Evaluation of Serum Anti-Mullerian Hormone Level before and after Laparoscopic and Surgical Intervention in Management of Endometriosis

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abdelalim, taher; abdel-aal, mohammed; and El-Garhy, Ismail (2022) "Evaluation of Serum Anti-Mullerian Hormone Level before and after Laparoscopic and Surgical Intervention in Management of Endometriosis," Al-Azhar International Medical Journal: Vol. 3: Iss. 6, Article 17.
DOI: https://doi.org/10.21608/aimj.2022.99582.1662

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Evaluation Of Serum Anti-Mullerian Hormone Level Before And After Laparoscopic And Surgical Intervention In Management Of Endometriosis

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ABSTRACT

Background: The granulosa cells of the ovaries produce AMH, which is expressed by small antral follicles. Levels peak around 5–8 ng/mL during puberty, then gradually fall throughout reproductive life until they are undetectable by menopause.

Aim of the work: To evaluate of anti-Mullerian hormone levels before & after laparoscopic and surgical intervention in endometriosis management.

Patients and methods: This study included 100 women aged 18-43 years with pelvic pain and/or infertility who underwent laparoscopic or surgical treatment of suspected endometriosis or endometriomas. Ovarian reserve will be measured by AMH and compared before laparoscopic & surgical treatment and at 1 month and 6 months after treatment, the women were recruited to this research will be carried out in the Assisted Reproduction unit at the International Islamic Center for Population Studies and Research (IICPSR), Al Hussein University Hospital and Sayed Galal University Hospital.

Results: Main age was 29.28 in Laparoscopic group and 28.66 in surgical group and the Standard deviation of age was 4.96 in Laparoscopic group and 4.30 in surgical group. The relation between laparoscopic group and surgical group in present history (1ry and 2ry infertility) show no any different in data and data are very close to each other in different groups.

Conclusion: This study's findings show that both laparoscopic and surgical management are helpful at lowering AMH levels, with laparoscopic being more effective than surgical.

Keywords: Serum Anti-Mullerian Hormone Level; Laparoscopic; Endometriosis.

INTRODUCTION

Endometriosis is a prevalent gynecologic disorder that affects between 6% and 10% of women of reproductive age. It is characterised as the presence of endometrial glands and stroma outside of the uterine cavity, which are most typically observed in the ovary and on the peritoneum. It might be superficial or deep.

Ovarian endometriomas are ovarian cysts bordered by endometrial tissue that contain fluid caused by menstrual debris accumulation. They are detected in 17 percent to 44 percent of endometriosis patients. Invagination of the ovarian cortex with monthly debris resulting from bleeding endometrial implants and epithelial inclusions from the ovarian surface that invaginate and metaplasia into endometrial tissue are two theories for the formation of ovarian endometrioma.

Endometriomas can be found in up to 44% of women with endometriosis and can have a negative impact on fertility. However, whether endometriomas should be surgically removed before assisted reproductive technologies is a point of contention. The goal of this study was to see if surgical removal of endometriomas in infertile women increases the chances of a live birth. Endometriosis affects approximately 6-10% of women in their reproductive years. Endometriosis can cause infertility in up to 50 percent of women who have it.

The quantity and quality of follicles present in the ovaries that have the ability to mature into mature follicles that influence a woman's reproductive potential are referred to as ovarian reserve. It's also a term used to describe the ovary's ability to produce oocytes capable of fertilisation, resulting in a healthy and successful pregnancy.

Anti-Mullerian hormone is a hormone that predicts menopause age. AMH level might thus tell individual women about their reproductive lifespan and current reproductive capability, given the assumed fixed amount of time between the end of natural fertility...
and menopause. However, no previous research has directly compared AMH levels in couples with unexplained infertility to normal controls.

After cystectomy for ovarian endometriomas, serum AMH values are known to decrease significantly. The loss of ovarian reserve after ovarian cystectomy for endometriomas is unavoidable, as measured by serum AMH values. Patients with innately low AMH concentrations would see their serum AMH concentrations drop even more.

**PATIENTS AND METHODS**

**Type of studies:**

This is a prospective cohort study to evaluate of anti-Mullerian hormone levels before & after laparoscopic and surgical intervention in endometriosis management.

**Study population:**

Our study included 100 women aged 18-43 years with pelvic Pain and/or infertility who underwent laparoscopic (n=50) or surgical (n=50) treatment of suspected endometriosis or endometriomas. Ovarian reserve will be measured by AMH and compared before laparoscopic & surgical treatment and at 1 month and 6 months after treatment, the women were recruited to this research will be carried out in Al Hussein University Hospital and Sayed Galal University Hospital and the Assisted Reproduction unit at the International Islamic Institute for Population Studies and Research (IICPSR).

**Patients where be classified into two equal groups:**

**Group A:** included 50 patients with laparoscopic treatment of suspected endometriosis or endometriomas. **Group B:** included 50 patients with surgical treatment of suspected endometriosis or endometriomas.

**All patients’ groups where be subjected to the following:**

**Through history taking.** Detailed personal history (Name, Age, present history, menstrual history, obstetric history). General examination: each patient will be examined systemically (Weight and height BMI will be recorded).

**Clinical examination:** All ovarian follicles measuring 3 mm to 10 mm on both ovaries were counted preoperatively in both groups using the largest cross-sectional sagittal view of the ovary, the averaged ovarian diameters for each patient were calculated by measuring two perpendicular diameters.

**Laboratory investigations including:** Hormonal Profiles Determination: Blood sample (5 cc) will be collected through vein puncture, samples will be allowed to clot at room temperature for at least one hour. All samples will be centrifuged within 2 hours after withdrawal; samples will be stored at –20 OC until assayed of basal hormones.

**Inclusion Criteria:**


**Exclusion Criteria:**

Pregnant women. Patients with previous excision of ovarian cysts. Patients diagnosed with infertility (unless solely related to endometriosis or the male infertility). Patients who had received hormonal treatment during the prior 36 months. Patients diagnosed with endocrine disorders.

Patients suffering from chronic diseases. Patients with history of malignancy. Liver function tests.

**Protocol and treatment:**

There was no recommendation for a restrictive diet, and none of the women in the trial did any intense aerobic activity. All of the women who were questioned agreed to take part in the study, and each one signed a written informed permission form. Neither the drug companies that make the drugs gave financial support for this study. The study was approved by the institutional review board.

**Patient preparation:**

The patients who enrolled in the study were submitted to the following criteria; age between 18 and 43 years old, BMI < 30, no other pelvic pathology or previous ovarian surgery and size of endometrioma ≥ 5 cm in average diameter. All patients had undergone laparoscopic ovarian cystectomy (LC) which preceded by AMH estimation. Six months after group to group comparisons were done as regard all parameters, laparoscopic surgery, AMH were re-estimated. Paired and All group to group comparisons were done as regard all parameters.

**Statistical analysis:**

Number (No) and percentage (%) were used to express qualitative data, whereas mean (and standard deviation) were used to describe quantitative data (SD). Statistical analysis: To investigate the relationship between two qualitative variables, the Chi square test (X2) was performed. Fischer’s Exact test was employed whenever any of the anticipated cells were fewer than five. The LSD test was employed as a post-hoc test to compare quantitative variables between more than two groups of normally distributed data using the ANOVA test.
## RESULTS

### General examination

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Mean (SD)</th>
<th>Min</th>
<th>Max</th>
<th>Laparoscopic (Mean (SD))</th>
<th>Min</th>
<th>Max</th>
<th>Surgical (Mean (SD))</th>
<th>Min</th>
<th>Max</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age</td>
<td>29.28 (4.96)</td>
<td>20</td>
<td>38</td>
<td>28.66 (4.30)</td>
<td>20</td>
<td>39</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Weight</td>
<td>72.42 (9.04)</td>
<td>55</td>
<td>89</td>
<td>73.28 (8.34)</td>
<td>56</td>
<td>92</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Height</td>
<td>168.68 (4.33)</td>
<td>156</td>
<td>178</td>
<td>168.06 (4.92)</td>
<td>155</td>
<td>176</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>BMI</td>
<td>25.50 (3.43)</td>
<td>17.75</td>
<td>33.98</td>
<td>26.03 (3.36)</td>
<td>20.17</td>
<td>35</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Table 1:** General examination distribution in study population

The total number of Patient selected for the tests was 100 Patient. The data showed at previous table are mostly the same, the mean of all parameter and standard deviation show the data are random distributed there is no bias in any group. main age was 29.28 in Laparoscopic group and 28.66 in Surgical group and the Standard deviation of age was 4.96 in Laparoscopic group and 4.30 in Surgical group.

<table>
<thead>
<tr>
<th>All cases</th>
<th>Laparoscopic</th>
<th>Surgical</th>
</tr>
</thead>
<tbody>
<tr>
<td>N (%)</td>
<td>N (%)</td>
<td>N (%)</td>
</tr>
<tr>
<td>Present history</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1ry infertility</td>
<td>42 (61)</td>
<td>20 (29)</td>
</tr>
<tr>
<td>2ry infertility</td>
<td>27 (39)</td>
<td>14 (21)</td>
</tr>
</tbody>
</table>

**Table 2:** Present history distribution in study population

The relation between Laparoscopic group and Surgical group in Present history (1ry and 2ry infertility) show no any statistically significant of data.

<table>
<thead>
<tr>
<th>All cases</th>
<th>Laparoscopic</th>
<th>Surgical</th>
</tr>
</thead>
<tbody>
<tr>
<td>N (%)</td>
<td>N (%)</td>
<td>N (%)</td>
</tr>
<tr>
<td>Obstetric history</td>
<td></td>
<td></td>
</tr>
<tr>
<td>No History</td>
<td>71 (71)</td>
<td>33 (33)</td>
</tr>
<tr>
<td>Normal vaginal delivery</td>
<td>18 (18)</td>
<td>11 (11)</td>
</tr>
<tr>
<td>Caesarean section</td>
<td>11 (11)</td>
<td>6 (6)</td>
</tr>
</tbody>
</table>

**Table 3:** Obstetric history distribution in study population

The relation between Laparoscopic group and Surgical group in Obstetric history (No History, Normal vaginal delivery and Caesarean section) show no any statistically significant of data.

<table>
<thead>
<tr>
<th>All cases</th>
<th>Laparoscopic</th>
<th>Surgical</th>
</tr>
</thead>
<tbody>
<tr>
<td>N (%)</td>
<td>N (%)</td>
<td>N (%)</td>
</tr>
<tr>
<td>Menstrual history</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Regular</td>
<td>21 (21)</td>
<td>12 (12)</td>
</tr>
<tr>
<td>Irregular</td>
<td>39 (39)</td>
<td>40 (40)</td>
</tr>
</tbody>
</table>

**Table 4:** Menstrual History distribution in study population

The relation between Laparoscopic group and Surgical group in Menstrual history (Regular and Irregular) show no any statistically significant of data. History of patients are normally distributed due to no any significant data between different groups.

<table>
<thead>
<tr>
<th>All cases</th>
<th>Laparoscopic</th>
<th>Surgical</th>
</tr>
</thead>
<tbody>
<tr>
<td>N (%)</td>
<td>N (%)</td>
<td>N (%)</td>
</tr>
<tr>
<td>Ultrasound examination</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Chocolate cyst right ovary normal uterus</td>
<td>43 (43)</td>
<td>19 (19)</td>
</tr>
<tr>
<td>Chocolate cyst left ovary normal uterus</td>
<td>34 (34)</td>
<td>19 (19)</td>
</tr>
<tr>
<td>Chocolate cyst Bilateral vary normal uterus</td>
<td>12 (12)</td>
<td>8 (8)</td>
</tr>
</tbody>
</table>

**Table 5:** Ultrasound examination distribution in study population

The relation between Laparoscopic group and Surgical group in Ultrasound examination (Chocolate cyst right, left and bilateral ovary with normal uterus) show no any statistically significant of data.
The data in the two groups were compared and the results showed no any statistically significant of data.

Table 6: Hysteroscope distribution in study population

<table>
<thead>
<tr>
<th>Ovarian reserve</th>
<th>Laparoscopic</th>
<th>Surgical</th>
<th>P value</th>
<th>Statistically significant</th>
</tr>
</thead>
<tbody>
<tr>
<td>All cases N (%)</td>
<td>Total 69 100</td>
<td>36 52</td>
<td>33 48</td>
<td>0.4057</td>
</tr>
<tr>
<td>Normal uterus</td>
<td>49 49</td>
<td>24 48</td>
<td>25 50</td>
<td></td>
</tr>
<tr>
<td>Endometriosis</td>
<td>20 20</td>
<td>12 24</td>
<td>8 16</td>
<td></td>
</tr>
</tbody>
</table>

Table 8: Ovarian reserve at different time

The relation between Laparoscopic group and Surgical group in Ovarian reserve (Before and After 1 months) show no any statistically significant of data, but in case of (After 6 months) show statistical different.

**DISCUSSION**

Endometriosis is a disease defined by the formation of endometrium-like tissue outside of the uterine cavity (stroma and glands). The condition can affect any organ, although it is most common in the pelvic organs, especially the ovaries. Practically, pain and infertility are the two main clinical implications of endometriosis 1.

AMH, a dimeric glycoprotein, has been found in the granulosa cells of developing follicles up to the antral stage, or around 6 mm in diameter, in the ovary. As the follicles become more reliant on FSH, AMH production decreases. The day of the menstrual cycle has no effect on serum levels, and exogenous steroid therapy is unlikely to impact them. Serum levels are closely connected with reproductive age. As a result, AMH has been used to predict both poor and excessive IVF response 2.

Ovarian reserve (OR) is the pool of follicles available to provide eggs cells throughout each woman's reproductive age. OR predicts the length of a woman's reproductive lifespan in reproductive medicine. The examination of OR enables for the identification of cases of early ovarian insufficiency as well as the development of egg freezing and egg donation programmes 3.

In the result of this study, 100 participants were chosen to participate in the examinations. The data in the previous table are basically the same, and the mean of all parameters and standard deviation show that the data are randomly distributed and that no group is biased. The median age in the Laparoscopic group was 29.28, whereas the median age in the surgical group was 28.66, with a standard deviation of 3.65 in the Laparoscopic group and 4.30 in the surgical group.

Another study found that postoperative AMH levels declined significantly after surgery, regardless of age (38 years, P=0.001; > 38 years, P=0.001), and that age was a negative factor in this study 4.

Preoperative AMH levels in patients with endometriosis (4.97 2.66 ng/mL) were lower than those in the other two groups (5.88 3.17 ng/mL in those with teratoma, and 6.39 3.61 ng/mL in those with other benign cysts) in another study, but the differences were not statistically significant, despite the fact that the endometrioma group was older 5.

Another study found that the drop in serum AMH after surgery is related to the bilaterality, severity, and age of endometriosis. The rate of drop in the AMH in the bilateral group was higher than in the unilateral group at 1 month post-surgery, according to the former group. It was also linked to the revised American Society for Reproductive Medicine score, but not to age, blood AMH concentration prior to surgery, or cyst diameter 6.

The current study results showed that there was no difference in data between the laparoscopic and surgical groups in recent history (1ry and 2ry infertility), and the data in the two groups were extremely near to each other.

Endometriosis is a chronic benign estrogen-dependent disease defined by the aberrant growth of endometrial-like tissue outside the uterine cavity and is usually linked to infertility, according to another study 7.

In the results of this study, comparing the Laparoscopic and Surgical groups in terms of menstrual history, the number of patients in each group was 6 regular and 20 irregular in the laparoscopic group and 6 regular and 20 irregular in the surgical group (15 Regular and 19 Irregular).

The current study results revealed that the number of patients in each group in Ultrasound examination was 19 Chocolate cyst right, 19 left, and 8 bilateral ovarian with normal uterus in the Laparoscopic group and 19 Chocolate cyst right, 19 left, and 8 bilateral ovary with normal uterus in the Surgical group (24 Chocolate cyst right, 15 left and 4 bilateral ovary with normal uterus).

Other study found a significant difference in AMH level drop between dermoid cysts and the two other cyst types tested, but no difference between mucinous and serous cystadenomas. The similar explanation could explain our findings about the effect of primary AMH levels on the percentage of...
The primary aim of this study was to determine if primary AMH levels could be used as the primary marker for fertility. In a controlled trial of a new technique for laparoscopic ovarian drilling on AMH and ovarian reserve: a meta-analysis Reproduction. 2017; 154: R13–R21.


