



6-1-2022

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### How to Cite This Article

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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Received for publication November 16, 2021; Accepted June 24, 2022; Published online June 24, 2022.

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doi: 10.21608/aimj.2022.99582.1662

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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.

**Disclosure:** The authors have no financial interest to declare in relation to the content of this article. The Article Processing Charge was paid for by the authors.

**Authorship:** All authors have a substantial contribution to the article.

### 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<sup>1</sup>.

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<sup>2</sup>.

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<sup>3</sup>.

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<sup>4</sup>.

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<sup>5</sup>.

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<sup>6</sup>.

## 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 0C until assayed of basal hormones.

### Inclusion Criteria:

Age: 18-43. Complain: pelvic pain or infertility. Bilateral or unilateral ovarian endometriosis diagnosed during US assessment.

### 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  $\geq 5$  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 (X<sup>2</sup>) was performed. Fischers 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	Laparoscopic				Surgical			
	Mean	SD	Min	Max	Mean	SD	Min	Max
Age	29.28	4.96	20	38	28.66	4.30	20	39
Weight	72.42	9.04	55	89	73.28	8.34	56	92
Height	168.68	4.33	156	178	168.06	4.92	155	176
BMI	25.50	3.43	17.75	33.98	26.03	3.36	20.17	35

**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.

Total	All cases	N (%)	Laparoscopic	N (%)	Surgical	N (%)	P value	Statistically significant
	69	100	34	49	35	51		
Present history								
1ry infertility	42	61	20	40	22	44	0.8075	N.S
2ry infertility	27	39	14	28	13	26		

**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.

Total	All cases	N (%)	Laparoscopic	N (%)	Surgical	N (%)	P value	Statistically significant
	100	100	50	50	50	50		
Obstetric history								
No History	71	71	33	66	38	76		
Normal vaginal delivery	18	18	11	22	7	14	0.5138	N.S
Caesarean section	11	11	6	12	5	10		

**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.

Total	All cases	N (%)	Laparoscopic	N (%)	Surgical	N (%)	P value	Statistically significant
	60	100	26	43	34	57		
Menstrual history								
Regular	21	21	6	12	15	30	0.1085	N.S
Irregular	39	39	20	40	19	38		

**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.

Total	All cases	N (%)	Laparoscopic	N (%)	Surgical	N (%)	P value	Statistically significant
	89	100	46	52	43	48		
Ultrasound examination								
Chocolate cyst right ovary normal uterus	43	43	19	38	24	48	0.3187	N.S
Chocolate cyst left ovary normal uterus	34	34	19	38	15	30		
Chocolate cyst Bilateral vary normal uterus	12	12	8	16	4	8		

**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.

	All cases	N (%)	Laparoscopic	N (%)	Surgical	N (%)	P value	Statistically significant
Total	69	100	36	52	33	48		
			Hysteroscope					
Normal uterus	49	49	24	48	25	50	0.4057	N.S
Endometriosis	20	20	12	24	8	16		

**Table 6:** Hysteroscope distribution in study population

The relation between Laparoscopic group and Surgical group in Hysteroscope (Normal uterus and Endometriosis) show no any statistically significant of data.

Ovarian reserve	Laparoscopic		Surgical		P value	Statistically significant
	Mean	SD	Mean	SD		
Before	3.82	1.78	3.65	1.70	0.5841	N.S
After 1 months	2.11	1.30	2.36	2.53	0.6821	N.S
After 6 months	1.16	0.66	1.71	0.99	0.0018	Sig.

**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<sup>1</sup>.

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<sup>2</sup>.

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<sup>7</sup>.

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 4.96 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, P0.001;> 38 years, P0.001), and that age was a negative factor in this study<sup>3</sup>.

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<sup>5</sup>.

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<sup>8</sup>.

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<sup>9</sup>.

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



serum drop after surgery. The group whose primary AMH level was greater than 5 ng / ml had a significantly higher decline in AMH level than the group whose primary AMH level was less than 5 ng / ml, according to statistical analysis <sup>10</sup>.

In the current study, the number of patients in each group in the Hysteroscope was (24 normal uterus and 12 endometriosis) in the Laparoscopic group and (24 normal uterus and 12 endometriosis) in the Surgical group (25 Normal uterus and 8 Endometriosis).

Another study found that in individuals with endometriomas, postoperative serum AMH declined significantly compared to pre-operative levels, although postoperative basal FSH did not alter significantly compared to pre-operative levels. Taken together, serum AMH appears to be superior to FSH for assessing ovarian reserve change. The inclusion of women who underwent myomectomy and hysterectomy using different techniques is a limitation of this study, while it is unlikely that the differing approaches would have a significant impact on ovarian reserve <sup>11</sup>.

In another study, serum AMH levels tended to decrease more at 4 months after hysterectomy than in controls who did not have hysterectomy (1.46 2.02 to 0.62 0.9 ng/mL in the hysterectomy group vs. 1.531.82 to 1.26 1.78 ng/mL in the controls, mean  $\pm$  SD, P = 0.73 and P = 0.262 before and after surgery, respectively) <sup>12</sup>.

This study results demonstrated that the number of patients in each group in ovary endometriosis was (24 Right, 18 Left, and 8 Bilateral) in the Laparoscopic group and (24 Right, 18 Left, and 8 Bilateral) in the Surgical group (30 Right, 16 Left and 4 Bilateral).

In current study the relationship between laparoscopic and Surgical groups in ovarian reserve, the mean of AMH in serum in each group was (3.82 Before and 2.11 After 1 month and 1.16 After 6 months) in Laparoscopic group and (3.65 Before and 2.36 After 1 month and 1.71 After 6 months) in Surgical group, but statistical differences in the case of (After 6 months) showed that Laparoscopic group decreased more than Surgical group.

In other studies, the AMH is found to be an important predictor of ovarian reserve and thus folliculogenesis, despite the fact that it only displays a modest drop in the early postoperative phase. Furthermore, our findings suggest that a proper surgical procedure in the hands of a qualified surgeon does not result in severe ovarian reserve impairment <sup>13</sup>.

Another study looked into the impact of laparoscopic surgery on ovarian reserve by measuring AMH levels. Many research have identified possible factors for the decline in AMH levels. The examination of AMH levels during the 3-month follow-up period in this study revealed a small reduction at time 2 (first month after surgery) <sup>14</sup>.

In another study, operation-related ovarian reserve damage was related to whether the endometriomas were bilateral, as well as cyst size (particularly for

cysts larger than 7 cm), but not to the pre-operative serum AMH level. In this study, age was a negative factor that reduced ovarian reserve. <sup>15</sup>.

## CONCLUSION

The result of this study demonstrates that laparoscopic and surgical management are effective on AMH levels but laparoscopic more than surgical.

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