

Hysteroscopic Treatment of Adenomyosis and its Impact on Pregnancy Outcomes: A Mini Review

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ABSTRACT

The presence of endometrial glands and stroma within the myometrial wall histologically characterizes adenomyosis, a complicated and multivariate uterine condition. Adenomyosis, which was formerly believed to largely affect multiparous women in their 40s and 50s, is now more widely recognized in younger patients, especially those who have infertility or recurrent pregnancy loss. While there are many different clinical signs, the most common ones are menorrhagia, dysmenorrhea, persistent pelvic pain and most importantly impaired fertility. The development of imaging technologies like MRI and transvaginal ultrasound has made early diagnosis more practical, enabling treatment planning that preserves fertility and earlier intervention.

In the past, hysterectomy represented as gold standard regarding final treatment of adenomyosis. However, this surgical treatment prohibits women to become pregnant in the near future. Due to this restriction, focus has shifted to less invasive, uterus-sparing procedures. Of these, hysteroscopic methods most notably, end myometrial excision and localized lesion ablation have attracted a lot of interest. Restoring the uterine cavity's structure and function, reducing discomfort, and above all improving fertility and pregnancy outcomes are the goals of these surgical confrontations.

With an emphasis on fertility and obstetric outcomes, this thorough narrative review assesses the available data on hysteroscopic therapy of adenomyosis. Using the terms adenomyosis, hysteroscopy, pregnancy, infertility, treatment and outcomes, a comprehensive search of English-language literature from 2000 to 2025 was carried out, incorporating clinical trials, cohort studies, and systematic reviews from PubMed, Scopus, and Google Scholar. Excluded were studies with no particular reproductive outcome data or that focused on other surgical modalities (laparoscopy, hysterectomy).

Keywords:

Adenomyosis, Hysteroscopy, Pregnancy rate, Doppler ultrasound, MRI.

Introduction

According to this research, hysteroscopic therapy has a significant positive impact on reproduction, particularly when localized adenomyosis is present. Liu et al. (2019), for example, showed that of 130 women with localized illness who had hysteroscopic resection, 45% became pregnant within six months, while only 20% of the untreated group did so. Smith et al. [1] (2020) have found similar results, emphasizing notable increases in fertility after hysteroscopic endometrial ablation, especially in patients who do not have fibroids or endometriosis coexisting [2].

From a technical perspective, hysteroscopic resection entails the precise removal of adenomyotic nodules or cystic lesions with direct visualization, with the goal of maintaining adjacent myometrium. Conversely, ablation aims to thermally or chemically eliminate superficial adenomyotic foci. Both methods seek to enhance the intrauterine conditions, minimize irregular contractility, and fix anatomical distortions that hinder implantation and placentation. Zhou and Chen (2018)

emphasized that enhancing the structure of the uterine cavity is essential for attaining successful pregnancies in women suffering from adenomyosis [2-3].

Although promising outcomes have been reported, multiple studies highlight significant constraints. The effectiveness of hysteroscopic treatment seems to be affected by the severity of the disease, depth of myometrial invasion, lesion position, patient age, and the existence of concurrent gynaecologic conditions. Chung et al. (2021), in a prospective cohort of women receiving hysteroscopic resection, noted increased live birth rates (38% vs. 25%) and lower miscarriage rates in comparison to controls. However, they observed reduced advantages in instances of diffuse or deeply infiltrative adenomyosis, aligning with earlier studies.

Aside from conception, the influence of hysteroscopic surgery on pregnancy results continues to be an important factor. Although numerous studies indicate enhanced implantation and live birth rates, issues like abnormal placentation, preterm birth, and uterine rupture have been recorded as well. Li et al. (2022) found a higher occurrence of placenta accreta (6%) and preterm delivery (14%) in women who underwent previous hysteroscopic procedures, especially when aggressive or extensive resections were done. This is probably caused by

iatrogenic interference with the junctional zone and subsequent uterine scarring.

Regarding adjunctive approaches, numerous writers have suggested utilizing postoperative hormonal treatment to sustain symptom relief and inhibit adenomyotic activity [4]. Liu et al. (2021) examined evidence indicating that the use of GnRH agonists or progestins following hysteroscopic resection could improve pregnancy maintenance and lower the likelihood of recurrence. These agents function by adjusting the hormonal environment, inhibiting remaining ectopic endometrium, and alleviating local inflammation. Nonetheless, the best regimens, timing, and duration for hormonal supplementation have yet to be established [5].

One notably difficult factor is choosing the right patients. Not every person gains the same advantages from hysteroscopic treatment. Zhu et al. (2017) and Wang et al. (2020) emphasize the significance of detailed preoperative imaging and customization of treatment strategies [6]. Factors like junctional zone thickness, lesion echogenicity, and vascularity observed through Doppler ultrasound or MRI can assist in determining surgical eligibility and forecasting response. Additionally, appropriate guidance about expectations and risks is crucial, particularly for women with previous surgeries, serious conditions, or advanced maternal age.

Another significant factor is the quality of evidence. Even with promising results, numerous current studies are retrospective, featuring limited sample sizes and varied methodologies. Randomized controlled trials are limited, and only a small number of studies offer long-term follow-up. Future studies should focus on multicentre prospective research employing standardized surgical protocols and comprehensive fertility endpoints, such as time to conception, live birth rates, and obstetric complications.

Furthermore, the function of hysteroscopy alongside other fertility therapies, like IVF, deserves investigation. Certain writers suggest that hysteroscopic resection could prepare the uterus for Assisted Reproductive Technologies (ART) by enhancing endometrial receptivity. Nonetheless, existing evidence is not definitive. The timing of ART following a hysteroscopic procedure is still uncertain, with some suggesting a waiting duration of no less than 3–6 months for healing and hormone stabilization.

Adenomyosis is a prevalent condition that is frequently underdiagnosed in women of childbearing age, particularly among those experiencing infertility or unexplained pregnancy loss. It is characterized by the existence of endometrial glands and stroma in the myometrium, leading to an increase in uterine size and changes in tissue structure [7].

The exact cause of adenomyosis is still unknown, but it is believed to be associated with elements like hormonal disruptions, uterine injury, or genetic factors. Its link to subfertility and pregnancy issues, such as preterm birth and abnormal placentation, has turned it into a key area of study in reproductive medicine [8].

Historically, the management of adenomyosis has been restricted to medical treatments focused to alleviating symptoms or more invasive surgical procedures, like abdominal hysterectomy.

Nonetheless, abdominal hysterectomy does not refer as feasible treatment of choice in cases of fertility maintenance.

In recent times, hysteroscopic surgery has arisen as a promising minimally invasive option for addressing adenomyosis, providing the benefit of maintaining the uterus and often enhancing fertility [9].

Hysteroscopic techniques like myometrial resection or endometrial ablation seek to diminish the adenomyotic lesions, potentially enhancing the operational ability of the uterine cavity [10].

Considering the increasing interest in this treatment approach, this review will examine the efficacy of hysteroscopic treatment for adenomyosis, focusing specifically on its effects on fertility and birth results [11-13].

In summary, hysteroscopic treatment for adenomyosis offers a hopeful fertility-preserving choice for certain women. It provides numerous benefits such as low invasiveness, preservation of the uterus, alleviation of symptoms, and enhanced reproductive capability. However, the method carries certain risks, and its effectiveness differs depending on various factors. Thorough preoperative assessment, careful surgical methods, and individualized treatment plans are crucial. Combining hormonal therapy with careful obstetric supervision after conception enhances results.

Ongoing research especially through extensive randomized trials is essential for clarifying indications, improving techniques, and creating evidence-based guidelines. Additionally, collaborative efforts among reproductive endocrinologists, gynaecologic surgeons, and maternal-fetal medicine specialists are essential for enhancing care for this distinct and frequently underserved group.

Material and Methods

A systematic review of studies published from 2000 to 2025 was conducted to synthesize the current literature on hysteroscopic treatment for adenomyosis. Databases such as PubMed, Scopus, and Google Scholar were searched using these keywords: hysteroscopy, adenomyosis, fertility outcomes, pregnancy outcomes and treatment.

Only research published in English-language peer-reviewed journals was considered, emphasizing clinical trials, cohort studies, case-control studies, and systematic reviews.

Exclusions criteria included studies that did not specifically focus on hysteroscopy for treating adenomyosis or those that did not provide pertinent data on fertility pregnancy outcomes.

Following the assessment of abstracts, full text acquired and pertinent information was gathered concerning study design, treatment approach, patient demographics, sample sizes and primary outcomes (e.g. fertility rates, live birth rates, miscarriage rates.)

Inclusions criteria were utilized:

- Research focusing on women diagnosed with adenomyosis who are receiving hysteroscopic procedures (resection, ablation, or a combination of both)
- Research documenting fertility and/or pregnancy results after hysteroscopic treatment

- English-language studies that have undergone peer review
 - Clinical studies, cohort analyses, or systematic evaluations
- Studies concentrating on alternative surgical techniques (like laparoscopic surgery or hysterectomy), research involving non-human subjects, or those lacking data on fertility or pregnancy outcomes were excluded.

Results

Fertility Outcomes

Numerous studies indicate that hysteroscopic removal or ablation of adenomyotic lesions can enhance fertility in women suffering from adenomyosis. For example, research conducted by Liu et al. (2019) on 130 women with mild to moderate adenomyosis revealed that 45% of participants became pregnant within six months post-hysteroscopic resection, whereas the control group had a pregnancy rate of 20%. In the same vein, a meta-analysis conducted by Smith et al. (2020) showed that hysteroscopic surgery notably enhanced fertility rates, especially among patients with localized adenomyosis.

The efficacy of hysteroscopic treatment may rely on the position and dimensions of the adenomyotic lesions.

Women suffering from localized adenomyosis frequently managed through myometrial resection, generally experience more favorable results compared to those with widespread disease.

The latter group might not react as positively to hysteroscopic procedures since the large extent of the adenomyotic tissue can complicate removal.

Pregnancy and Birth Outcomes

The effect of hysteroscopic treatment on pregnancy results has been similarly encouraging, yet it is not free from complications.

Several studies suggest that hysteroscopy enhances live birth rates and decreases miscarriage rates, although results differ based on the population examined.

Research conducted by Chung et al. (2021) showed that 38% of women who received hysteroscopic treatment for adenomyosis had a live birth in one year, while the control group had 25%.

Additionally, the research pointed out that women with mild to moderate adenomyosis had a more favorable response to the treatment, resulting in considerably fewer preterm births.

Nonetheless, certain studies indicate worries about placental issues, especially in women experiencing severe adenomyosis. Research conducted by Li et al. (2022) indicated that women with severe adenomyosis receiving hysteroscopic therapy experienced a greater rate of preterm birth (14%) and placenta accreta (6%).

These complications are believed to be connected to the uterine scarring that may occur due to aggressive resection or ablation methods.

Consequently, it is advisable for women who have undergone hysteroscopic treatment for adenomyosis to have careful monitoring throughout their pregnancy.

Hormonal Treatment Supplement

Numerous studies have examined the implementation of hormonal therapy after hysteroscopic treatment for

adenomyosis to enhance long term results.

Liu et al. (2021) performed a systematic review indicating that women undergoing hormonal therapy post hysteroscopic treatment experienced notably higher pregnancy and live birth rates than those who did not receive any additional therapy.

Hormonal therapies, like GnRH agonists or progestins, can aid in decreasing the recurrence of adenomyosis and foster a more suitable uterine environment for embryo implantation and the upkeep of pregnancy.

Discussion

The research on hysteroscopic management of adenomyosis indicates that this method can greatly enhance fertility and pregnancy results, especially in women with mild to moderate conditions.

Nevertheless, the evidence is inconclusive, and the success of hysteroscopy may be affected by several factors, such as adenomyosis severity, lesion positioning, and the age of the patient.

Treatment Techniques

Hysteroscopic resection and ablation are frequently employed to address adenomyosis. These methods seek to eliminate or eradicate the adenomyotic lesions, potentially enhancing the function of the uterine cavity.

Surgical removal of adenomyosis lesions has proven especially advantageous for women with localized conditions, as directly addresses the affected regions.

Conversely, more widespread types of adenomyosis pose a difficulty, since total removal of the tissue is frequently hard.

This could clarify the varied results regarding fertility and pregnancy outcomes suggested in different studies.

Effects on Pregnancy and Maternal Health

Although hysteroscopic procedures can improve fertility, they do not ensure successful pregnancy results, especially for women with extensive adenomyosis.

Research has indicated a heightened risk of pregnancy complications, including preterm birth, placenta accreta and various placental irregularities, particularly in women with more severe cases of the disease.

Therefore, meticulous prenatal observation is crucial for these individuals.

Future Directions

Future research should concentrate on enhancing patient selection criteria for hysteroscopic treatment of adenomyosis, since not all women will gain the same advantages.

Additionally, studies should explore the best surgical methods, including if supplemental hormonal treatment can enhance long-term fertility and pregnancy results.

Additionally, research is required to evaluate the long-term health of women who have hysteroscopic surgery for adenomyosis, along with the impacts on future pregnancies and maternal well-being.

Conclusion

Hysteroscopic therapy for adenomyosis presents a hopeful

method for enhancing fertility and pregnancy results in women suffering from this condition. Although the evidence endorses its application in specific patient groups, the outcomes are not universally favorable, and additional research is required to gain a deeper understanding of the complexities of treatment effectiveness.

The success of hysteroscopy relies on factors like the severity of adenomyosis, the existence of concurrent conditions, and the particular surgical method employed.

Moreover, although hysteroscopic therapy may improve fertility, it does not remove the risk of complications in pregnancy, including preterm delivery or placental issues.

Consequently, continued research, especially extensive randomized controlled trials, is crucial to determine best practices and enhance outcomes for women receiving hysteroscopic treatment for adenomyosis.

Disclosure of interest

All authors declare any financial interest with respect to this manuscript.

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