Ovarian Endometrioma In Subfertile Women: The Need For A New Surgical Staging

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Abstract

Objective: To present a new surgical staging for ovarian endometriomas at time of laparoscopy in infertile women.

Study Design: Prospective clinical trial

Participants & Methods: After establishing a new surgical staging scheme, women diagnosed as having endometriomas during laparoscopy were managed applied according to the proposed staging scheme. Follow up for one year after laparoscopy was done to validate the surgical staging outcomes.

Results: Seventy eight women were diagnosed as having endometriomas distributed as follow: stage I: 7 cases (8.9%), Stage II: 10 cases (12.9%), Stage III: 31 cases (39.7%) and finally stage IV: 30 (38.5%). After management according to the proposed surgical staging, recurrence rate over one year was relatively low (14.1%), 52.2% of participants got pregnant within one year whether spontaneous pregnancy or after IVF.

Conclusion: The new surgical staging has achieved balance between conservative management and intervention by assisted reproduction after laparoscopic surgery of endometriomas.

Keywords: endometrioma, surgical staging, pregnancy, validity

INTRODUCTION

Understanding of the pathological anatomy and the course of endometrioma is crucial for proper management and assessing the prognosis of the disease. Recent molecular and pathological evidence suggests that endometriosis is a monoclonal, neoplastic disease. Endometriosis shares certain characteristics with malignant neoplasms, it is progressive in nature, it may present in distant areas (metastasis) and it is infiltrating in character. (3) The management of endometriomas from the standpoint of anatomical-clinical view should consider these characteristics and staging of endometriomas is a prerequisite for proper management plan.

Unfortunately, the two published classifications in the medical literature were not helpful for planning the treatment modality.

The first was published by Scurry et al, 1992 and it was a pathological classification and did not include any clinical implications or squeal in relation to infertility. The second one was published by Nezhat et al, 1992 and it was a clinical classification for the pathological origin of haemorrhagic cyst whether true endometriomas or originating from a complication of functional cysts.

Endometriomas are frequently diagnosed during the course of infertility work up and ultrasound examination is usually the first suspecting tool in diagnosis.

What is already known?
The Current classifications for endometriosis are not tailored for planning the treatment modality of endometriomas associated infertility.

What does this study add?
A new surgical staging system that guide for management of endometriomas in a balance between conservative and interventional methods.
However, the definitive tool for diagnosis is surgical one: Laparoscopy and sometimes laparotomy. (4)
The management of endometriomas from the standpoint of surgical anatomy should consider the anatomical insult to the adnexa and staging of endometriomas is a prerequisite for proper management plan. Ideally, a classification system should correlate outcomes with an observed stage of disease. Treatment responses should be also related to the suggested staging, allowing for a specific prognosis to be given according to the stage. (5)
Thus a surgical staging for endometriomas at time of laparoscopy seems warranted to standardize management protocol and follow up is required to formulate the prognosis of the condition. The aim of the present work is to present a new surgical staging for ovarian endometriomas at time of laparoscopy in infertile women.

PARTICIPANTS AND METHODS
The present study was divided into two phases: Phase one to establish a laparoscopic staging system for endometriomas including standardizing surgical management and phase two to validate this staging system by evaluation of the outcome of the surgical technique and the standardized infertility management according to the different stages. The study started in May 2007 till 2010. The study was approved by the ethical committee of the Department of Obstetrics & Gynecology, Cairo University.

Surgical staging:
Four stages were suggested taking into consideration the slow but progressive nature of endometriomas, its size, Douglas Pouch adhesions, bilaterality, and patency of fallopian tube (Table I). Based on this surgical staging, a management plan was incorporated for infertile women to achieve pregnancy either with laparoscopic surgery alone or with ART.

All patients had laparoscopic surgery using four-puncture technique. At laparoscopy initial assessment for the pelvic or extra-pelvic endometriosis and each patient was initially assessed and staged according to the revised AFS classification. A special diagram is used to mark the extent of the disease and the site and the size of lesions. All infertile patients were also staged using the new staging system for true ovarian endometrioma developed by our team. For all patients the following surgical steps were undertaken: Dissection and mobilization of the ovary is started from its deep attachment to the back of the broad ligament, uterus or uterosacral ligament. When the point of maximum adhesion and origin of the cyst is reached it is unavoidable that the chocolate cyst is opened and the chocolate material is spilled in the pelvis (weakest point in the pseudowall. Drainage and wash of the chocolate material was done. Ovariolysis with complete mobilization of the ovary was attempted before proceeding to cystectomy. Surgical landmark for the ovariolysis is the ovarian ligament above, and the infundibulo-pelvic ligament below.

When ovariolysis is complete, the opening into the cyst wall is visualized (through which chocolate material has spilled). Additional lavage is done until all chocolate material is removed and the cyst wall is clearly visualized. We did not drain the endometrioma in any case through an incision into the normal ovarian tissue (as our understanding that true endometriotic cyst is an extra-ovarian one with adhesion to the ovary). This is to minimize trauma to the healthy ovarian tissue (extra-ovarian approach). Cystectomy was done by peeling off the wall from the surface of the ovary (extra-ovarian origin). It is fairly easy if the plane is properly identified.
The technique of cystectomy relatively easy if the cyst in the majority of the cases is more than 2 cm. If the cyst is less that 2 cm or if cystectomy is difficult ablation of the cyst wall using Argon beam coagulation was done. No attempt was done to resect any of the ovarian walls with endometriotic cyst. In case of large cyst the cavity left by stretching the ovary was done by interrupted or continuous vicryl 0 or number1 suture in order to prevent adhesions of the bowel or tube to the raw surface of the ovary. At the end of surgery, peritoneal lavage and approximately 2 liters of Lactated Ringer is left inside the peritoneal cavity as anti-adhesion measures.

Patients were followed in the postoperative period and management of infertility was employed subsequently according to the presence of other factors of infertility and the staging system suggested. The duration of follow up was up to one year of expectant management for pregnancy in stage 1a, 1b and stage 2 diseases. For patients in stage 3, limited period of 3-6 months is given for spontaneous pregnancy. For other patients when IVF treatment is indicated (e.g. male factor or other indications) direct enrollment was done according to our staging system.

**Table 1.** The New surgical staging system for endometrioma and the recommended surgical treatment and infertility management

<table>
<thead>
<tr>
<th>Stage</th>
<th>Surgical findings*</th>
<th>Surgical treatment</th>
<th>Infertility management**</th>
</tr>
</thead>
<tbody>
<tr>
<td>1a</td>
<td>Endometrial implant on the surface of the ovary or cyst ≤ 2cm</td>
<td>Laparoscopic ablation of the cyst wall</td>
<td>Spontaneous pregnancy expected</td>
</tr>
<tr>
<td>1b</td>
<td>Cyst 2-4 cm Fixation of the ovary</td>
<td>Laparoscopic ablation of cyst wall and/ovariolysis</td>
<td>Spontaneous pregnancy expected</td>
</tr>
<tr>
<td>2</td>
<td>Cyst &gt; 4cm in size. Fixation of the ovary. DP is free. Tube patent</td>
<td>Laparoscopic ablation of cyst wall and ovariolysis</td>
<td>Limited trial (6 months to one year) for spontaneous pregnancy</td>
</tr>
<tr>
<td>3</td>
<td>Cyst &gt; 4cm. Fixation of the ovary. Obliteration of the DP. Tube patent</td>
<td>Laparoscopic cystectomy/ovariolysis/adhesiolysis</td>
<td>IVF or limited trial for spontaneous pregnancy</td>
</tr>
<tr>
<td>4</td>
<td>Cyst of any size. Tubes closed</td>
<td>Laparoscopic cystectomy, ablation/ovariolysis/adhesiolysis</td>
<td>IVF is required</td>
</tr>
</tbody>
</table>

*Unilateral or bilateral endometrioma. ** The infertility management is suggested based on the absence of other factors of infertility.
Figure 1: Stage 1a. Small endometriotic cyst < 2 cm in size with no fixation of the ovary.

Figure 2: Stage 1b. Small cyst 2-4 cm in diameter with fixation of the ovary. Douglas pouch is free and the tube is patent.

Figure 3: Stage 2. The size of the cyst is 4 cm or more, the Douglas pouch is free and the tube is patent. Note the direction of the pull on the adnexa due to fibrosis and puckering of tissue.

Figure 4: Note the deep relation of the cyst in relation to the healthy ovary as true endometrioma is extraovarian cyst.

Figure 5: Stage 3. The cyst more than 4 cm and the Douglas pouch is partial or completely obliterated but the tube is patent.

Figure 6: Stage 4. Cyst of any size and the tubes are closed.
RESULTS
Seventy eight women were diagnosed as having endometriomas distributed as follow according to rAFS classification: stage I: 7 cases (8.9%), Stage II 10 cases (12.9%), Stage III 31 cases (39.7%) and finally stage IV 30 (38.5%). Table 2 shows the outcome of follow up for one year after management according to our new surgical staging.

Table 2. Outcome of laparoscopic surgery according to the new classification of ovarian endometrioma

<table>
<thead>
<tr>
<th>Stage</th>
<th>N</th>
<th>(%)</th>
<th>Recurrence</th>
<th>Pregnancy spontaneous</th>
<th>Pregnancy ART</th>
<th>Over all pregnancy rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>1a</td>
<td>5</td>
<td></td>
<td>0</td>
<td>3 (60%)</td>
<td>1 (20%)</td>
<td>4 (80%)</td>
</tr>
<tr>
<td>1b</td>
<td>7</td>
<td></td>
<td>0</td>
<td>4 (57.1%)</td>
<td>1 (14%)</td>
<td>5 (71.4%)</td>
</tr>
<tr>
<td>2</td>
<td>17</td>
<td>1 (5.8%)</td>
<td>6 (35.2%)</td>
<td>2 (11.7%)</td>
<td>8 (47%)</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>20</td>
<td>4 (20%)</td>
<td>2 (10%)</td>
<td>8 (40%)</td>
<td>10 (50%)</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>29</td>
<td>6 (20.6%)</td>
<td>0</td>
<td>14 (48.2%)</td>
<td>14 (48.2%)</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>78</td>
<td>11</td>
<td>15 (19.23)</td>
<td>26 (33.3%)</td>
<td>41 (52.5%)</td>
<td></td>
</tr>
</tbody>
</table>

*The recurrence is estimated based on one year follow up

Table 3. Results of laparoscopic surgery and infertility management according to the rAFS staging system

<table>
<thead>
<tr>
<th>Stage</th>
<th>Number</th>
<th>Spontaneous pregnancy</th>
<th>Pregnancy (ART)</th>
<th>Recurrence*</th>
<th>Total pregnancy</th>
</tr>
</thead>
<tbody>
<tr>
<td>I</td>
<td>7</td>
<td>1</td>
<td>2</td>
<td>0</td>
<td>3</td>
</tr>
<tr>
<td>II</td>
<td>10</td>
<td>1</td>
<td>3</td>
<td>2</td>
<td>4</td>
</tr>
<tr>
<td>III</td>
<td>31</td>
<td>8</td>
<td>10</td>
<td>6</td>
<td>18</td>
</tr>
<tr>
<td>IV</td>
<td>30</td>
<td>5</td>
<td>11</td>
<td>3</td>
<td>16</td>
</tr>
</tbody>
</table>

*The recurrence is estimated based on one year follow up.

DISCUSSION
Ovarian endometrioma is a progressive disease during reproductive years with serious consequences on infertility if left untreated. Pelvic factors directly related to infertility such as distorted tubo-ovarian relationship, obliteration of Douglas pouch and tubal occlusion can only be evaluated by laparoscopy. These can be removed only surgically.

In addition, the presence of endometrioma especially if large in size is likely to decrease spontaneous ovulation and may also affect ovarian reserve (Benaglia et al.,2009). A surgical evaluation and appropriate staging is thus needed to standardize management protocol including surgical technique and formulating a prognosis of the infertility.
Many points should be considered when judging the proposed surgical staging: First it has achieved balance between conservative management and intervention by assisted reproduction. Second recurrence rate over one year was relatively low (14.1%) which points to adequate surgery without over destruction of ovarian tissue. Third: LHRH analogue treatment prior to surgery was not used for all our patients as it makes it difficult to do cystectomy with much trauma to the ovaries. Fourth: comparing it to rAFS, the proposed surgical staging was more accurate as over all pregnancy rate in stage I was 9 in our proposed staging while it was only 3 in the rAFS classification. This can be attributed to two factors: the surgical intervention done immediately after staging and the fact that the proposed surgical staging is more oriented about the progression of the disease. In the revised AFS classification the correlation of the prognosis of infertility to the staging system is very poor. Prognostic factors as tubal occlusion and tubal motility are not included in the classification system. In our new surgical staging system, only endometriotic cyst should be included in such classification as its relation to infertility and the progressive nature of the lesion creates a risk on the patient’s fertility. In addition, It is mandatory to standardize surgical and subsequent infertility management in such cases. Such challenge in creating a satisfactory staging in this respect is met with in our suggested surgical staging. In stage 1a disease the implants on the surface of the ovary or the endometriotic cyst is less than 2 cm. The impact on compromising ovarian reserve at this stage is minimal. In addition, the adnexa is freely mobile so the tubo-ovarian relationship and functional pick up mechanism is not compromised. The laparoscopic surgical management in this stage is minimal in the form of ablation of endometriotic implants on the surface of the ovary as well as other sites. Tubes are patent and the Douglas pouch was free so spontaneous pregnancy is expected if no other factors of infertility are present. In this group of women, Sixty percent pregnancy rate was observed in our study correlating with the early stage of the disease. Recurrence rate is expected to be low. None was observed in stage 1a in our study group. In stage 1b the endometrioma is 2-4cm and the ovary is fixed by adhesions to the ovarian fossa or the posterior leaf of the broad ligament. The impact on the ovarian reserve is still minimal. At least one tube is still patent and the Douglas pouch is free. Laparoscopic management should be directed to cystectomy better than ablation with freeing the ovary and restoring tubo-ovarian relation. In the study group as expected spontaneous pregnancy rate was 57% with no recurrence. On the other hand in stage 2 disease, the impact on ovarian reserve and the remnant of healthy ovarian tissue is critical. Laparoscopic surgery should be directed for cystectomy, adhesiolysis and freeing the adnexa. At least one tube should be patent to allow for expectant management but with consideration to the ovarian reserve for a period of one year if no other factor of infertility is present. Spontaneous pregnancy rate has dropped to about 35% in our study group indicating the impact of the cyst size on ovarian function and distorted pelvic anatomy by the presence of adhesions. Recurrence rate was still low (5.8%). In stage 3, the size of the cyst is more than 4 cm with fixation of the adnexa and partial or completely obliteration of the Douglas pouch but at least one tube is still patent.
Laparoscopic cystectomy and adhesiolysis was performed. Only, limited time for expectant treatment was given to our patients in this stage taking into consideration the age of the patient, and duration of infertility. In general only, young age couples with short duration of infertility less than 4 years in the absence of other factors of infertility were given the limited time expectancy management.

In stage 4 the size of the cyst is not important as the tubes are closed. So the management is only by IVF. No expectant management was offered to this group. The recurrence rate as expected was the highest 20.6%.

Another advantage of the new staging system, is that counseling of the infertile patient with endometrioma is made easy with clear outline on subsequent management with different management options. Indeed this staging system will prove ideal to establish guidelines for teaching and fellowship training.

Finally, such staging will help to standardize and evaluate protocol of management of endometrioma in infertile patient. The number of cases in our study group is small, so this initial validation of the surgical staging needs to be applied on large scale for further validation.

References


