

Saline Containing Vasopressin in Laparoscopic Excision of Ovarian Endometrioma

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Abstract

Background: Endometriomas are known as cystic formations of ovarian endometriosis and 35% of ovarian cysts require surgery in women of reproductive age. Laparoscopic stripping is the choice of treatment in conservative treatment of ovarian endometrioma and is known to be better than fenestration and coagulation because of less pain, low recurrence rate and spontaneous pregnancy rates. **Objective:** The effectiveness and safety of laparoscopic surgery using saline containing vasopressin injection as assisted method for excision of ovarian endometrioma. **Patients & Methods:** 20 women in child peering period ages ranges from 18 to 40 years diagnosed with ovarian endometrioma more than 3 cm in diameter was selected for this study. **Results:** 20 women had been evaluated the value and effectiveness of "saline containing vasopressin injection"-assisted laparoscopic excision of ovarian endometrioma. No statistically significant difference between pre- and post-operative according to AFC. Meanwhile, there was difference between mean AMH of pre-operative patients was 2.4255 ± 0.907 while mean AMH of post-operative patients was 1.966 ± 0.680 . In addition, the mean endometrioma size in mm^3 was 59.25 ± 15.063 , mean time of operation in sec was 518.3 ± 87.150 and mean number of coagulation events was 10.38 ± 2.376 . **Conclusion:** Diluted vasopressin is an effective method for decreasing operation time and electrocauterization and pinpoint coagulation during laparoscopic stripping of ovarian endometriomas

Keywords:

Endometrium-like tissue, in-vitro fertilization (IVF), Laparoscopic stripping ovarian endometrioma.

Introduction

One of the important issues of recent years is concerned with the ways for preserving ovarian reserve to decrease the manipulation and direct damage to ovary.

Endometriomas are known as cystic formations of ovarian endometriosis and 35% of ovarian cysts require surgery in women of reproductive age.

Laparoscopic stripping is the choice of treatment in conservative treatment of ovarian endometrioma and is known to be better than fenestration and coagulation because of less pain, low recurrence rate and spontaneous pregnancy rates (1).

However, in recent studies, laparoscopic stripping has been associated with reduction of ovarian reserve & volume due to excessive removal of ovarian tissue and hemostasis through bipolar coagulation of ovarian tissue (thermal injury) or by suturing (local tissue pressure and local hypoxia) (2).

Histopathological studies had shown that the removal fragments of nearby healthy ovarian tissue due to cystectomy of endometrium, particularly in areas close to the ovarian hilum (3).

Galantine thrombin matrix sealant is effective in hemostasis. However, has been related to small bowel obstruction in some patients who underwent laparoscopic surgery.

The injection of vasopressin during laparoscopic excision of Endometriomas reduces the use of coagulation events and thus may protect ovarian reserve (4).

This randomized observational trial was carried out to determine the effect of diluted vasopressin on operation time and the need for electrocoagulation and ovarian reserve volume (5).

Hypothesis

This study suggests that vasopressin decreased operation time and the need for electro coagulation events in hemostasis

Also negative impactation of ovarian stripping on ovarian reserve evaluated by AMH &AFC.

Objectives

Evaluation of the impact of laparoscopic surgery using saline containing vasopressin injection as assisted method for excision of ovarian endometrioma and impactation at ovarian reserve evaluated by AMH &AFC .

Design

An observational study

Setting

Department of Obstetrics & Gynecology, Faculty of Medicine, Benha University & Amenah Specialized Hospital.

Patients and Methods

The current study intended to include 20 women attending laparoscopic surgery unit to remove unilateral endometrioma more than 3cm through the period from March 2022 – August 2022. All 20 women with ovarian endometrioma underwent clinical evaluation and US determination of endometrioma. Clinical evaluation included

collection of demographic data including age, body weight and height for calculation of body mass index (BMI) according to the equation: $BMI (kg/m^2) = \text{weight (kg)} / \text{height (m)}^2$. Full history concerning family history or current diabetes mellitus (DM), hypertension (HTN), renal or cardiac diseases, gastrointestinal disorders was taken. Obstetric history included number of gravidities, parity, history of previous operations, first day of last menstrual period 'abdominal pain 'infertility 'regularity of menstruation 'diarrhea or constipation 'pain during intercourse.

Diagnosis of ovarian endometrioma

Abdominal ultrasonography for antral follicle count was performed during the early proliferative stage (days 3–7 of the menstrual cycle) and the total number of follicles with diameters <10 mm will be considered.

Trans abdominal scanning was done with distended bladder by using real time scanners with the low frequency probe (3/3.5 MHz).

Diagnosis of ovarian reserve

Ovarian reserve was assessed by measuring AMH before surgery and two months after surgery. Serum samples were obtained from each participant and centrifuged for 10 min to separate the cell contents and debris. Each serum sample was transferred to polypropylene tubes and stored at –80 °C.

AMH levels were quantitatively measured using Enzyme-Linked Immunosorbent Assay (ELISA) (Diagnostic Systems

Laboratories, Webster, TX, USA), with a detection sensitivity of 0.006 ng/mL.

Main outcome measures:

Value and feasibility of "saline-containing vasopressin injection"-assisted laparoscopic excision of ovarian endometrioma by operative time & number of punctures needed for hemostasis and excision /preservation of ovarian volume.

Evaluate the impact of surgery for endometriomas on ovarian reserve as Determined by serum anti mullerian hormone (AMH).

Inclusion criteria:

- Subjects undergoing laparoscopic ovarian cyst enucleation for unilateral endometrioma.
- Age from 18 to 40 years.
- Endometrioma more than 3cm in size.

Exclusion criteria:

- Subjects with major medical conditions such as uncontrolled infection, Diabetes, severe renal or hepatic disease.
- History of hormonal medication use within 2months.
- Previous surgical intervention for endometriosis.
- Pregnant.

Consent:

A written informed consent was taken from all cases after full demonstration of steps and significance of this study.

Ethical Consideration:

The data that were obtained from participants are confidential according to Research Ethics Committee (REC) Benha university code number **MS 27-2-2022**. The study participants were not identified by name in any report or publication

concerning this study. The purpose and nature of the study, as well as the risk–benefit assessment was explained to them. An informed consent was obtained.

Interventions:

The "saline contains vasopressin "- as assisted method for laparoscopic excision of ovarian endometrioma consists of five steps:

Rupture the ovarian endometrial cyst and remove the "chocolate fluid.

Inject the saline with vasopressin into the interface between endometrioma and ovarian parenchyma, injecting until the solution overflow.

Separate the endometrioma away from the ovarian parenchyma.

NO Suture of the ovary; hemostasis achieved by electrocoagulation.

All laparoscopies were performed during late proliferative phase of the cycle by an experienced surgeon under general anesthesia.

Operative laparoscopy was performed through a three-port approach with one 11 mm sub umbilical port for the scope and two 5.5 mm ancillary ports. Usual operation for laparoscopic ovarian cystectomy was done using stripping the cyst wall by normal saline hydro dissection. The following procedures included careful inspection of pelvic and peritoneal cavity, peritoneal washings, staging of endometriosis and adhesiolysis for release and mobilization of the ovaries from the surrounding structures the injections of normal saline between the cyst wall and the

ovarian cortex, aspiration of chocolate material of the cyst by suction needle.

Applying careful traction-counter traction technique over the edges of the cyst wall with two traumatic graspers, the cyst wall stripped from the healthy surrounding normal ovarian tissue and cortex.

Hemostasis was achieved by a 35-W current bipolar electrocoagulation on the cyst bed for the shortest possible time. Finally, the pelvic cavity was irrigated with a large amount of saline.

Before hydro dissection, vasopressin was prepared by dilution of one ampoule (5ml) of glypressin 1mg (Ferring Co.) with 20 ml of physiologic saline to dilute it. The injection of 3 ml diluted vasopressin was made at one to three points, at the nearby large vessels, but not to the hilum, followed by 30-40 ml saline solution injection in different points to achieve hydrodissection. This was done to decrease the side effects of vasopressin like arrhythmia.

Operation time was considered from the start of detaching the cyst wall until hemostasis of the normal ovarian tissue. The total number of electrocoagulation events used to achieve hemostasis was counted. To confirm the diagnosis and exclusion of malignancy, cyst wall was sent for histological assessment. None of the operated ovaries were sutured.

All patients were discharged the following day, and then followed by ultrasound examination and serum AMH after 2 regular menstrual cycles as described above.

Statistical analysis

Pre-coded data was statistically analyzed using the statistical package of the social science software version SPSS vs.20. (IBM, Armonk, New York, United states). Data was summarized using mean, SD, median and IQR for quantitative variables and number and percentage for qualitative variables.

Comparison between qualitative variables were done using Chi-square test, while an independent T-test was used for quantitative variables between two groups, One-way categories which were normally disturbed.

Non parametric Kruskal-Wallis and Mann-Whitney tests were used for quantitative variables which were not normally disturbed. Other statistical tests were used when appropriate. P value less than 0.05 was considered statistically significant.

Results

Twenty women in child bearing period ages ranges from 18 to 40 years diagnosed with ovarian endometrioma more than 3 cm in diameter (history of dysmenorrhea, infertility, irregular menstruation, abdominal ultrasonography) will be selected for this study. The mean age was 28.05 ± 6.3 years. The mean body mass index of pre-operative patients was 25.65 ± 4.05 Kg/m² and in postoperative was 25.85 ± 3.99 Kg/m².

According to Independent-samples t-test of significance and Chi-square (X²) test of significance, there was no significant difference between case and control groups as regard BMI and Age.

Mean AFC of pre-operative patients was 7.1 ± 1.586 while mean \pm sd of AFC of post-operative patients was 6.7 ± 1.031 . There was a slight difference between pre-and post-operative AFC. Mean \pm SD Hb level of pre-operative patients was 10.255 ± 1.691 g/dL while Mean \pm SD Hb level of post-operative patients was 9.565 ± 1.804 g/dL. There was difference between mean \pm SD of AMH of pre-operative patients was 2.4255 ± 0.907 ng/ml, while mean \pm sd of post-operative patients was 1.966 ± 0.680 ng/ml. There was significant difference between level of AMH of pre-operative and post-operative .table (2)

No statistically significant difference between pre- and post-operative AFC. Mean Endometrioma size in mm was 59.25 ± 15.063 mm³. Mean time of operation in sec was 518.3 ± 87.150 secs. Mean number of coagulation events was 10.38 ± 2.376 .table (3)

Data are presented as mean, standard deviation, BMI: Body mass index; P value indicates significance of variance between groups; $p > 0.05$ indicates non-significant difference; $p < 0.05$ indicates significant difference

Table (1): Enrolment data of studied patients

Demographic Data	Pre-operative	Post-operative	t-test	p-value	Sig.
Age (years)					
Mean±SD	28.05±6.293				
BMI					
Mean±SD	25.65±4.05	25.85±3.99	0.87592	0.4378	N S

Table 2: pre- and post-operative clinical data

Clinical Data	Pre-operative	Post-operative	t-test	p-value	Sig.
Mean±SD	7.1±1.586	6.7±1.031	0.35033	0.175102	NS
AFC					
Mean±SD	10.255±1.6	9.565±1.804	0.2084087	0.41681746	NS
Hg (gm/dL)					
Mean±SD	2.4255±0.90	1.966±0.680	0.06921548	0.03460774	S
AMH (ng/mL)					

Table 3: pre- and post-operative AFC

Clinical Data	VALUE
Endometrioma size Mean±SD	59.25mm ³ ±15.063
time of operation Mean±SD	518.3Sec±87.150
Coagulation events Mean±SD	10.38 ±2.376

Discussion

This Observational study showed that vasopressin decreased operation time and the need for electro coagulation events in hemostasis. Ovarian reserve decreased after laparoscopic cystectomy and it was significantly decreased.

Histologic specimens of all 20 patients were confirmed to be endometriotic cysts. None of these patients experienced post-operative complications. No abnormal findings were seen in any of the 20 patients. After the operations, normal

menstrual cycles with biphasic body basal temperatures were observed in all 20 women.

During the operation, hemostasis in the normal ovaries was performed by bipolar electrocoagulation. No suture was placed after ovarian cystectomy. The time required for stripping and hemostasis was 518.3±87.150seconds. The number of pinpoint bipolar coagulation events was 10.38±2.376, these data are shown in and table 3.

In the vasopressin injection technique, it required significantly fewer pinpoint coagulation events also lesser time for operation.

In this study, evaluation the ovarian reserve markers of patients who had performed laparoscopic cystectomy for endometrioma before and after surgery. The study showed that the preoperative and postoperative AMH and AFC levels in patients with endometrioma was different, there was decrease rate in AMH in postoperative 1.966 ± 0.680 ng/mL than pre-operative 2.4255 ± 0.907 ng/mL and AFC levels was lesser in patients with postoperative 9.565 ± 1.804 than pre-operative 10.2557 ± 1.691 table 2.

Findings showed decreased AMH levels over a 2 month follow-up evaluation; the difference between pre-operative and post-operative was statistically significant. If the patients were followed for 6 months, the results may be different. Important limitations of present study were the small number of patients and short follow up period & also no control group.

Although the mechanism is still not well known, endometriomas are confirmed to reduce fecund ability. However, previous studies showed conflicting results on the relationship between endometrioma and ovarian reserve. Streuli et al. (6) evaluated the AMH levels of patients with endometrioma and reported similar AMH levels in patients with endometrioma and healthy controls.

Uncu et al., (7) compared the AMH and AFC levels of 30 women with endometrioma and healthy controls and showed decreased AMH and AFC levels in women with endometrioma. Similarly, Pacchiarotti et al., (8) reported lower AMH levels in patients with endometrioma than in healthy controls.

Laparoscopic cystectomy is the treatment of choice for the conservative treatment of

endometriotic cysts. But it is not exactly clarified what would be the appropriate technique. Available surgical laparoscopic techniques are ovarian cystectomy, ablative surgery, three-step procedure (laparoscopic drainage, GnRH analogues for 3 months, laparoscopic laser vaporization) and combined technique of excisional and ablative surgery (partial cystectomy of 80% to 90% of the endometrioma and then vaporization by the CO2 laser to the remaining 10-20% of the Endometrioma near- by the hilum).

On the other hand, some studies indicated that cyst drainage and vaporization or thermal coagulation may have less harmful impact on ovarian reserve. Some studies suggested decreasing the size of ovarian endometrioma prior to cystectomy like a three-step surgical management of large cysts.

In this technique, after using the hydro dissection, the best surface was used for cleavage.

The point of successful surgery is to prevent bleeding, trauma to the ovary that requires hemostasis.

To the best of our knowledge, there are only three studies on the effect of vasopressin in decreasing the time of operation and the need for electro-coagulation for laparoscopic stripping of the endometriomas.

In their randomized prospective study including 15 women with single endometrioma in 3 subgroups of stripping alone, stripping with hydrodissection using only normal saline and stripping with hydrodissection using normal saline plus diluted vasopressin, Saeki et al.(9) suggested that the injection of vasopressin during laparoscopic excision of endometriomas reduces the use of coagulation and operation time and thus may protect ovarian reserve.

Local injection of vasopressin due to its tourniquet effect has been used for over 25 years. There are some other agents like vasopressin that are used for a tourniquet effect including oxytocin or epinephrine but the longer half-life of vasopressin and not having great effect on systemic circulation makes it a reasonable choice to decrease blood loss during surgery in various clinical fields .

Shimanukiet et al., (10) have demonstrated that local injection of vasopressin to the uterus can be a safe and practical hemostatic technique due to its tourniquet effect for laparoscopic myomectomy.

A known side effect of vasopressin during surgery is mild arrhythmia (mainly tachycardia). There are some reports of more severe complications due to administration of vasopressin, but, in these reports, more concentrated vasopressin has been injected. In this study, none of the patients experienced any complications of vasopressin during or after surgery.

One of the noticeable features in my study is assessment of ovarian reserve by means of both ultrasound and biochemistry.

In a study, Hansen et al. (11) have demonstrated that AFC&FSH is reflective of the true ovarian reserve like histological assessment by the ovarian primordial follicle number. As mentioned before, Coric et al.(12) declared that postoperative AFC &AMH showed significant functional reduction in operated ovaries.

Conclusion

There was no statistically significant difference between pre- and post- Operative AFC. There was difference between pre-operative &postoperative AMH levels.

Diluted vasopressin is effective method for decreasing operation time and electrocauterization and pinpoint coagulation

during laparoscopic stripping of ovarian endometriomas.

This method may help decrease use of electrocautery and potential thermal Spread to surrounding viable ovarian follicles.

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