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International Journal of Clinical Case Reports and Reviews
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Research Article

Comparison of Outcomes of Ivf in Infertile Patients with Ovarian Endometriomas after Single-Port Laparoscopic Ethanol Sclerotherapy and Laparoscopic Cyst Removal

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Received Date: January 02, 2026 | **Accepted Date:** January 26, 2026 | **Published Date:** February 06, 2026

Citation: Feng Wang, Yamei Li, Hualing Wang, Lan'e Huang, Weifen Deng, (2026), Comparison of Outcomes of Ivf in Infertile Patients with Ovarian Endometriomas After Single-Port Laparoscopic Ethanol Sclerotherapy and Laparoscopic Cyst Removal, *International Journal of Clinical Case Reports and Reviews*, 34(1); **DOI:10.31579/2690-4861/818**

Abstract:

Objective: To compare the efficacy of ovarian endometriosis cyst (OEA) single-port laparoscopic ethanol sclerotherapy (SLES) and laparoscopic ovarian cyst dissection (LOCR) and pregnancy outcomes after in vitro fertilization-embryo transplantation. Methods: 50 patients who underwent IVEF-ET after OEA in the reproductive center of our hospital were divided into 2 groups: LOCR (n=25 cases) and SLES (n=25 cases) according to the 2 surgical methods to compare the postoperative clinical changes and adjuvant pregnancy outcomes of the two groups.

Results: The age, AMH, and sinus follicle count (AC) between the two groups ($P > 0.05$). The AMH levels were significantly lower in the postoperative LOCR group than in the SLES group ($P < 0.05$). The number of MII, 2PN, available embryos, excellent embryos, and clinical pregnancy rate in the SLES group were significantly higher than those in the LOCR group ($P < 0.05$). Biochemical pregnancy rates and abortion rates were similar in both groups.

Conclusion: SLES has the advantage of having less effect on ovarian reserve and improving the pregnancy rate of IVF-ET cycle in patients after OEA.

Key words: ovarian endometrioma; in vitro fertilization embryo transfer (ivf-et); single-port laparoscopy; ethanol sclerotherapy; infertility

Introduction

Endometriosis (EMT) is caused by the uterus ... [Project] Shenzhen Baoan District Health Research Project (Project No.: 2022JD059). [Author Profile] Wang Feng (1983-), female, Tibetan, from Liangshan, Sichuan, China, holds a master's degree and is an associate chief physician engaged in clinical medical research. EMT is a chronic, estrogen-dependent disease present in the uterine lining [1,2]. It is characterized by implantation and distant metastasis, most commonly affecting the ovary and uterosacral ligament [1-3]. It is most common in women of reproductive age, with an incidence of approximately 10%-15%, of whom 30%-50% experience infertility, and it affects ovarian reserve parameters and reproductive outcomes [1-5]. Ovarian endometriotic cysts are the most common type of endometriosis-related metastasis (EMT). Ovarian endometriomas are a typical lesion of ovarian endometriosis and may impair ovarian reserve function [3]. Ectopic endometrium grows in the ovarian cortex, forming single or multiple cysts, namely ovarian endometriomas (OEA). It can negatively impact ovarian reserve, leading to problems such as infertility. B Protecting ovarian function while treating disease is particularly important. Studies have shown that anti-Müllerian hormone (AMH) and antral follicle count (AFC) are the most commonly used and important parameters and indicators of ovarian reserve [1,5,6]. Some researchers have reported that the presence of OEA is associated with lower AMH levels compared to women without OEA [8-10]. OEA is associated with a significantly reduced ovarian response to controlled ovarian stimulation (COS), manifested as a decrease in the number of follicles and oocytes obtained [8,11].

OE A Treatment depends on its primary expected outcome: pain relief or restoration of fertility. Currently, clinical treatment for this population mainly includes medication and surgery [2-6]. OEA Patients with larger cysts, those whose symptoms do not improve with medication, or those whose cysts worsen require surgical treatment. OE Surgical procedures include laparoscopic resection, open surgery, sclerotherapy, and comprehensive treatment techniques [1,2]. In recent decades, minimally invasive surgical techniques, especially laparoscopic surgery, have made significant progress in the treatment of gynecological diseases [1-3]. To

date, laparoscopy is considered the gold standard for the diagnosis and treatment of endometriosis. Although laparoscopic ovarian cystectomy (LOCR) is a standard treatment, the removal of healthy ovarian tissue near ectopic cysts or electrocoagulation may lead to a decrease in ovarian reserve [7,12]. Considering that most patients with endometriosis are women of reproductive age, ovarian reserve should be preserved postoperatively through radical resection of endometriotic lesions [13]. Restoring normal pelvic structure is crucial. In recent years, single-port laparoscopic surgery has become increasingly popular among young women due to its cosmetic benefits and reduced postoperative pain, gradually replacing multi-port laparoscopy in gynecological benign tumor surgery [14,15]. Currently, researchers are increasingly concerned about accidental damage to normal ovarian tissue during laparoscopic resection, leading to deterioration of ovarian reserve. Therefore, anhydrous ethanol sclerotherapy has become the most commonly used technique, including single-port laparoscopic ethanol sclerotherapy (SLES) and transvaginal ultrasound-guided ethanol sclerotherapy (TUES) [7,12,16]. Studies have shown that SLES ... Treatment of OE A The efficacy of Filippi is superior to that of LOCR, not only protecting ovarian reserve but also reducing complications and hospitalization time, resulting in better pregnancy outcomes for patients [6]. In addition, Filippi et al. [[18]] The report states that the presence of OEA in women undergoing in vitro fertilization (IVF) does not affect the developmental capacity of oocytes, nor does it affect the quality of oocytes or the chances of pregnancy. Therefore, our aim is to study SLES. and LOCR The clinical and in vitro fertilization effects on patients with moderate to severe OEA. In this retrospective analysis, we compared 50... Example OEA The patient's LOCR, SLES The study aims to provide a reference for the optimal treatment of this population by analyzing the efficacy of the treatment, ovarian stimulation (the number of mature oocytes restored), and clinical pregnancy outcomes.

2.Materials and Methods

2.1Ethical Approval

We retrospectively analyzed 2020 Year 1 From [Month] to 2024 October in [month], [patient] underwent a histological diagnosis at the Reproductive Medicine Center of Shenzhen Hengsheng Hospital and was diagnosed with OEA. And accept SLES (n=25) and LOCR (n=25) 50 patients who subsequently underwent conventional IVF Example. This study was reviewed and approved by the Ethics Committee of Hengsheng Hospital (Approval Code: HSYY20221212), according to 1975 The procedures were conducted in accordance with the guiding principles of the 2008 Declaration of Ethical Principles for Human Medical Research in Helsinki. Informed consent was provided to each patient or their spouse.

2.2Inclusion criteria

1.Transvaginal color Doppler ultrasound or pelvic magnetic resonance imaging (MRI) Diagnosed as OEA OEA confirmed by pathology Patient; 2. Body Mass Index (BMI) ≤ 30kg/m2; 3. Age 27-41 Age; and 4. The patient underwent in-vitro fertilization treatment.

2.3Exclusion criteria

1. Other endocrine disorders, such as polycystic ovary syndrome, thyroid disease, diabetes, Cushing's syndrome, etc.; 2. Combined with hydrosalpinx; 3. Uterine malformations; and 4. Patients with severe internal medicine, surgical diseases, and mental illnesses.

2.4OEA Surgical treatment

Based on the patient's ovarian reserve, 1.0 ~ 2.5 mg GnRH-α After 1 to 2 reductions, OEA surgery is performed.

2.5 Surgical methods

The patients' vital signs were stable before the surgery, which was performed jointly by the reproductive physician, anesthesiologist, and operating room doctors. All women had negative vaginal samples one week prior to the surgery. OE A was recorded. Location and size. All patients routinely received the same anti-inflammatory and hemostatic medications during the procedure. Postoperative follow-up 1 Over the course of the month, intraoperative data were collected, including operative time (from skin incision to closure), estimated blood loss (EBL) (visual and empirical estimates), length of hospital stay, and intraoperative and postoperative complications. Postoperative pain scoring at 1 hour: The Vascular Acid Score (VAS) was used, with 0-3 indicating mild, tolerable pain; 4-6 indicating ... A score of 7-10 indicates extreme pain; The pain was described as severe and unbearable. [18] The contents of the cyst were completely aspirated and its volume was measured. (mL). A portion of the cyst contents was sent for cytological analysis. SLES. We used a laparoscopic support system (OLYMPUS, CLV - S190, Japan), made a transverse incision at the umbilicus, and established pneumoperitoneum. A thorough abdominal exploration was performed, pelvic adhesions were separated, and the ovarian cyst fluid was aspirated from the center under visual pressure. If the cyst fluid was viscous, the pressure was increased, and the cyst was repeatedly flushed with normal saline until the fluid became clear. Then, anhydrous ethanol (1/2) was injected. ~ 2/3 The volume of cyst fluid causes the cyst wall to harden. ~ After 7 minutes, rinse the cyst cavity with physiological saline containing 1/ 300,000 epinephrine. ~ Repeat 3 times until the fluid becomes clear, electrocoagulating the pelvic EMT that is visible to the naked eye. Lesions [1 1,20,21].

LOCR. We used a laparoscopic system (OLYMPUS, CLV-S190, Japan), made a transverse incision at the umbilicus, established pneumoperitoneum, and performed a comprehensive abdominal exploration. When removing the cyst, the ovarian portal vein and the infundibulopelvic ligament were avoided. The ovarian cortex was removed using monopolar electrocoagulation. The ovarian cortex was then repeatedly irrigated with normal saline to reduce residual pathological tissue. The ovarian wound was sutured with absorbable sutures for hemostasis. Finally, after confirming no further bleeding, the abdomen was closed. The aspirated cyst fluid and the removed cyst wall were sent for pathological examination.

2.6 In vitro fertilization process

In SLES and LOCR 2 days after surgery Superovulation began this week. When B... Super- detected three or more with an average diameter greater than 18mm When the preferred follicle is located, human chorionic gonadotropin (HCG) is injected subcutaneously. (Ovitrelle, Merck Serono (Germany). 36 Eggs were retrieved vaginally after h. Cleavage-stage embryos were transferred on day 3. Embryos transferred on day 14 ... Tian HCG A positive result indicates a biochemical pregnancy. (30th day after embryo transfer) Ultrasound scan confirmed a clinical pregnancy by detecting a fetal heartbeat 12 days post-transfer. If the embryo stops developing within the week, it is recorded as a miscarriage.

2.7 Statistical processing

All results were analyzed using SPSS. 22.0 (IBM) The analysis was conducted at Corp., Armonk, NY, USA. Quantitative data are expressed as mean ± standard deviation ($x \pm s$).

Using t Test the means between two groups. Count data are expressed as rates (%), and the chi-square test is used for comparisons between two groups. Inspection and Fisher Precise inspection. (P) A value < 0.05 indicates a statistically significant difference.

3 Result

3.1 Comparison of basic data between SLES and LOCR groups

This study included a total of 50 For example, the patient, SLES Group 25 Example, LOCR Group 25 cases. Table 1 The data showed that the two groups of patients had differences in age, infertility period, BMI, baseline LH, FSH, LH, E2, AMH, and total AFC. The difference was not statistically significant (P). > 0.05). Bilateral OEA In SLES Groups and LOCR The groups were 10/25 (40%) and 32/69 respectively. (46.4%), with no statistically significant difference between the two groups (x^2 = 0.618, P = 0.432). OEA The patients' cysts were all over 4 cm in diameter.

3.2 Changes in intraoperative and postoperative clinical characteristics in the SLES and LOCR groups

SLES Groups and LOCR Table 2 summarizes the changes in postoperative clinical characteristics in the group. As shown. SLES Postoperative AMH in the group Total AFC All significantly higher than LOCR Group (P) < 0.05), 1 postoperative period Hourly pain significantly lower than LOCR Group (P) < 0.001). SLES Group bleeding volume and LOCR The group comparison was statistically significant (P < 0.05). < 0.001). There was no significant difference in pathological findings between the two groups. Pathological examination of the aspirated cyst contents showed a large number of red blood cells, a small number of lymphocytes, neutrophils, and macrophages. No cases required blood transfusions or conversion to laparotomy. No complications occurred in either group, including peripheral visceral injury, incisional hernia, or other postoperative complications. LOCR The relapse rate in the group was significantly higher than that in SLES. Group (7/25, 28.0%) VS 1/25, 4.0%), the difference was statistically significant (x 2 = 5.357, P = 0.049).

3.3 IVF-ET results between the two groups

SLES Groups and LOCR The groups conducted 23 tests respectively. and 31 IVF Period. Two groups using Gn The total amount and number of days were not statistically significant (P < 0.05). > 0.05), the number of oocytes collected in the SLES group, 2 The number of pronuclear embryos, usable embryos, and high-quality embryos were all significantly higher than those in LOCR. Group (P) < 0.05 ~ 0.01). Compared with the LOCR group, SLES There was no statistically significant difference in the number of embryos transferred (ET) between the groups (P < 0.05). > 0.05), see Table 3. The cycle pregnancy rates were 15/23 (65.2%) and 10/31, respectively. (32.3%), SLES The group was significantly higher than LOCR Group (x 2 = 7.695, P = 0.006). The twin pregnancy rates were 0% and 4.0%, respectively, with no statistically significant difference between the two groups (P < 0.006). > 0.05). LOCR Group 1 For example, induced labor due to fetal developmental abnormalities, SLES The fetuses in this group are developing normally, and no induced labor was required. SLES There were no biochemical pregnancies in the LOCR group (0 cases), and one case (1/31=3.2%) of biochemical pregnancy occurred in the LOCR group. Two cases (9.5%) of embryonic arrest occurred in the SLES group. There were no statistically significant differences in biochemical pregnancy rate and miscarriage rate between the two groups (x 2). = 0.691, P = 1.000 (and x 2 = 3.070, P = 0.158) .

parameter	SLES(n=25)	LOCR(n=25)	t -value	P
Age (years)	33.36 ± 4.18	33.92 ± 3.30	0.684	0.501
Duration of infertility (years)	3.94 ± 3.41	3.28 ± 2.34	2.191	0.387
BMI (kg/ m²)	22.40 ± 6.24	20.98 ± 2.55	0.904	0.378
FSH (IU/L)	7.87 ± 3.71	9.104 ± 3.26	1.224	0.233
LH (IU/L)	4.23 ± 2.27	4.477 ± 3.13	0.762	0.454
E2 (pmol/mL)	143.34 ± 145.38	165.67 ± 146.24	0.492	0.628
AMH (ng/mL)	3.52 ± 2.22	3.56 ± 1.45	0.086	0.932
Total- AFC	12.40 ± 6.93	9.08 ± 3.67	1.079	0.124

Table 1: SLES and LOCR Comparison of preoperative characteristics between groups (x ± s)

SLES: Single-port laparoscopic sclerotherapy; LOCR: Conventional laparoscopic ovarian cystectomy; BMI: Body Mass Index; AMH: Anti-Müllerian hormone; FSH: Follicle-stimulating hormone; LH: Luteinizing hormone; AFC: Antral follicle count.

parameter	SLES(n=25)	LOCR(n=25)	t -value	P
AMH (ng/mL)	3.41 ± 2.16	1.39 ± 2.16	4.253	< 0.001
Total - AFC	11.60 ± 6.15	6.00 ± 2.80	4.513	< 0.001
Intraoperative blood loss (mL)	7.04 ± 9.72	11.56 ± 12.55	34.599	0.000
Pain score	2.48 ± 0.71	4.84 ± 1.07	59.133	0.000

Table 2. SLES and LOCR Comparison of intraoperative and postoperative parameters between the two groups (x ± s)

parameter	SLES(n=25)	LOCR(n=25)	t -value	Pvalue
Gn Total	2367.8 ± 794.3	2326.7 ± 765.0	1.942	0.064
Gn Days	10.1 ± 2.5	9.3 ± 2.2	1.155	0.259
Collect oocyte follicle count	9.7 ± 6.5	4.3 ± 3.5	3.512	0.002
number of mature oocytes	8.7 ± 5.8	4.1 ± 3.5	3.289	0.003
2. Number of pronuclear embryos	7.3 ± 5.5	3.1 ± 2.7	3.414	0.002
Number of available embryos	6.4 ± 5.1	2.5 ± 2.5	3.353	0.003

Number of high-quality embryos	4.0 ± 3.9	1.5 ± 1.6	3.201	0.004
Number of transplant cycles	1.3 ± 0.5	1.6 ± 0.5	2.110	0.055

Table 3: SLES and LOCRComparison of postoperative parameter changes in the groups (x ±s

4 Discusses

This retrospective study analyzed the treatment efficacy of SLE S and LOCR in OEA patients and their IVF-ET pregnancy outcomes. Results showed that age, duration of infertility, BMI, baseline LH, FSH, LH, E2, AMH, and total AFC were correlated. There were no statistically significant differences in the basic indicators (P < 0.05). > 0.05), the basic characteristics of the two groups were the same, and the ovarian reserve was also the same. Therefore, they were well comparable after surgery. The best method to assess the severity of the lesion is laparoscopic surgery, which is superior to open surgery because it produces very little adhesion [22]. However, there are some problems with laparoscopic surgery, including surgery-related ovarian reserve damage and a high recurrence rate of endometriotic cysts after treatment [23]. In this regard, sclerotherapy is a new treatment for OEA. This method was introduced. Our surgical results also showed that LOCR Intraoperative blood loss and postoperative 1 The pain level was significantly higher in the hour than in the SLE. Group, and LOCR Postoperative AMH levels were significantly reduced. This supports the findings of previous studies [24-26]. Raff i A meta-analysis by Huang et al. showed that laparoscopic surgery for endometriotic cysts can reduce AMH levels, which may be one of the reasons for the decline in fertility in women after endometriotic cyst surgery [24]. On the other hand, according to Huang et al. [27] the report stated that serum AM H in the sclerotherapy group No change was observed in the levels; the experiment suggests that sclerotherapy may be more effective than LOCR. Safer and less invasive. Our results show that, compared with the SLE S group, the LOCR group has a higher postoperative total AFC. A significant decrease indicates that LOCR The damage is greater, and the ovarian damage is also greater because part of the ovarian cyst tissue is removed. Clinically, LOCR is often used for infertile OEA patients with cysts larger than 4 cm in diameter [28,29]. Studies have found that after laparoscopic ovarian cyst removal, OEA ... The patient's AM H Horizons and AFC The number is significantly reduced. The main reason for this is that during the surgical dissection, the normal ovarian cortex is inevitably peeled off, thereby reducing the number of remaining follicles, and the ovarian cortex is further subjected to electrocoagulation [24]. Damage. 2020 The expert consensus on ultrasound intervention published in 2008 pointed out that ultrasound intervention is also a means of treating OEA [30]. However, there are still few clinical studies on the efficacy of SLES and LOCR in treating OEA, and there is currently no conclusive evidence.

The results of this study indicate that the number of oocytes collected, the number of 2- pronuclear embryos, the number of usable embryos, and the number of high-quality embryos in the SLES group were significantly higher than those in the LOCR group. Group (P) < 0.05); SLE S The pregnancy rate in this group was higher than that in the LOCR group. Group (P) < 0.05). There were no significant differences in biochemical pregnancy rate and miscarriage rate between the two groups. Regarding SLE S Post- IVF-ET The increased cyclic pregnancy rate is consistent with previous studies. Yazbeck et al. [31] reported that in a prospective comparative study of women with recurrent ectopic endometriomas, IVF after ethanol sclerotherapy was significantly improved. Pregnancy rates are higher than those after surgical removal followed by IVF. Pregnancy rate. Lee [32] The report stated that the number of follicles, retrieved oocytes, mature oocytes, and fertilized oocytes in the group undergoing surgical resection of endometrial tumors before in vitro fertilization (IVF) was significantly lower than that in the ethanol sclerotherapy group and the group without any surgical intervention. Furthermore, the report indicated that the results were more favorable for IVF. Pregnancy rate was not significantly affected. Surgical resection of endometriotic cysts can affect ovarian reserve and ovarian response [32]. In 134 patients with ovarian endometriosis, GnRH-a combined with transvaginal ultrasound-guided cyst aspiration and IVF-ET were performed. The experimental group and 102 A study comparing a control group (without transvaginal ultrasound-guided cyst aspiration) showed improvements in ovarian response, embryo quality, implantation rate, and IVF clinical pregnancy rate compared to the control group. GnRH-a Combined transvaginal ultrasound-guided cyst aspiration for OE A Infertility IVF-ET in patients the treatment was effective and the pregnancy outcomes were good. The results of this study show that SLES The surgical incision is small, only one incision is made at the umbilicus, and the laparoscopy can enter the OEA. At the lesion site, the cyst contents can be absorbed, alcohol can be injected to sclerotherapy the cyst, and adhesions in the pelvic area can be appropriately released and separated. SLES in OEA The treatment causes less damage to the ovaries, and therefore less damage to ovarian reserve. However, LOCR The recurrence rate of surgery is higher than that of SLES. Group (P < 0.05). Antonaci et al. reported that compared with laparoscopic dissection, sclerotherapy for endometriotic cysts was more effective than laparoscopic dissection in infertile women awaiting in vitro fertilization, not only preserving ovarian function but also resulting in fewer complications and better pregnancy outcomes. Borghese Some researchers have suggested that ethanol sclerotherapy can be used for patients with recurrent endometriomas after surgery.

5 Conclusion

In summary, SLES and LOCR Treatment of OEA It is safe and feasible, and helps improve OEA. The effectiveness of assisted reproductive technology (ART) for infertile patients. SLES was used. This approach to treating OEA simplifies the surgical procedure, reduces surgical difficulty, shortens the operation time, and decreases bleeding and complications, making it worthy of further investigation with an increased number of cases.

References

1. Angelos Daniilidis, (2023). Georgios Grigoriadis, Dimitrios Rafail Kalaitzopoulos, Stefano Angioni, Üzeyir Kalkan, Adrien Crestani, Benjamin Merlot, Horace Roman. Surgical Management of Ovarian Endometrioma: Impact on Ovarian Reserve Parameters and Reproductive Outcomes. *J Clin Med*.;12(16): 5324.
2. Frankowska K, Dymanowska-Dyjak I, Abramiuk M, Polak G. (2024). The efficacy and safety of transvaginal ethanol sclerotherapy in the treatment of endometrial cysts: a systematic review. *International Journal of Molecular Sciences (Int J Mol Sci)*. 25(2): 1337.
3. Miquel L, Preaubert L, Gnisci A, Resseguier N, Pivano A, Perrin J, Courbiere B. (2020). Endometrioma ethanol sclerotherapy could increase IVF live birth rate in women with moderate-severe endometriosis. *PLoS One.* **15(9): e0239846.**
4. Horne AW, Missmer SA. (2022). Pathophysiology, diagnosis, and management of endometriosis. *BMJ*. 379: e070750 Vaduva

CC, Dira L, Carp-Veliscu A, Goganau AM, Ofiteru AM, Siminel MA. (2023).

5. Ovarian reserve after treatment of ovarian endometriomas by ethanolic sclerotherapy compared to surgical treatment. *European Review for Medical and Pharmacological Sciences (Eur Rev Med Pharmacol Sci).* **27(12): 5575–5582.**
6. Antonaci D, Schiavi MC, Carletti V, Yacoub V, Morgani C, Grilli D, Galanti F, Ligato A, Valensise HC, Palazzetti P, Rago R. (2022). Laparoscopic stripping versus endometrioma ethanol sclerotherapy in women with endometrioma awaiting IVF: a long-term analysis of ovarian reserve and pregnancy outcome. *Minerva Obstetrics and Gynecology (Minerva Obstet Gynecol).* 74(5): 410–418.
7. Yang C, Geng Y, Li Y, Chen C, Gao Y. (2015). Impact of ovarian endometrioma on ovarian responsiveness and IVF: a systematic review and meta-analysis. *Reproductive BioMedicine Online (Reprod Biomed Online).* 31(1): 9–19.
8. Muzii L, Di Tucci C, Di Feliciantonio M, Galati G, Di Donato V, Musella A, Palaia I, Panici PB. (2018). Anti-Müllerian hormone is reduced in the presence of ovarian endometriomas: a systematic review and meta-analysis. *Fertility and Sterility (Fertil Steril).* **110(5): 932–940.**
9. Uncu G, Kasapoglu I, Ozerkan K, Seyhan A, Yilmaztepe AO, Ata B. (2013). Prospective assessment of the impact of endometriomas and their removal on ovarian reserve and determinants of the rate of decline in ovarian reserve. *Human Reproduction (Hum Reprod).* **28(8): 2140–2145.**
10. Goodman LR, Goldberg JM, Flyckt RL, Gupta M, Harwalker J, Falcone T. (2016) Effect of surgery on ovarian reserve in women with endometriomas, endometriosis and controls. *American Journal of Obstetrics and Gynecology (Am J Obstet Gynecol).* 215(5): 589.e1–589
11. Miquel L, Preaubert L, Gnisci A, Netter A, Courbiere B, Augustin A, Pivano A. (2021). Transvaginal ethanol sclerotherapy for an endometrioma in 10 steps. *Fertility and Sterility (Fertil Steril).* 115(1): 259–260.
12. Tian Z, Zhang Y, Zhang C, Wang Y, Zhu HL. (2021). Antral follicle count is reduced in the presence of endometriosis: a systematic review and meta-analysis. Reproductive *BioMedicine Online (Reprod Biomed Online).* 42(1): 237–247.
13. Benaglia L, Busnelli A, Biancardi R, Vegetti W, Reschini M, Vercellini P. (2018) Oocyte retrieval difficulties in women with ovarian endometriomas. *Reproductive BioMedicine Online (Reprod Biomed Online*). 37(1): 77–84.
14. Gupta S, Agarwal A, Agarwal R, Loret de Mola JR. (2006). Impact of ovarian endometrioma on assisted reproduction outcomes. *Reproductive BioMedicine Online (Reprod Biomed Online*). 13(3): 349–360.
15. Becker CM, Bokor A, Heikinheimo O, Horne A, Jansen F, Kiesel L, King K, Kvaskoff M, Nap A, Petersen K, et al. (2022). ESHRE guideline: endometriosis. *Human Reproduction Open*. 2022(2): hoac009.

Mohtashami S, Jabarpour M, Aleyasin A, Aghahosseini M, Najafian A. (2024).

16. Efficacy of ethanol sclerotherapy versus laparoscopic excision in the treatment of ovarian endometrioma. *Journal of Obstetrics and Gynaecology of India (J Obstet Gynaecol India)*. 74(1): 60–66.
17. Coccia ME, Rizzello F, Baron S, Pinelli S, Rapalini C, Parri C, Caracciolo D, Papageorgiou S, Tosti G, Gandini L. (2014). Is there a critical endometrioma size associated with reduced ovarian responsiveness in assisted reproduction techniques? Reproductive *BioMedicine Online (Reprod Biomed Online).* 29(2): 259–266.
18. Philippi F, Benaglia L, Paffoni A, Restelli L, Vercellini P, Somigliana E, Fedele L. (2014). Ovarian endometriomas and oocyte quality: insights from in vitro fertilization cycles. *Fertility and Sterility (Fertil Steril*). 101(4): 988–993.
19. Wan L, Zhao Q, Chen J, et al. (2020). Consensus of Chinese experts on the application of pain assessment scales (2020 edition). *Chinese Journal of Pain Science*. 16(3): 177–187.
20. Crestani A, Merlot B, Dennis T, Roman H. (2022). Laparoscopic sclerotherapy for an endometrioma in 10 steps. *Fertility and Sterility (Fertil Steril).* 117(6): 1102–1103.
21. Wang F, Deng WF, Wang S, Li XL, Shen L. (2017).
22. Clinical effect of absolute alcohol solidification in ovarian chocolate cyst combined with modified super-long protocol in patients with endometriosis. *Clinical Medical Research and Practice*. 2(): 1–6.
23. Goldberg JM, Falcone T, Diamond MP. (2019). Current controversies in tubal disease, endometriosis, and pelvic adhesion. *Fertility and Sterility (Fertil Steril).* 112(3): 417–425.
24. Raffi F, Metwally M, Amer S. (2012). The impact of excision of ovarian endometrioma on ovarian reserve: a systematic review and meta-analysis. *Journal of Clinical Endocrinology and Metabolism (J Clin Endocrinol Metab).* 97(9): 3146–3154.
25. Ghasemi Tehrani H, Tavakoli R, Hashemi M, Haghighat S. (2022). Ethanol sclerotherapy versus laparoscopic surgery in management of ovarian endometrioma: a randomized clinical trial. *Archives of Academic Emergency Medicine (Arch Acad Emerg Med).* 10(1): e55.
26. Deckers P, Ribeiro SC, Simões RDS, Miyahara C, Baracat EC. (2017). Systematic review and meta-analysis of the effect of bipolar electrocoagulation during laparoscopic ovarian endometrioma stripping on ovarian reserve. *International Journal of Gynecology and Obstetrics (Int J Gynaecol Obstet).* 140(1): 11–17.
27. Mostaejeran F, Hamoush Z, Rouholamin S. (2015). Evaluation of anti-Müllerian hormone levels before and after laparoscopic management of endometriosis. *Advanced Biomedical Research (Adv Biomed Res).* 4: 218.
28. Huang L, Chang MY, Shiau CS. (2021). Changes in anti-Müllerian hormone after ultrasound-guided aspiration and ethanol sclerotherapy of ovarian cyst. *Taiwanese Journal of Obstetrics and Gynecology (Taiwan J Obstet Gynecol*). 60(3): 509–512.
29. Singh SS, Suen MW. (2017). Surgery for endometriosis: beyond medical therapies. *Fertility and Sterility (Fertil Steril).* 107(3): 549–554.
30. Vercellini P, Chapron C, De Giorgi O, Consonni D, Frontino G, Crosignani PG. (2003). Coagulation or excision of ovarian endometriomas? *American Journal of Obstetrics and Gynecology (Am J Obstet Gynecol).* 188(3): 606–610.

31. Xu HX, Wang WP, Li HB, et al. (2020). Chinese expert consensus on ultrasound-guided sclerotherapy for ovarian endometriotic cysts. *Chinese Journal of Ultrasonography.* 29(11): 1013–1024.
32. Yazbeck C, Koskas M, Cohen-Scali S, Kahn V, Luton D, Madelenat P. (2012). How I do… ethanol sclerotherapy for ovarian endometriomas. *Gynécologie Obstétrique & Fertilité*. 40(10): 620–622.
33. Lee KH, Kim CH, Lee YJ, Kim SH, Chae HD, Kang BM. (2014). Surgical resection or aspiration with ethanol sclerotherapy of endometrioma before in vitro fertilization in infertile women with endometrioma. Obstetrics & *Gynecology Science (Obstet Gynecol* Sci). 57(4): 297–303.

DOI:10.31579/2690-4861/818