Research Article

INTERNATIONAL RESEARCH JOURNAL OF PHARMACY

www.irjponline.com

ISSN 2230-8407 [LINKING]

ASSESSING THE EFFECT OF OVARIAN SURGERY ON OVARIAN RESERVE

Dr. Madhuri Deotale

Assistant Professor, Department of Obstetrics and Gynaecology, Government Medical College, Nagpur, Maharashtra

Email id: drmadhuri.mayahospital@gmail.com

How to cite: Deotale M. Assessing the effect of ovarian surgery on ovarian reserve. International Research Journal of Pharmacy. 2015; 6:10:740-743.

Doi: 10.7897/2230-8407.0610144

ABSTRACT

Background: Existing evidence indicates a decline in ovarian reserve following ovarian surgery. The effect of the surgery, type of ovarian cyst, histology, and underlying illness remains unknown, necessitating additional research.

Aim: The current study aims to investigate the effect of ovarian surgery on ovarian reserve in terms of AMH (anti-mullerian hormone) depending on operation type, size, and lesion histology.

Methods: The current study included 56 participants aged 18 to 40 years. Anti-Mullerian hormone levels were measured in all participants using a standardized ELISA.

All 52 participants developed one or more ovarian cysts with varying histological characteristics, which were handled at the Institute during the research period. The levels of AMH were measured before and after surgery. Results: Anti-Mullerian hormone levels decreased significantly from 3.92±3.16 to 3.12±2.55 ng/mL (p=0.001). Unilateral cysts were found in 80.8% of the individuals, and 90.4% had their cysts completely removed. AMH levels decreased significantly in follicular cysts from 4.70±3.82 to 3.74±2.89 ng/ml (p=0.03) and in endometriosis cysts from 2.53±1.85 to 1.70±1.37 ng/ml (p=0.02). The size of the cyst also had an impact on ovarian reserve, with bigger cysts measuring 5cm or more exhibiting a considerable drop in anti-Mullerian hormone.

Conclusions: The current study found a considerable drop in anti-Mullerian hormone levels following ovarian surgery. However, it is unclear if this decrease will last in the long run or if it is a temporary side effect of ovarian surgery. These operations should be performed with caution in young girls because they might cause a transient loss in their ovarian reserve.

Keywords: anti-müllerian hormone, ovarian cyst, ovarian reserve, ovarian cancers**.**

INTRODUCTION

Ovarian cysts are a common discovery in younger girls of the reproductive age. It is estimated that roughly 7% of females worldwide develop a symptomatic cyst over their lifetime. Cysts, particularly functional and uncomplicated ones, can be handled and controlled conservatively. However, surgical therapy is recommended when cysts grow considerably in size, there are questionable ultrasonography findings, or there are symptomatic cysts. Furthermore, in instances when spontaneous remission is not predicted, as in organic ovarian cysts such as dermoid cysts or endometriosis, surgical excision is the primary treatment option.1

The gold standard approach for ovarian cyst removal is laparoscopic ovarian cystectomy. Previous and available literature studies have shown a decline in OR (ovarian reserve) after an ovarian surgical intervention. Still, the impact of operational surgical methods, cyst size, histology, and cyst etiology on these cysts is unknown. As a result, there are no recommendations

for determining whether surgical intervention is required and when a conservative approach is sufficient. The current investigation used anti-Mullerian hormone to determine ovarian reserve.2

AMH (anti-Mullerian hormone) is released by granulosa cells during the reproductive years of a female's life. It represents the residual fertile pool and is thus utilized as an indicator of the ovarian reserve. It outperforms other blood indicators of fertility such as LH (luteinizing hormone) and FSH (follicle stimulating hormone) and has low fluctuation during the menstrual cycle. In comparison, the AFC (antral follicle count) has high inter-observer variability and is heavily dependent on the technology, whereas the AMH is a more objective marker.3

Furthermore, AMH is an excellent indicator of iatrogenic harm to the ovarian reserve.4 The major goal of the study was to determine the effect of ovarian surgery on ovarian reserve in terms of AMH (anti-mullerian hormone) based on the kind of surgery, size of the lesion, and histology.

MATERIALS AND METHODS

The major observational clinical goal of the study was to evaluate the effect of ovarian surgery on ovarian reserve in terms of AMH (anti-mullerian hormone) depending on operation type, size, and lesion histology. The research subjects were members of the Institute's Department of Obstetrics and Gynaecology. All individuals provided verbal and written informed permission before participating in the study.

The study included 104 females with ovarian cysts, who were evaluated before and after 1-2 weeks following laparoscopic ovarian surgery. The study's inclusion criteria were patients aged 18 to 40 years old, no malignancies on postoperative histological evaluation, normal LH and FSH levels, a regular menstrual cycle, and no history of fallopian tube or ovarian surgery. Previous ovarian surgery, radiography suspected of cancer, and individuals with a history of endometriosis were all excluded from the research.

Histopathology classified lesions into several categories, including endometriosis cysts, follicular cysts, dermoid cysts, and cystadenomas. AMH was measured and evaluated in all obtained samples using a standardized ELISA (enzyme-linked immunosorbent assay). The typical range was 1–8 ng/ml. AMH values <1ng/mL were regarded decreased, whereas AMH levels <0.4ng/mL were classified severely diminished ovarian reserve.

All individuals were asked questions on contraception, obstetric data, lifestyle, and menstrual abnormalities. The collected data were statistically analyzed using SPSS (Statistical Package for the Social Sciences) software version 24.0 (IBM Corp., Armonk, NY, USA) for descriptive measures, Student t-test, ANOVA (analysis of variance), and Chi-square test. The data were presented in the form of mean and standard deviation, as well as frequency and percentage. A p-value < 0.05 was considered statistically significant.

RESULTS

The major observational clinical goal of the study was to evaluate the effect of ovarian surgery on ovarian reserve in terms of AMH (anti-mullerian hormone) depending on operation type, size, and lesion histology.

The current study included 56 participants aged 18 to 40 years. Anti-Mullerian hormone levels were measured in all participants using a standardized ELISA. The average age of research participants was 28.2±2.2 years. The average number of children per female was 0.35 (0-3 range). 15.3% of patients experienced one to two miscarriages, with an average of 0.17±0.47. The average age at menarche was 13.2±1.6 years, with a range of 10-16 years. Unilateral cysts were observed in 80.8% (n=84) of the cases, whereas bilateral cysts were found in 19.2% (n=20) of the participants.

In 90.4% of the cases (n=94), total cyst ectomy was performed, while the other participants had surgical fenestration of the cysts. The study included 15% (n=16) endometriosis, 44% (n=46) follicular, 14% (n=14) dermoid cysts, and 27% (n=27) miscellaneous entities. Prior to surgery, the mean AMH level was 3.92±3.16 ng/ml, with a range of 0.04-14.63. The study found a substantial decrease of 3.12±2.55 (0.00-9.87 ng/ml) in all histological entities (p=0.001). The average AMH decrease in unilateral intervention was 0.52 ng/ml, but in bilateral intervention it was 1.89 ng/ml. ANOVA revealed a statistically significant difference by intervention type (p=0.01) (Table 1).

Complete cyst removal reduced AMH levels from 3.86±2.84 to 3.12±2.52 ng/ml, a 0.72 ng/ml drop. After fenestration surgery, levels reduced from 4.51±5.79 to 3.10±3.09 ng/mL. A fenestration operation is used in cases where total cyst excision might result in complete ovary loss due to the negative relationship between cyst size and functional ovarian tissue. Only big ovarian cysts (diameter ≥5cm) showed a substantial drop in AMH levels from 3.85±3.00ng/ml before surgery to 2.73±1.96ng/ml after surgery (p=0.002). Cysts less than 5cm showed no significant decline in AMH (p=0.171).

Endometriosis cysts had a substantial drop in AMH levels from 2.53±1.85ng/ml to 11.70±1.37ng/ml (p=0.02), whereas follicular cysts had a reduction from 4.70±3.82ng/ml to 3.74±2.89ng/ml (p=0.03). The dermoid cyst showed a non-significant decrease in AMH from 3.73±3.16 to 3.16±3.04 ng/ml (p=0.261), whereas the other cyst showed a comparable decrease from 3.54±2.34 to 2.89±2.01 ng/ml (p=0.121). Only symptomatic individuals should have their follicular cysts removed.

DISCUSSION

The current study included 56 participants aged 18 to 40 years. Anti-Mullerian hormone levels were measured in all participants using a standardized ELISA. The average age of research participants was 28.2±2.2 years. The average number of children per female was 0.35 (0-3 range). 15.3% of patients experienced one to two miscarriages, with an average of 0.17±0.47. The average age at menarche was 13.2±1.6 years, with a range of 10-16 years. These findings were equivalent to those of Johnson J et al5 in 2004 and Muzii L et al6 in 2002, who evaluated patients with demographic data similar to the current study in their separate investigations.

According to the study's findings, unilateral cysts were found in 80.8% (n=84) of the cases and bilateral cysts in 19.2% (n=20). In 90.4% of the cases (n=94), total cyst ectomy was performed, while the other participants had surgical fenestration of the cysts. The study included 15% (n=16) endometriosis, 44% (n=46) follicular, 14% (n=14) dermoid cysts, and 27% (n=27) miscellaneous entities. Prior to surgery, the mean AMH level was 3.92±3.16 ng/ml, with a range of 0.04-14.63.

The study found a substantial decrease of 3.12±2.55 (0.00-9.87 ng/ml) in all histological entities (p=0.001). The average AMH decrease in unilateral intervention was 0.52 ng/ml, but in bilateral intervention it was 1.89 ng/ml. ANOVA revealed a statistically significant difference by intervention type (p=0.01). These findings were consistent with those of Muzii L et al7 in 2011 and Chen Y et al8 in 2014, in which the authors reported mean cyst and AMH distributions that were comparable to those of the current research.

Complete cyst removal reduced AMH levels from 3.86±2.84 to 3.12±2.52 ng/ml, a 0.72 ng/ml drop. After fenestration surgery, levels reduced from 4.51±5.79 to 3.10±3.09 ng/mL. A fenestration operation is used in cases where total cyst excision might result in complete ovary loss due to the negative relationship between cyst size and functional ovarian tissue. Only big ovarian cysts (diameter ≥5cm) showed a substantial drop in AMH levels from 3.85±3.00ng/ml before surgery to 2.73±1.96ng/ml after surgery (p=0.002). Cysts less than 5cm showed no significant decline in AMH (p=0.171). These findings were consistent with the findings of Mehdizadeh Kashi A et al9 in 2014 and Kwon SK et al10 in 2014, who also observed a change in AMH level similar to the current research.

Endometriosis cysts had a substantial drop in AMH levels from 2.53±1.85ng/ml to 11.70±1.37ng/ml (p=0.02), whereas follicular cysts had a reduction from 4.70±3.82ng/ml to 3.74±2.89ng/ml (p=0.03). The dermoid cyst showed a non-significant decrease in AMH from 3.73±3.16 to 3.16±3.04 ng/ml (p=0.261), whereas the other cyst showed a comparable decrease from 3.54±2.34 to 2.89±2.01 ng/ml (p=0.121).

Only symptomatic individuals should have their follicular cysts removed. These findings were consistent with the findings of Raffi F et al in 2012 and Dewally D et al in 2014, who observed a substantial drop in AMH in endometriosis cysts and follicular cysts, as seen in the current investigation.

CONCLUSIONS

The present study, within its limitations, concludes that there is a significant reduction in anti-Mullerian hormone levels after ovarian surgeries. However, it is yet to be clarified if this reduction continues in the long term or is just a short-term effect of ovarian surgery. These surgeries should be cautiously done in young females as they can lead to a temporary reduction in the ovarian reserve in these females. Further studies are warranted for further exploration of the issue.

REFERENCES

1. Visser JA, De Jong FH, Laven J, et al. Anti-Müllerian hormone: a new marker for ovarian function. Reproduction 2006;131:1–9.
2. Chang H, Han S, Lee J, et al. Impact of laparoscopic cystectomy on ovarian reserve: serial changes of serum antiMüllerian hormone levels. Fertil Steril 2010;94:343–9.
3. Schindler A. Ovarialzysten—Diagnostik und Therapie. Frauenarzt 2005;46:132–4.
4. Farghaly SA. Current diagnosis and management of ovarian cysts. Clin Exp Obstet Gynecol 2014;41:609–12.

5. Johnson J, Canning J, Kaneko T, et al. Germline stem cells and follicular renewal in the postnatal mammalian ovary. Nature 2004;428:145–50.
6. Muzii L, Bianchi A, Crocè C, et al. Laparoscopic excision of ovarian cysts: is the stripping technique a tissue-sparing procedure? Fertil Steril 2002;77:609–14.
7. Muzii L, Marana R, Angioli R, et al. Histologic analysis of specimens from laparoscopic endometrioma excision performed by different surgeons: does the surgeon matter? Fertil Steril 2011;95:2116–9.
8. Chen Y, Pei H, Chang Y, et al. The impact of endometrioma and laparoscopic cystectomy on ovarian reserve and the exploration of related factors assessed by serum antiMüllerian hormone: a prospective cohort study. J Ovarian Res 2014;267:108.
9. Mehdizadeh Kashi A, Chaichian S, Ariana S, et al. The impact of laparoscopic cystectomy on ovarian reserve in patients with unilateral and bilateral endometrioma. Int J Gynaecol Obstet 2014;136:200–4.
10. Kwon SK, Kim SH, Yun SC, et al. Decline of serum antiMüllerian hormone levels after laparoscopic ovarian cystectomy in endometrioma and other benign cysts: a prospective cohort study. Fertil Steril 2014;101:435–41.
11. Raffi F, Metwally M, and Amer S. The impact of excision of ovarian endometrioma on ovarian reserve: a systematic review and meta-analysis. J Clin Endocrinol Metab 2012;97:3146–54.
12. Dewally D, Andersen CY, Balen A, et al. The physiology and clinical utility of anti-Müllerian hormone in women. Hum Reprod Update 2014;20:370–85.

S. No	Parameter	Number (n)	Mean AMH before surgery (ng/ml)	Mean AMH before surgery (ng/ml)	p-value
1.	**Total**	104	3.92±3.16	3.12±2.55	**0.001**
2.	**Size**				
a)	>5 cm	56	3.85±3.00	2.73±1.96	**0.002**
b)	<5 cm	48	4.00±3.39	3.58±3.08	**0.001**
3.	**Localization**				
a)	Unilateral	84	3.86±3.23	3.32±2.61	**0.03**
b)	Bilateral	20	4.19±2.98	2.28±2.16	**0.001**
4.	**Histology**				
a)	Dermoid cyst	14	3.73±3.16	3.16±3.04	0.261
b)	Endometriosis cyst	16	2.53±1.85	1.70±1.37	**0.02**
c)	Follicular cyst	46	4.70±3.82	3.74±2.89	**0.03**
d)	Others	28	3.53±2.34	2.89±2.01	0.121

Table 1: Mean AMH levels before and after surgery based on histology, size, and localization