ORIGINAL RESEARCH

Exploration of Protective Factors Affecting Postoperative Natural Pregnancy in Patients with Endometriosis

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ABSTRACT

Objective • This study aimed to analyze the factors affecting natural pregnancy in patients with endometriosis (EMs) and to identify corresponding nursing measures. Understanding these factors is crucial as it may offer insights into improving fertility outcomes and enhancing the overall well-being of individuals with EMs. By identifying effective nursing measures, we hope to contribute to the development of targeted interventions that can positively impact the reproductive health of these patients.

Methods • The clinical data of 147 patients with EMs who were admitted to our hospital from April 2018 to April 2020 were retrospectively analyzed. The analysis included a comprehensive examination of various key factors and parameters, such as demographic information, disease severity, surgical outcomes, and postoperative complications. All patients underwent laparoscopic conservative surgery in our hospital, and the analysis was conducted over a follow-up period of 2 years after discharge.

Results • The two groups exhibited significant differences in the following factors: (1) Factors with significant differences ($P < .05$): Age, dysmenorrhea, duration of menstrual cramps, history of uterine cavity operation, combined gynecological inflammation, r-AFS stage, postoperative GnRH-a treatment, and EFI score. (2) Factors with no significant differences ($P > .05$): Uterine fibroids, endometrial polyps, affected side of the lesion, and postoperative ovulation-inducing drugs. (3) Protective Factors for Postoperative Natural Pregnancy in EMs Patients ($P < .05$): No history of dysmenorrhea, postoperative GnRH-a treatment, and high EFI score. (4) Risk factors affecting natural pregnancy after EMs patients ($P < .05$): Age ≥ 35 years, duration of menstrual cramps < 3 days, history of uterine cavity operations ≥ 2 times, gynecological inflammation, and r-AFS stage III-IV.

Conclusions • Regarding nursing measures based on patient information, clinical nursing intervention can be carried out by strengthening the education of related knowledge such as reproductive health, maintaining the patient's menstrual cycle, guiding patients to apply GnRH-a treatment, and designing individualized nursing care for patients with high-risk factors. Among there, continuous monitoring and follow-up care, particularly for patients with risk factors, can contribute to ongoing assessment and timely intervention. Regular check-ins with high-risk patients can facilitate early identification of potential challenges and enable the adjustment of care plans as needed. Furthermore, nurses should establish a schedule for regular check-ins with high-risk patients, facilitating ongoing communication and rapport-building. These interventions can help patients improve the probability of natural pregnancy after surgery. (*Altern Ther Health Med.* [E-pub ahead of print.])

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INTRODUCTION

Endometriosis (EMs) is a common gynecological disease in clinical practice. Repeated bleeding can then lead to pain, infertility and nodules or masses.[1] Studies[2] have reported a prevalence of 3% to 10% among women of reproductive age for EMs, with the infertility rate in EMs patients potentially being 20 times higher than that of the general population. This elevated infertility risk often necessitates the utilization of assisted reproductive techniques to enhance the likelihood of achieving pregnancy. With many patients with different symptoms and lesion sites, about 65% of patients are often misdiagnosed.[3]

Hormonal suppression aims to regulate the menstrual cycle and reduce the growth and activity of endometrial tissue outside the uterus. Common hormonal therapies include oral contraceptives, gonadotropin-releasing hormone agonists (GnRH-a), and progestins. However, it's crucial to note that hormonal therapy may lead to side effects, and its long-term efficacy can be limited.[4] Surgical resection, particularly laparoscopic conservative surgery, is often employed to remove endometrial lesions. This procedure aims to alleviate clinical symptoms and improve pelvic pathological structure, potentially increasing the chances of natural pregnancy post-surgery.[5,6] However, it's essential to highlight that surgical treatment can exacerbate central sensitivity, potentially worsening symptoms in postoperative patients.[7,8]

Despite these treatment options, the clinical connection mechanism between EMs and infertility remains unclear. Numerous studies[9,10] have analyzed and speculated on the underlying mechanisms, but a clear and unified understanding has not been achieved. Our study aims to contribute to this ongoing exploration by evaluating the natural pregnancy probability in EMs patients post laparoscopic conservative surgery, potentially shedding light on the broader context of the relationship between EMs and infertility.

Side effects of hormonal therapy may include weight gain, mood swings, and reduced bone density, among others. Long-term use may be associated with a risk of recurrence upon discontinuation.[4] While laparoscopic conservative surgery is recognized for its effectiveness, it may not uniformly address infertility symptoms for all patients.[11] Additionally, surgery poses inherent risks, including infection and adhesion formation, and may not guarantee a permanent resolution of symptoms.. This discrepancy underscores the need for an objective evaluation of natural pregnancy outcomes after EMs surgery and an analysis of related influencing factors.

EMs is a prevalent gynecological condition associated with pain, infertility, and a range of clinical challenges. While current treatment options, such as hormonal suppression and surgical resection, aim to alleviate symptoms, the impact on natural pregnancy outcomes remains a critical area of investigation. Laparoscopic conservative surgery, in particular, has shown promise in improving reproductive outcomes, but a thorough evaluation of its effectiveness is essential. By explicitly stating our research objective to assess the probability of natural pregnancy post laparoscopic conservative surgery, we address a crucial aspect of patient care and contribute valuable insights to the existing body of knowledge. This study aims to provide clinicians with evidence-based information to guide postoperative care decisions and enhance the overall reproductive prognosis for EMs patients.

In this retrospective study, our focus is on assessing the natural pregnancy probability in EMs patients following laparoscopic conservative surgery. Specifically, we will retrospectively analyze the clinical data of 147 EMs patients treated at our hospital. The primary objective is to provide valuable reference information on postoperative reproductive outcomes, contributing to a more comprehensive understanding of the effectiveness of laparoscopic conservative surgery in enhancing the chances of natural pregnancy for EMs patients.

OBJECTS AND METHODS

Research object

We conducted a retrospective analysis of clinical data from 147 patients diagnosed with EMs admitted to our hospital between April 2018 and April 2020. All patients underwent laparoscopic conservative surgery at our institution. The division into two groups was based on natural pregnancy outcomes during the follow-up period. The observation group comprised 109 patients who achieved successful natural pregnancies, while the control group included the remaining 38 patients who did not achieve natural pregnancy during the follow-up. All patients and their families signed informed consent forms before enrollment. All procedures complied with the ethical guidelines of the Declaration of Helsinki.

Inclusion and exclusion criteria

Inclusion: (1) Patients who underwent laparoscopic conservative surgery at our hospital and achieved successful outcomes; (2) Patients aged ≥18 years old and <45 years old, with the rationale for this age range being that it corresponds to the reproductive age range, and the study aims to assess natural pregnancy probability in the context of childbearing potential; (3) Patients who were married, had a desire for childbearing, were not using contraceptive measures, and whose male partners had normal semen test results; (4) The patient's clinical information was complete.

Exclusion: (1) Exclude patients with a history of ovarian surgery; (2) Exclude patients with primary tumors, heart, liver and kidney insufficiency and other serious diseases; (3) Exclude patients with congenital genital dysplasia and deformities; (4) Exclude patients with autoimmune diseases and blood system diseases; (5) Exclude patients with hyperprolactinemia and polycystic ovary syndrome; (6) Exclude patients with organic dysfunction affecting pregnancy; (7) Exclude lacking clinical data (8) Patients with missing follow-up records were excluded.

Method

Surgical method: The 147 endometriosis (EMs) patients included in this research underwent laparoscopic conservative surgery, performed 3-7 days after menstruation was completed. The surgical procedure aimed at addressing various aspects of endometriotic lesions and restoring normal pelvic anatomy. (1) Pelvic Cavity Observation: For membranous ectopic cyst, a thorough observation of the pelvic cavity structure was conducted. (2) Lesion Removal: Pelvic ectopic foci were identified and removed during the surgery. (3) Uterine Rectal Depression Repair: The uterine rectal depression was repaired to enhance pelvic structural integrity. (4) Anatomical Relationship Observation: The

anatomical relationship between the ovary and surrounding appendages was carefully observed. (5) Adhesion Separation: Adhesion parts were separated to restore the normal anatomical structure. (6) Fallopian Tube Repair and Plastic Surgery: Bilateral fallopian tube repair and plastic surgery were performed to improve tubal function. (7) Intimal Polyp Removal: Using an electric knife, intimal polyps were removed. (8) Fallopian Tube Patency Confirmation: The patency of bilateral fallopian tubes was assessed through intubation, ensuring unobstructed tubes. (9) Pelvic Cavity Wash: After confirming the unobstructed fallopian tubes, the pelvic cavity was thoroughly washed. (10) Abdominal Closure: The abdomen was closed to relieve pneumoperitoneum, concluding the laparoscopic conservative surgery.

Follow-up method: The postoperative follow-up of the patients will extend until April 2022, involving a comprehensive and structured approach to ensure the continuity of care. Follow-up appointments were scheduled at regular intervals, typically occurring every three months, allowing for close monitoring of patients' postoperative progress. (1) Regular In-Person Appointments: Patients attended regular in-person follow-up appointments every three months, providing an opportunity for thorough clinical assessment, including physical examinations and discussions about any concerns or symptoms. (2) Telephone Contacts: In addition to in-person appointments, patients received periodic telephone contacts between scheduled visits. These phone calls served to address any immediate queries, assess general well-being, and reinforce ongoing care. (3) Fertility Guidance: Throughout the follow-up period, patients received targeted fertility guidance. This included discussions about family planning, menstrual health, and guidance on optimizing conditions for natural conception. (4) Assessment of Reproductive Outcomes: The follow-up assessments involved a detailed evaluation of reproductive outcomes, focusing on natural pregnancy probability and any challenges or successes experienced by the patients.

By providing a combination of regular in-person appointments, telephone contacts, and fertility guidance, the follow-up approach aimed to ensure continuous and comprehensive care for the patients. This strategy not only facilitated the monitoring of postoperative outcomes but also addressed patients' individual needs and concerns throughout the follow-up period.

Observation indicators and judgment criteria

The collected patient data encompass a range of clinical indicators, each chosen for its relevance to the study's primary objective of assessing natural pregnancy outcomes in EMs patients post laparoscopic conservative surgery. The rationale for selecting these specific indicators is as follows: (1) Age: Age is a crucial factor as it influences reproductive potential. By considering the age of the patients, the study aims to account for age-related variations in natural pregnancy probabilities. (2) Dysmenorrhea and Duration of Menstrual Cramps: These indicators provide insights into the severity and duration of symptoms associated with EMs. Understanding the impact of EMs symptoms on patients' quality of life is essential in evaluating the effectiveness of the surgical intervention. (3) History of Uterine Cavity Operation: Patients with a history of uterine cavity operations may have unique considerations that could influence postoperative outcomes. This information helps in tailoring follow-up care. (4) Uterine Fibroids and Endometrial Polyps: The presence of additional uterine pathologies can impact fertility. Assessing these factors contributes to a more comprehensive understanding of the reproductive landscape. (5) Gynecological Inflammation: The assessment of gynecological inflammation in this study was conducted in accordance with established diagnostic criteria as outlined in the "Diagnostic Criteria for Gynecological Diseases." These criteria include a combination of clinical manifestations, physical examinations, and laboratory test results to determine the presence of inflammation in the pelvic region. (6) r-AFS Stage: r-AFS staging system categorizes the severity of endometriosis based on lesion extent and location. This classification aids in stratifying patients according to the severity of their condition, offering insights into how disease severity may correlate with postoperative outcomes. (7) Affected Side of the Lesion: Understanding the specific location of lesions provides additional context for the surgical intervention and its potential impact on fertility. (8) Postoperative GnRH-a Treatment and Ovulation-Stimulating Drugs: These indicators capture postoperative interventions that may influence reproductive outcomes. Monitoring their usage allows for an assessment of their impact on natural pregnancy probabilities. (9) EFI Score: The Endometriosis Fertility Index (EFI) score is a comprehensive tool that considers various factors, including age, r-AFS stage, and ovarian reserve, to predict fertility outcomes in EMs patients. Its inclusion aligns with the study's objective of evaluating overall reproductive prognosis. r-AFS is divided into 4 stages according to the patient's condition: stage I: 1-5 points, stage II: 6-15 points, stage III: 16-40 points, stage IV: >40 points. The judgment of gynecological inflammation refers to the "Diagnostic Criteria for Gynecological Diseases".

Statistical methods

SPSS 25.0 was used to analyze the data; the χ^2 test was used for univariate analysis, and Logistic regression analysis was used for multivariate analysis of screening-related variables. $P < .05$ indicated that the difference was statistically significant.

Chi-Squared Test (χ^2): Why χ^2 for Univariate Analysis: The chi-squared test is apt for examining associations between categorical variables. In our study, univariate analysis involves exploring the relationships between individual factors (such as age, clinical conditions, and surgical outcomes) and the binary outcome of natural pregnancy success or failure. The chi-squared test is well-suited to assess the significance of these associations.

Table 1. Single factor analysis of clinical data

	Observation group (n = 109)	Control group (n = 38)	χ^2	*P* value
age			50.779	<.001
<35 years old	102	15		
≥35 years old	7	23		
Dysmenorrhea			4.94	.026
yes	82	35		
no	27	3		
Duration of menstrual cramps (d)			8.199	.004
<3d	51	28		
≥3d	58	10		
History of uterine cavity operation (times)			13.696	<.001
<2 times	84	17		
≥2 times	25	21		
combined uterine fibroids			0.865	.352
yes	25	6		
no	84	32		
Combined endometrial polyps			1.729	.189
yes	5	4		
no	104	34		
Combined with gynecological inflammation			23.835	<.001
yes	51	35		
no	58	3		
r-AFS staging			24.763	<.001
Phase I-II	81	11		
Phase III-IV	28	27		
lesion affected side			0.488	.485
one side	99	33		
bilateral	10	5		
GnRH-a treatment after operation			41.318	<.001
yes	92	11		
no	17	27		
Postoperative application of ovulation induction drugs			3.324	.068
yes	50	11		
no	59	27		
EFI score (points)			7.193	.007
≤4 points	5	7		
>4 points	104	31		

Figure 1. Multivariate Logistic regression analysis forest plot

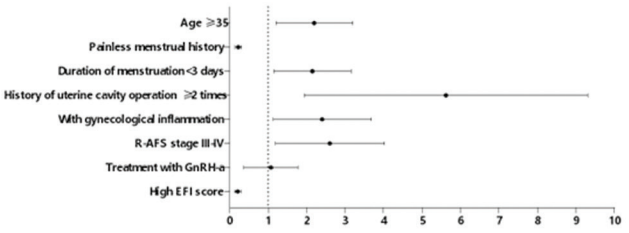

Table 2. Multivariate Logistic regression analysis

factor	beta	Wald χ^2	*P* value	OR	95% CI
Age ≥ 35 years old	0.675	7.306	<.05	1.962	1.201-3.195
No history of dysmenorrhea	-0.322	12.063	<.05	0.205	0.136-0.308
Menstrual cramps last <3 days	0.644	6.193	<.05	1.901	1.145-3.152
History of intrauterine operation ≥ 2 times	1.447	13.053	<.05	4.248	1.936-9.307
With gynecological inflammation	0.714	5.596	<.05	2.037	1.131-3.675
r-AFS stage III-IV	0.781	6.236	<.05	2.179	1.183-4.019
GnRH-a treatment after operation	-0.214	0.283	<.05	0.811	0.372-1.774
High EFI score	-0.353	25.322	<.05	0.194	0.128-0.294

Logistic Regression Analysis: Why Logistic Regression for Multivariate Analysis: Logistic regression is a robust method for investigating the relationship between a binary outcome and multiple predictor variables. In our context, the binary outcome is the success or failure of natural pregnancy post laparoscopic conservative surgery for endometriosis. Logistic regression allows us to identify and quantify the significance of various factors concurrently, providing a comprehensive understanding of their impact on the likelihood of natural pregnancy. This method enables the exploration of complex interactions among predictor variables, offering insights into the nuanced factors influencing reproductive outcomes.

RESULTS

Single-factor unconditional Logistic regression analysis of clinical data information

There were significant differences between the two groups in terms of age, dysmenorrhea, duration of menstrual cramps, history of uterine cavity operation, combined gynecological inflammation, r-AFS stage, postoperative GnRH-a treatment, and EFI score (all, $P < .05$); however, there was no significant difference between the two groups in terms of uterine fibroids, endometrial polyps, affected side of the lesion, and postoperative application of ovulation-inducing drugs (all, $P > .05$). See Table 1 below for details.

Multivariate Logistic regression analysis

The absence of dysmenorrhea emerged as a protective factor positively influencing natural pregnancy in patients with endometriosis after laparoscopic conservative surgery ($P < .05$). Patients who received postoperative GnRH-a treatment exhibited a higher likelihood of natural pregnancy, indicating a protective effect ($P < .05$). A high EFI score was identified as another protective factor associated with increased natural pregnancy rates in patients with endometriosis ($P < .05$). Furthermore, Advanced age, specifically 35 years or older, was identified as a risk factor impacting natural pregnancy rates negatively ($P < .05$).

Menstrual Cramps Duration < 3 Days: Patients with shorter durations of menstrual cramps faced increased challenges in achieving natural pregnancy after laparoscopic conservative surgery ($P < .05$). About History of Uterine Cavity Operation ≥ 2 Times, multiple previous uterine cavity operations were associated with reduced natural pregnancy rates, signifying a risk factor ($P < .05$). The presence of gynecological inflammation was identified as a risk factor negatively influencing natural pregnancy outcomes ($P < .05$). Patients in r-AFS stage III-IV were more likely to experience difficulties in achieving natural pregnancy after surgery ($P < .05$).

The in-depth analysis of factors with significant differences in both univariate and multivariate analyses provides critical insights into the prognosis of natural pregnancy in patients with endometriosis following laparoscopic conservative surgery. The identified protective and risk factors hold considerable clinical significance, offering valuable guidance for patient counseling and enhancing postoperative care strategies.

In summary, the comprehensive examination of factors through both univariate and multivariate analyses has unearthed crucial insights into the natural pregnancy outcomes of EMs patients post-laparoscopic conservative surgery. These identified protective and risk factors have direct implications for healthcare professionals, guiding patient counseling and refining postoperative care strategies.

DISCUSSION

Related research[12] shows that the incidence of EMs disease in women of childbearing age is about 10%-15%. Seriously affected. Laparoscopic conservative surgery is currently the first

choice for the clinical treatment of EMs. It removes the lesions in the patient's body while preserving the patient's reproductive function. Side fallopian tubes improve the pelvic environment, thereby increasing the probability of pregnancy.[13] Among the 147 patients with EMs included in this study, 109 patients successfully conceived naturally during the follow-up period, and the natural pregnancy rate was 74.15%. This result is similar to the results of previous related studies.[14] Surgical treatment of patients with EMs has a good effect, but some patients still cannot benefit from natural conception from this operation. In addition, we also need to pay attention to the status and related factors of pregnant women.[15] Therefore, it is urgent to analyze the relevant factors that affect natural pregnancy after surgery in patients with MEs, so as to provide effective treatment for patients. Intervention guidance.

Number of previous[16,17] studies have shown that age is one of the important factors leading to infertility in patients with MEs. As the age of patients continues to increase, the probability of natural pregnancy will show a significant downward trend. Scholars Broi[18] and other research reports show that before the age of 35, the pregnancy rate of women is relatively constant, and after the age of 35, it will show a downward trend. The results of this study showed that the natural pregnancy rate of patients aged ≥35 years was significantly lower, which was consistent with the results reported in previous related studies.[19] Patients aged 35 and above face a higher risk of reduced natural pregnancy rates. To address this, nursing interventions should focus on education and counseling: Provide patients with information on age-related fertility decline and the importance of timely family planning. Discuss assisted reproductive techniques, such as IVF, to increase the chances of pregnancy. We could offer emotional support to help patients cope with potential stress or anxiety related to age and fertility. Communicating age-related fertility issues sensitively and encouraging timely decision-making can be challenging, as patients may face emotional distress and complex decisions.

This study found that the duration of menstrual cramps <3 days is a risk factor affecting natural pregnancy in patients with MEs, and the history of painless menstruation is a protective factor affecting patients. Patients with shorter menstrual cramps duration are at a higher risk of reduced natural pregnancy. Nursing measures should include educating patients about menstrual health and possible impacts on fertility. And help patients manage menstrual pain and discomfort through medications or non-pharmacological methods. Subsequently, monitor patients closely to assess menstrual health improvements and adapt interventions accordingly. The reason may be analyzed. The above factors can affect ovarian function and fertilized eggs. Implantation function and other reasons[20]; therefore, actively regulating the patient's menstruation can play a role in improving the patient's natural pregnancy after surgery.

A study[21] found that the number of uterine cavity operations in patients with MEs is a risk factor affecting postoperative natural pregnancy. The results of this study show that the history of uterine cavity operations ≥ 2 times is a risk factor affecting postoperative natural pregnancy in patients with MEs. Consistent with the above research results, the reason may be that negative pressure operation is required during the operation of the uterine cavity, which may cause the patient's endometrium to reflux into the pelvic cavity, resulting in the patient's endometrial glands or stroma outside the uterine cavity. Plant, grow and develop anywhere else. In this study, gynecological inflammation is a risk factor affecting natural childbirth in patients with EMs. The occurrence of inflammation often leads to pelvic or abdominal adhesions, which will affect the peristalsis of the fallopian tubes, and interfere with the fallopian tubes' uptake of egg cells and the affect on fertilized eggs.[22] In addition, the appearance of lesions may also cause damage to the ovarian parenchyma, and the destruction of the ovarian parenchyma will affect the production of the patient's eggs.[23] The r-AFS staging is a commonly used staging standard for the severity of EMs disease in clinical practice. The higher the staging degree of the patient, the higher the severity of the disease, the greater the difficulty of laparoscopic conservative surgery to completely remove the lesion, and the higher the damage to the ovarian tissue,[24] and the recurrence risk of EMs at higher stages is also lower and more serious at stages. In this study, the proportion of r-AFS stages III-IV in the observation group was significantly lower than that in the control group. The r-AFS stages Stage III-IV is a risk factor affecting natural pregnancy after surgery. Still, another study[25] showed that the difference in r-AFS stages will not affect natural pregnancy after surgery. Therefore, the effect of r-AFS on EMs The impact of natural pregnancy after surgery needs more case analysis and investigations related to EMs staged fertility so as to facilitate the selection of postoperative treatment methods for patients. GnRH-a is a synthetic GnRH derivative. Some studies[26] found that postoperative GnRH-a treatment may be a protective factor for postoperative natural pregnancy in patients with EMs. The results of this study confirmed that postoperative GnRH-a treatment It is a protective factor affecting natural pregnancy in patients with EMs, but its protective mechanism is still unclear. Analysis may be related to GnRH-a. It can treat residual and tiny endometriosis lesions, delay recurrence, and improve the microenvironment of the pelvic cavity and uterine cavity, etc. factors. The results of this study show that patients with high EFI scores have a relatively higher success rate of natural pregnancy. However, it should be noted that although EFI considers age, it still cannot reflect ovarian reserve function, so ovarian reserve function should be fully evaluated clinically. After that, the patient is given postoperative fertility guidance. This study suggests that for those with an EFI score > 4, they should be observed for 6-12 months during fertility guidance, and if necessary, ovulation-stimulating drugs can be given to stimulate the ovaries slightly to help patients improve their postoperative pregnancy rate. Some studies[27] have shown that if the patient does not conceive naturally within 12 months after surgery, 2-4 cycles of controlled ovulation induction should be used, and if the patient still fails to

conceive after the application, in vitro fertilization-embryo transfer (IVF-ET) should be performed. For those with an EFI score of ≤4, the author recommends direct IVF-ET. In conclusion, for EMs patients with fertility needs, it is not recommended to increase the postoperative pregnancy rate by waiting for a long time.

In summary, history of dysmenorrhea, postoperative GnRH-a treatment, and high EFI score are protective factors affecting natural pregnancy in patients with EMs; age ≥ 35 years, duration of menstrual cramps < 3 days, history of uterine cavity operations ≥ 2 times, gynecological inflammation, and r-AFS stage III-IV are the risk factors affecting natural pregnancy in patients with EMs. The analysis of the corresponding nursing measures for the influencing factors of natural pregnancy in patients with EMs is summarized as follows: Clinically, we should actively strengthen health education and related guidance for patients, help patients improve their menstrual conditions, do a good job in family planning in advance, and reduce induced abortion or unsatisfactory pregnancy. Necessary uterine cavity operations to help patients improve their healthy living standards and quality. However, it should be noted that the factors affecting natural delivery in patients with EMs are diverse, not single. The author believes that for patients who are still infertile after EMs, a comprehensive infertility examination should be performed first in the clinic to rule out other causes of infertility. It can be instructed to use 3 to 6 cycles of GnRH-a for improvement and then assisted reproductive technology treatment. Combining the above viewpoints and conclusions, we can see that for different EMs patients, the treatment plan is also different. Therefore, it is necessary to design an individualized treatment plan for the patient in order to improve the natural pregnancy rate of EMs patients after surgery.

While our study provides valuable insights into factors influencing natural pregnancy outcomes in endometriosis patients following laparoscopic conservative surgery, it is crucial to acknowledge certain limitations that impact the interpretation of our findings. First, the retrospective nature of our study introduces inherent limitations associated with relying on historical data. The potential for incomplete or missing records may have affected the comprehensiveness of our analysis. Rretrospective studies are susceptible to selection bias, as the inclusion of patients is contingent on having undergone laparoscopic conservative surgery, potentially excluding those with diverse characteristics. Secondly, Despite rigorous efforts to minimize biases during data collection and analysis, the presence of certain biases remains an important consideration. Selection bias, information bias, and confounding variables are inherent challenges in retrospective research. Variables like postoperative interventions may be influenced by individual patient preferences and clinical judgment, introducing potential bias into our results.

Furthermore, The generalizability of our findings is constrained by the specific patient population under analysis—women with endometriosis who underwent laparoscopic conservative surgery at our hospital. This population may not fully represent the broader spectrum of women with endometriosis, especially those with more severe or complex cases necessitating different treatment approaches. It is imperative to interpret our findings within the broader clinical context, considering the limitations outlined above. Clinicians should exercise caution when extrapolating our results to patient populations with different characteristics or those receiving alternative treatments. Understanding the potential biases inherent in our study ensures a more nuanced and realistic interpretation of the observed associations.

Above all, our findings not only contribute to a more nuanced understanding of the factors influencing natural pregnancy outcomes in patients with EMs but also have practical implications for clinicians. By translating these insights into personalized treatment plans, healthcare professionals can optimize clinical decision-making, aiming to maximize postoperative natural pregnancies.[28] This tailored and patient-centered approach ensures that women with EMs receive interventions precisely aligned with their unique circumstances, ultimately improving their prospects for successful natural pregnancies.

CONCLUSION

In conclusion, while our study contributes valuable insights, it is essential to view the findings as part of the broader landscape of endometriosis research. Ongoing research, incorporating diverse patient cohorts and methodologies, will further enrich our understanding and refine clinical applications in the management of endometriosis-related fertility challenges.

DATA AVAILABILITY STATEMENT

The datasets used and analyzed during the current study are available from the corresponding author upon reasonable request.

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No funds were received

AUTHOR CONTRIBUTIONS

Fengju Zhang and Jie Liu contributed equally to this study.

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