INPLASY

Endometriosis and Infertility: Medical versus Surgical Approaches – A Systematic Review and Meta-Analysis

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ADMINISTRATIVE INFORMATION

Support - None.

Review Stage at time of this submission - Completed but not published.

Conflicts of interest - None declared.

INPLASY registration number: INPLASY202560103

Amendments - This protocol was registered with the International Platform of Registered Systematic Review and Meta-Analysis Protocols (INPLASY) on 25 June 2025 and was last updated on 25 June 2025.

INTRODUCTION

Review question / Objective 1. What are the benefits of medical treatment in suppressing ovarian steroid production?
2. What are the benefits of surgery in restoring spontaneous fertility?
3. What is the effect of medical treatment prior to IVF?
4. What is the effect of surgical treatment prior to IVF?
5. Are there standardized recommendations to guide the choice between medical and surgical strategies to:
o Restore natural fertility?
o Stabilize or delay disease progression?
o Improve IVF success?
6. How do surgical complications influence treatment decisions?

Rationale To evaluate the evidence of the efficacy of medical versus surgical treatment in the finality of fertility resporation both sponstaneous and with IVF.

Condition being studied Endometriosis is a chronic inflammatory condition affecting reproductive-aged women, often associated with infertility. Medical and surgical treatments are widely used, but their relative effectiveness in restoring fertility remains debated.

METHODS

Search strategy Search Strategy. A comprehensive literature search was performed using the databases PubMed, Embase, Scopus, and the Cochrane Library. The time frame was limited to January 2000 through June 2025. The search terms included: “Endometriosis AND Infertility”- “Medical treatment vs controls”- “Surgical treatment vs controls”- “Medical vs surgical treatment”-“Surgical complications”
Search strategies were adapted for each database using standardized Medical Subject Headings (MeSH) and free-text terms, and Boolean operators were applied. All articles identified were

imported into a reference manager (Zotero) and screened for duplicates.

Participant or population Eligibility Criteria. Only comparative studies—prospective, retrospective, randomized controlled trials, and meta-analyses—were eligible. Studies had to fulfill the following inclusion criteria: Reported fertility outcomes (spontaneous pregnancy and/or IVF results); Included women with surgically or radiologically confirmed endometriosis; Provided data on endometriosis stage, when available; Included a comparison group (medical vs surgical, treatment vs control)
Exclusion criteria included case reports, studies focused exclusively on pain without reproductive outcomes, non-comparative designs, and studies not available in English or as full text.

Intervention This study was conducted as a systematic review and meta-analysis, in accordance with the PRISMA 2020 guidelines.[1] All stages of selection, screening, inclusion, and analysis were performed independently by two reviewers, with discrepancies resolved by consensus or third-party adjudication.

Comparator 1. Medical Treatment vs Controls
o Stratified by endometriosis stage
o Focus on disease suppression and IVF outcomes
2. Surgical Treatment vs Controls
o Focused on fertility-related indications only (not pain)
o Reporting spontaneous pregnancy and IVF success rates
3. Medical vs Surgical Interventions
o Comparison of spontaneous fertility and IVF success
o Analysis of impact of surgical complications on reproductive decision-making.

Study designs to be included This study was conducted as a systematic review and meta-analysis, in accordance with the PRISMA 2020 guidelines.[1] All stages of selection, screening, inclusion, and analysis were performed independently by two reviewers, with discrepancies resolved by consensus or third-party adjudication.

Eligibility criteria Only comparative studies—prospective, retrospective, randomized controlled trials, and meta-analyses—were eligible. Studies had to fulfill the following inclusion criteria: Reported fertility outcomes (spontaneous pregnancy and/or IVF results); Included women with surgically or radiologically confirmed endometriosis; Provided data on endometriosis stage, when available; Included a comparison group (medical vs surgical, treatment vs control)
Exclusion criteria included case reports, studies focused exclusively on pain without reproductive outcomes, non-comparative designs, and studies not available in English or as full text.

Information sources The databases PubMed, Embase, Scopus, and the Cochrane Library.

Main outcome(s)
• Spontaneous pregnancy rate
• IVF outcomes, including clinical pregnancy and live birth rates
• Surgical complications, including ovarian reserve reduction or procedure-related morbidity
• Cost-effectiveness (reported only when explicitly assessed in eligible studies).

Data management Statistical Analysis. Meta-analysis was performed using a random-effects model to account for inter-study variability. Heterogeneity was assessed with the I^2 statistic. For each comparison group, pooled odds ratios (OR) and 95% confidence intervals (CI) were calculated. Subgroup analyses were performed by:
• Endometriosis stage (I–IV)
• Type of treatment (medical vs surgical)
• Outcome (spontaneous conception vs IVF-related)
Forest plots were generated to visually represent effect sizes, and funnel plots were used to assess publication bias. All analyses were conducted using RevMan 5.4 and R.

Quality assessment / Risk of bias analysis Risk of bias was evaluated using the ROBINS-I tool for non-randomized studies and the Cochrane Risk of Bias 2.0 for randomized trials.[2-3] Certainty of evidence was assessed using the GRADE approach across outcomes.[4]

Strategy of data synthesis Analysis is conducted by the help of an analyst statistician.

Subgroup analysis Meta-analysis was performed using a random-effects model to account for inter-study variability. Heterogeneity was assessed with the I^2 statistic. For each comparison group, pooled odds ratios (OR) and 95% confidence intervals (CI) were calculated. Subgroup analyses were performed by:
• Endometriosis stage (I–IV)
• Type of treatment (medical vs surgical)
• Outcome (spontaneous conception vs IVF-related)
Forest plots were generated to visually represent effect sizes, and funnel plots were used to assess

publication bias. All analyses were conducted using RevMan 5.4 and R.

Sensitivity analysis Meta-analysis was performed using a random-effects model to account for inter-study variability. Heterogeneity was assessed with the I^2 statistic. For each comparison group, pooled odds ratios (OR) and 95% confidence intervals (CI) were calculated. Subgroup analyses were performed by:
• Endometriosis stage (I–IV)
• Type of treatment (medical vs surgical)
• Outcome (spontaneous conception vs IVF-related)
Forest plots were generated to visually represent effect sizes, and funnel plots were used to assess publication bias. All analyses were conducted using RevMan 5.4 and R.

Language restriction English.

Country(ies) involved Italy.

Keywords endometriosis, infertility, spontaneous pregnancy, IVF, medical therapy, laparoscopy, GnRH, comparative studies.

Dissemination plans article in journal.

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