



2019

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Recommended Citation

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Physician Assistant Scholarly Project Posters. 132.
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Fertility Options for Women with Endometriosis: In Vitro Fertilization versus Surgical Excision or Ablation

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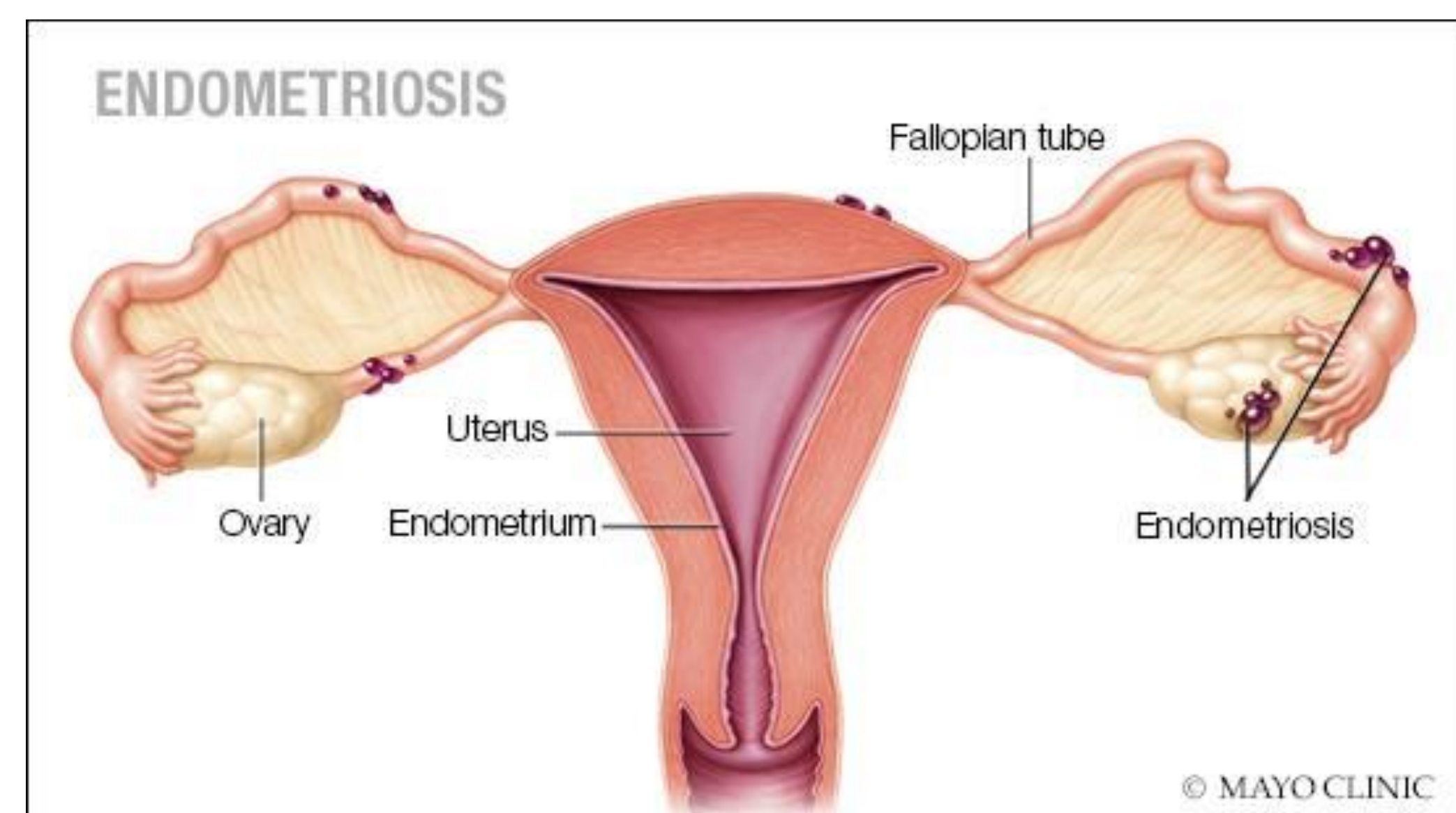
Abstract

Endometriosis negatively affects the fertility of many women of reproductive age worldwide. Some women with endometriosis are able to conceive without reproduction assistance, while others require medical intervention. In vitro fertilization and surgical management are available and widely used in the treatment of endometriosis associated infertility. In vitro fertilization has been found to be effective in women with stages I-IV endometriosis, with varying degrees of success at each stage. These varying results may be due to oocyte quality and availability as well as endometriosis location. Surgical excision and/or surgical ablation of endometriosis/endometriomas may also improve chance of successful pregnancy but has been found to decrease ovarian reserve and therefore decrease future fertility as a result of ovarian damage and decreased ovarian reserve. This project will discuss surgical treatment of endometriosis and in vitro fertilization in patients with endometriosis and the result of each on achieving and maintaining pregnancy.

• **Keywords:** *endometriosis, infertility, in vitro fertilization, surgical excision, surgical ablation, pregnancy, endometrioma, live birth.*

Introduction

- Endometriosis: characterized by endometrial tissue implanted outside of the uterus. Tissue is stimulated by estrogen and proliferates, responding like endometrial tissue.
- Endometriosis affects 10-15% of reproductive age women—some asymptomatic₁
- Multiple diagnostic methods: clinical diagnosis is the most common and least invasive, also ultrasonography, MRI, and laparoscopy (gold standard)₂



Statement of the Problem

Many women with endometriosis struggle with achieving pregnancy, and many women struggling with infertility are found to have endometriosis. There is no single way to increase fertility in women with endometriosis, and the most effective way to achieve and maintain pregnancy is still under study. There are many methods of achieving and maintaining pregnancy at this time including in IVF, IVF/ICSI, hormonal therapy, surgical excision/ablation, and other pharmacological treatments.

Research Question

In patients with pelvic endometriosis and/or ovarian endometriomas, which of the following is the most effective method to achieve and maintain pregnancy: IVF or excision/ablation of endometriomas?

Literature Review

IVF

- Gonadotropin releasing hormone agonist (GnRHa) administration 3-6 months prior to IVF increased odds of clinical pregnancy fourfold in endometriosis patients₁
- Women with endometriosis are likely to have poor ovarian reserve vs control but conceiving via IVF/ICSI is just as likely to occur as in patients without endometriosis and similar ovarian reserve₄
- Live birth rates in women with stages I/II in six studies showed no difference from controls₅
- Live birth rates in women with stages III/IV in nine studies “did not show a statistically different outcome”₅
- Pregnancy rate achieved via IVF/ICSI in diagnosed endometriosis (n = 177) vs control (n = 4267): endometriosis (45.2%) vs control (55.2%). Likely decreased because “reducing oocytes number and fertilization rates, regardless of severity of the disease”₆
- Stage III/IV patients experienced significantly reduced implantation and clinical pregnancy rates vs controls but live birth rates were equivalent to controls₁
- In women with bilateral endometriomas (39) vs control (78): fertilization rate, implantation rate, quality embryos per oocyte, and chances of pregnancy similar. Bilateral endometriomas during IVF “affect responsiveness to hyperstimulation”₃

Surgical Excision/Ablation

- Less than 25% of sub-fertile patients undergoing surgery for endometriosis of any type were able to conceive spontaneously, with average post-op pregnancy rate following excision of ovarian endometriomas ~ 50% while inducing gonadal damage₇
- Surgical resection of endometriomas in early-stage disease prior to IVF significantly improved live-birth rates (20.6% vs 27.7%)₁
- Surgical excision of endometriomas “yields better results in terms of subsequent pregnancy rates, pain control rates, and cyst recurrence rates” vs coagulation/ablation₈
- First line treatment for women with stage I/II endometriosis was surgical excision/ablation and resulted in doubling of spontaneous conception pregnancy rate₉

Discussion

Stages of Endometriosis by the American Society for Reproductive Medicine₂

Stage I	Minimal-superficial lesions in peritoneum and/or ovary; filmy adhesions are possible
Stage II	Mild- stage I findings + deep lesions may be detected in peritoneum
Stage III	Moderate- stage I & II findings + deep lesions may be detected in ovary, cul-de-sac may be partially obliterated, or filmy adhesions may be detected in fallopian tubes
Stage IV	Severe- stages I-III findings + deep lesions and dense adhesions may be detected in several regions, as well as complete obliteration of cul-de-sac

- Endometriosis symptoms: dysmenorrhea (50-90%), chronic pelvic pain, dyspareunia, menorrhagia, dysuria, dyschezia, constipation, hematochezia, and infertility₂
- Peak incidence: age 25-29 (most women with symptoms 6-12 years prior to diagnosis)₂
- OCPs 6-8 weeks prior to IVF and ICSI: higher pregnancy rates per retrieval than controls (35 vs 12.9%; p=0.01) and greater in women with endometriomas₁
- Ovarian reserve in patients with endometriosis decreased compared to controls (39.8% vs 22.7%) in study involving 787 women, 241 with endometriosis diagnosis₄
- 177 women with endometriosis vs 4267 women without: clinical pregnancy rate 45.2% vs 55.2%. May be explained by lower ratio of high-quality embryos transferred in endometriosis group: 53.7% vs control: 71.8%₆
- Women with endometriosis have decreased IVF pregnancy rate vs control mainly due to reduced oocytes and fertilization rate, regardless of endometriosis severity₆
- Women with endometriosis stages III-IV showed significantly less implantation and clinical pregnancy rates vs controls but did have comparable live birth rates₁
- “Ovarian endometriomas are present in 17 to 44% of patients with endometriosis”₈, and no more than 25% of sub fertile patients with endometriomas are able to achieve conception spontaneously₇
- Endometrioma excision prior to IVF does not increase odds of successful IVF treatment but should be considered for symptom control or if concern of rupture during pregnancy due to size₁
- Ovarian responsiveness to hyperstimulation is decreased when bilateral endometriomas present, but they do not affect oocyte quality, fertilization rate, implantation rate, or chance of pregnancy₃
- Conservative treatment of endometriomas preferred to maintain fertility versus decreasing recurrence via surgery but also reducing or completely destroying ovarian reserve₁₀
- Endometrioma may be cause for reduced ovarian reserve and not the endometrioma removal procedure itself₈

Applicability to Clinical Practice

- Due to potential worsening of endometriosis symptoms during first stages of IVF, patients should be made aware of options, risks, and benefits
- Women choosing surgical excision/ablation prior to assisted reproductive technology (ART) should be aware that initial procedure may increase their chances of conceiving spontaneously, but if further treatments indicated, IVF or other ART should be considered rather than another surgery due to potential harm and decreased ovarian reserve
- Education on conception options must be provided to women who are wishing to conceive who have the diagnosis of endometriosis to ensure they are making educated decisions about conception with ART or surgical procedures

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Acknowledgements

I would like to take this opportunity to thank all of those who have helped me to complete this project. Thank you to Professor Russell Kauffman, for his encouragement and guidance in completing this project. I would also like to thank Dr. Klug for her statistical specialty, Lindsey Brew, DC for an interdisciplinary approach to infertility treatment, and Jennifer Christianson for reviewing my project. Finally, a tremendous thank you to my family and friends for their patience throughout my years of education, and their constant love and support.