authors agree to provide copies of the appropriate documentation if requested.

Inclusion criteria:

Ovarian malignant tumors and other surgically difficult adnexal disorders namely recurrent endometrioma and chronic pelvic inflammatory disease.
Exclusion criteria:
- Advanced malignant cases not for surgical intervention.
- Patients with general illness not fit for surgery.
- Pregnant patients not for urgent intervention.
- Simple surgical cases diagnosed by simple diagnostic modalities.

1- All cases have undergone:
   History taking, full general and local examination and metastatic workup for suspected malignant cases.

2- Preoperative:
   A- Trans vaginal and abdominal ultrasound with doppler for all cases:
   - Trans Abdominal and Trans vaginal ultrasonography using Medison x4 Ultrasound system (Medison co., diagnostic group) with a 5 MHz ~ 8 MHz endovaginal curved transducer.
   - The dimensions, vascularity, morphology, consistency and relation to surrounding organs was detected for uterus, ovaries and any related masses.

   B- Magnetic resonance imaging on the pelvis will be done to all cases:
   MRI was performed for all cases using 1.5 T magnet (Gyroscan INTERA and ACHIEVA, Philips medical systems, the Nether land), dynamic post contrast sequence was accessible for the assessment of any adnexal masses and relation to surrounding organs and also regional lymph nodes.

   Senior ultrasonographer and diagnostic radiologist performed both modalities of imaging for each case.

3- Intraoperative:
   - Surgical evaluation of diagnosis made by MRI and transvaginal US and comparing data obtained by both of them.
   - Surgical staging in cases of malignant ovarian tumors and correlating to data obtained from the one of magnetic resonance imaging and also assessment of surgical difficulty.

4- Postoperative:
   Pathological evaluation of diagnosis made by MRI and trans vaginal US.

Data were statistically described in terms of mean ± standard deviation (± SD), and range, or frequencies (number of cases) and percentages when appropriate. Comparison was done using Chi square ($\chi^2$) test. Exact test was used instead when the expected frequency is less than 5. $p$-values less than 0.05 was considered statistically significant.

All statistical calculations were done using computer program SPSS (Statistical Package for the Social Science; SPSS Inc., Chicago, IL, USA) release 15 for Microsoft Windows (2006).

Results

In Tables (1) we are showing the classification of adnexal cases included in our study and their percentage from the total number included in our study.

<table>
<thead>
<tr>
<th>Adnexal cases</th>
<th>Number</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Benign ovarian tumor</td>
<td>14</td>
<td>46.6</td>
</tr>
<tr>
<td>Border line ovarian tumor</td>
<td>2</td>
<td>6.6</td>
</tr>
<tr>
<td>Malignant ovarian tumor</td>
<td>6</td>
<td>20</td>
</tr>
<tr>
<td>Chronic PID</td>
<td>5</td>
<td>16.6</td>
</tr>
<tr>
<td>Endometrioma</td>
<td>3</td>
<td>10</td>
</tr>
</tbody>
</table>

Data presented as number (percentage).

In Table (2) we show that for the adnexal masses magnetic resonance imaging was matching final pathological diagnosis in 24 cases out of 30 adnexal cases included in our study 80% and mismatching in 6 cases 20% but ultrasonography was matching in 16 cases 53.3% and mismatching in 14 cases 46.6% showing that comparing magnetic resonance imaging with US in diagnosis of adnexal masses is significant ($p$ value 0.044).

<table>
<thead>
<tr>
<th>Pathology MRI</th>
<th>With</th>
<th>Different</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>With</td>
<td>15</td>
<td>1</td>
<td>16</td>
</tr>
<tr>
<td>Different</td>
<td>9</td>
<td>5</td>
<td>14</td>
</tr>
<tr>
<td>Total</td>
<td>24</td>
<td>6</td>
<td>30</td>
</tr>
</tbody>
</table>

Data represented as numbers.

Finally in Table (3) we are showing the specificity and sensitivity of both ultrasonography and magnetic resonance imaging in provisional diagnosis for both groups included in our study.

<table>
<thead>
<tr>
<th></th>
<th>Specificity</th>
<th>Sensitivity</th>
</tr>
</thead>
<tbody>
<tr>
<td>US in adnexal masses</td>
<td>69.3 %</td>
<td>75.1 %</td>
</tr>
<tr>
<td>MRI in adnexal masses</td>
<td>89.3%</td>
<td>93.8%</td>
</tr>
</tbody>
</table>

Data represented as percentage.
Discussion

In our study we found the importance of magnetic resonance imaging as a diagnostic tool in adnexal masses was comparable to ultrasonography with better results specially in malignant cases with metastasis and lymph node affection.

The role of magnetic resonance imaging in detection of relation of the adnexal mass to its surroundings and also the lymph node metastasis may be the reason of its superiority to ultrasonography in such cases.

In a study that recommend the results of our study and it was [3] named (Value of ultrasound and magnetic resonance imaging in the preoperative evaluation of suspected ovarian masses).

In 93 patients, with ovarian cancer underwent preoperative trans vaginal and abdominal ultrasound as well as magnetic resonance imaging in a prospective comparative study.

And they finally concluded that MRI was superior in diagnosis of malignant ovarian masses though US, with a specificity and sensitivity reaching 91% and 94% respectively.

Another study [4] named Adnexal masses, comparing the specificity of vaginal US and pelvic MR imaging also showed some agreement with our study regarding accuracy of US in examination of pelvic masses and even adnexal masses which is not clear in our results.

Another study that showed high specificity and sensitivity of MRI in diagnosing adnexal masses as we showed in our results this study was named (MR Evaluation of Clinically Suspected Adnexal Masses), [5]. But they didn’t include surgical evaluation or pathological examination to confirm the results of their study and this seems a big drawback in this study.

Conclusion:

From the results of our study we concluded that magnetic resonance imaging is superior to ultrasound in provisional diagnosis of adnexal masses with specificity and sensitivity 89.2% & 93.8%.

References


