

Comparison Of The Effectiveness Of Different Treatments For Diseases Such As Endometriosis, Uterine Fibroids And Polycystic Ovary, And Their Impact On Women's Fertility And Quality Of Life.

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Abstract:

Introduction: Endometriosis, uterine fibroids, and polycystic ovary syndrome (PCOS) represent a trio of benign, highly prevalent gynecological conditions with a profound impact on the health of women of reproductive age. Although they have distinct pathophysiologies, these diseases often share an overlap of debilitating symptoms, including chronic pelvic pain, abnormal uterine bleeding, and, crucially, subfertility or infertility. This confluence of painful symptoms and compromised reproductive potential create complex clinical scenarios in which therapeutic decisions need to be carefully weighed to balance symptom relief with preservation or restoration of fertility and overall quality of life.

Objective: The aim of this systematic review was to compare the efficacy of different treatment modalities – medical and surgical – for endometriosis, uterine fibroids, and PCOS, with a primary focus on assessing their impact on fertility outcomes and improving patient quality of life.

Methodology: A systematic literature review was conducted in accordance with the PRISMA guidelines, with articles published in the last ten years. The search was performed in the PubMed, Scielo and Web of Science databases, using the descriptors: "endometriosis", "uterine fibroids", "polycystic ovary syndrome", "fertility" and "quality of life". The inclusion criteria were: comparative studies, especially randomized clinical trials, that evaluated at least two treatment modalities; population of women of reproductive age diagnosed with one of the conditions; and measurement of fertility or quality of life outcomes. Case reports, studies in postmenopausal populations and research focusing only on diagnosis were excluded.

Results: The results found in the literature indicated that the choice of the ideal treatment was highly dependent on the patient's condition and goals. For symptom control and improvement of quality of life, hormonal therapies have shown to be effective as first-line treatment for endometriosis and PCOS. However, for symptomatic fibroids or deep endometriosis, surgical interventions such as myomectomy and laparoscopic excision of lesions, respectively, offered more definitive relief. Regarding fertility, conservative surgery often proved superior to clinical management for women wishing to become pregnant, while for PCOS, lifestyle modification and ovulation induction remained the mainstays of treatment.

Conclusion: It was concluded that there was no universally superior therapeutic approach for these three gynecological conditions. The optimal therapeutic decision derived from a process of individualization of care, considering the severity of symptoms, the age of the patient and, predominantly, her immediate and future reproductive desires. The evidence reinforced the importance of shared decision-making, where a clear dialogue about the benefits and risks of each option – be it medical, surgical or the use of assisted reproductive technologies – allowed the alignment of the treatment plan with the priorities and values of each woman.

Key Word: "endometriosis", "uterine fibroids", "polycystic ovary syndrome", "fertility" and "quality of life"

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I. Introduction

Benign gynecological diseases, such as endometriosis, uterine fibroids, and polycystic ovary syndrome (PCOS), constitute a set of highly prevalent conditions that have a profound and multifaceted impact on women's

health during their childbearing years. Although they have distinct etiologies and pathophysiologies, these diseases converge in their ability to generate debilitating symptoms—such as chronic pelvic pain and abnormal uterine bleeding—and to compromise reproductive potential. The clinical management of these conditions is therefore inherently complex, as it requires careful navigation between strategies aimed at symptomatic relief and those aimed at optimizing fertility, two goals that are often mutually exclusive.

In this scenario, the therapeutic approach is often governed by a central dichotomy: symptom control versus the patient's reproductive desire. On the one hand, to improve quality of life through pain and bleeding management, hormonal therapies represent the first line of treatment. Agents such as combined oral contraceptives, isolated progestogens or GnRH analogues act by suppressing the hormonal axis and inducing a state of anovulation, which prevents the proliferation of hormone-dependent tissues (endometriosis foci and fibroids). In contrast, this hormonal suppression is, by definition, contraceptive, making such treatments unsuitable for women actively seeking conception. The pursuit of pregnancy requires an opposite approach, which aims to restore ovulation and normal reproductive function.

It is in this context of sometimes conflicting objectives that surgical intervention emerges as a dual-role therapeutic tool, whose purpose and technique are radically adapted to the woman's primary goal. Conservative surgery, in this context, aims to remove the pathology while maximizing the preservation of reproductive capacity. Procedures such as myomectomy (removal of fibroids), complete excision of endometriosis implants or ovarian cystectomy for endometriomas are meticulously performed, often using minimally invasive methods, to restore normal pelvic anatomy and thus increase the chances of spontaneous pregnancy or the success of assisted reproductive technologies. Conversely, when fertility is no longer a priority and symptom control is the ultimate goal, surgery can take on a radical character. Hysterectomy, for example, offers a definitive solution to the symptoms of fibroids and adenomyosis, but at the cost of permanent sterility. The choice between these two surgical philosophies is therefore one of the most critical and personalized decisions in modern gynecology.

From this perspective, clinical-hormonal management is established as a fundamental pillar for managing quality of life, especially when conception is not an immediate priority. The clinical therapeutic arsenal, which includes everything from combined oral contraceptives to continuous-use progestogens and GnRH analogues, has as its mechanism of action the modulation of the endogenous hormonal environment. By creating a state of relative hypoestrogenism or progestogen dominance, these therapies induce atrophy of endometriosis foci and can stabilize or even reduce the volume of fibroids, resulting in effective control of pelvic pain and abnormal uterine bleeding.

However, it is crucial to recognize that the benefit of these therapies is essentially dependent on continued use. Unlike surgery, clinical treatment manages symptoms but does not definitively eradicate the underlying pathology. Once medication is discontinued, symptoms tend to recur as physiological hormonal stimulation of the lesions resumes. Thus, clinical treatment functions as a long-term control strategy for women who do not wish to become pregnant or as a temporary therapeutic bridge, for example in the preoperative period, but not as a curative solution for the structural disease.

The existence of multiple therapeutic pathways with such distinct risk and benefit profiles makes it imperative to individualize care and practice shared decision-making. There is currently a consensus that there is no single algorithm that applies to all women. Choosing the most appropriate therapeutic pathway is a deliberative and personalized process that takes into account a series of interdependent variables. Among these, the following stand out: the patient's age, which directly influences her reproductive window; the intensity and type of her symptoms; and the specific characteristics of the disease, such as the number, size and location of fibroids or the stage and depth of endometriosis implants.

The cornerstone of this approach is shared decision-making, a collaborative process in which the physician presents therapeutic options based on the best available scientific evidence, and the patient contributes her values, life priorities, and preferences. It is in this dialogue that the relative weight between the desire for motherhood, the aversion to surgical intervention, the tolerance to possible side effects of hormones, and the impact of symptoms on daily life are considered. Only through this therapeutic alliance is it possible to design a treatment plan that is not only clinically sound, but also truly aligned with each woman's life project.

Finally, it is essential to differentiate the approach to Polycystic Ovary Syndrome (PCOS), which, by its nature, largely departs from the surgical-structural paradigm of endometriosis and fibroids. PCOS is primarily a complex endocrine-metabolic disorder, the main cause of infertility of which is ovulatory dysfunction (chronic anovulation) rather than anatomical distortion. Therefore, the first line of treatment for infertility associated with PCOS is not surgical, but rather focused on correcting the underlying pathophysiological imbalances.

The mainstay of treatment for women with PCOS who wish to become pregnant is lifestyle modification. Implementing a diet and regular physical activity, aiming for even modest weight loss (5-10%) in overweight or obese patients, is often sufficient to improve insulin resistance, reduce hyperandrogenism, and restore spontaneous ovulation. If ovulation is not restored, the subsequent pharmacological approach consists of inducing ovulation with drugs such as letrozole or clomiphene citrate. Surgical intervention in PCOS, such as laparoscopic

ovarian drilling, is considered a second- or third-line treatment, reserved for specific cases of drug resistance, which contrasts markedly with the central role of surgery in the management of infertility due to anatomic causes.

The objective of this systematic review is to analyze and synthesize the available scientific evidence on the comparative effectiveness of different treatment modalities – clinical and surgical – for endometriosis, uterine fibroids and polycystic ovary syndrome, with regard to their respective impacts on fertility outcomes and women's quality of life.

II. Material And Methods

This systematic review study was conducted in strict adherence to the PRISMA (Preferred Reporting Items for Systematic Reviews and Meta-Analyses) guidelines, with the aim of ensuring transparency and methodological rigor in the selection and synthesis of scientific evidence.

A comprehensive electronic search was performed in the PubMed, Scielo and Web of Science databases, limited to articles published in the last ten years, with the search completed in July 2025. The search strategy was constructed using a combination of five main descriptors and their synonyms (in Portuguese and English), articulated with the Boolean operators AND and OR: "endometriosis", "uterine myoma OR fibroid", "polycystic ovary syndrome", "fertility OR infertility" and "quality of life". Additionally, the reference lists of the selected articles were manually examined to identify relevant studies not captured by the initial search.

The criteria for inclusion and exclusion of studies were pre-specified according to the PICO framework (Population, Intervention, Comparison, Outcome).

inclusion criteria were defined :

1. **Type of Study:** Only Randomized Clinical Trials (RCTs) that compared the efficacy of at least two therapeutic modalities were included.
2. **Population:** Studies that investigated women of reproductive age (defined as between 18 and 45 years) with a confirmed diagnosis (by clinical, imaging or histopathological criteria) of endometriosis, uterine fibroids or polycystic ovary syndrome.
3. **Intervention and Comparison:** Research that evaluated any clinical intervention (hormonal or not) or surgical (conservative or radical) in comparison with another active intervention, placebo or no treatment (usual care).
4. **Outcomes:** Articles that reported, as a primary or secondary outcome, at least one objective measure of fertility (e.g. clinical pregnancy rate, live birth rate) and/or a measure of quality of life using a formal and validated instrument.
5. **Publication:** Only complete original articles published in peer-reviewed journals and available in Portuguese, English or Spanish were considered.

On the other hand, the **exclusion criteria** were:

1. **Type of Study:** Non-comparative studies, such as case series, as well as observational studies without a control group, literature reviews, meta-analyses, case reports and editorials were excluded.
2. **Population:** Studies that exclusively involved postmenopausal women, adolescents before menarche, or patients with gynecological malignancies.
3. **Focus of Study:** Research whose main objective was the diagnosis, epidemiology or pathophysiology of diseases, without the evaluation of a comparative therapeutic intervention.
4. **Insufficient Data:** Articles that did not present clear or sufficient quantitative data on the outcomes of interest that would allow for comparative analysis.
5. **Exclusive Focus on ART:** Studies that solely evaluated different Assisted Reproductive Technology (ART) protocols without comparing a primary treatment for the underlying disease (endometriosis, fibroids, PCOS).

Article selection was performed in two stages by two independent reviewers. Initially, titles and abstracts were screened. Studies that appeared to meet the eligibility criteria were retrieved for full-text reading. In the second stage, final eligibility was confirmed by full-text reading. Any disagreements between reviewers were resolved by consensus or, in case of impasse, by the assessment of a third senior reviewer. The process was documented to create a PRISMA flowchart.

III. Result

Fundamentally, the therapeutic management of endometriosis, uterine fibroids and polycystic ovary syndrome in women of childbearing age is guided by a central dichotomy: prioritizing symptomatic control to improve quality of life or to optimize reproductive potential. On one side of the spectrum, the management of chronic pelvic pain and abnormal uterine bleeding, prevalent and debilitating symptoms, relies largely on hormonal suppression strategies. Therapies such as continuous oral contraceptives, progestogens and GnRH analogues aim to induce a state of anovulation and relative hypoestrogenism, which leads to atrophy of endometriotic foci and stabilization of fibroids, resulting in effective symptomatic relief.

This strategy, however, is inherently contraceptive, creating a direct conflict with the desire for pregnancy. On the other hand, the path to conception requires the reactivation or optimization of the neuroendocrine axis and ovulatory function. This means that, in order to achieve pregnancy, the woman needs to discontinue the hormonal therapies that control her symptoms, potentially facing their recurrence. The fertility-focused approach, therefore, uses other tools, such as surgeries that restore the pelvic anatomy or drugs that induce ovulation. This opposition of objectives forces a strategic and temporal decision, where the patient, together with her doctor, needs to define which goal is a priority at her current moment in life.

Within this panorama of choices, surgical intervention emerges as a versatile tool, whose purpose and technique adapt radically to the established primary objective. Conservative surgery, in this context, represents the approach of choice for women who wish to preserve or increase their fertility. The primary goal of procedures such as myomectomy (selective removal of fibroids), laparoscopic excision of endometriosis implants, and lysis of pelvic adhesions is to remove visible pathology, restore the normal anatomy of the uterus, fallopian tubes, and ovaries, and reduce the pelvic inflammatory environment. The expectation is that by optimizing the structure and function of the reproductive organs, the chances of natural conception or the success of future assisted reproductive technologies will increase.

In contrast to the conservative philosophy, radical surgery is presented as a definitive option for symptom control, indicated for a specific patient profile: those who have already completed their childbearing or have no desire to reproduce, and who suffer from severe symptoms that are resistant to other forms of treatment. The emblematic procedure of this approach is hysterectomy, the removal of the uterus, which offers a definitive cure for symptoms caused by fibroids and adenomyosis. The irrefutable consequence of this intervention is permanent sterility. Thus, the decision between a conservative or radical surgical approach is one of the most critical points in therapeutic planning, requiring detailed counseling and a deep understanding of the patient's life goals.

For women whose immediate priority is to improve their quality of life through symptomatic control, clinical-hormonal management is the cornerstone of the first-line therapeutic approach. The pharmacological arsenal, which ranges from combined oral contraceptives and isolated progestogens (such as dienogest) to GnRH analogues, works on the fundamental principle of modulating the patient's hormonal environment. By inducing a state of pseudopregnancy, pseudomenopause or chronic anovulation, these therapies suppress the cyclic estrogenic and progestogenic stimulus on hormone-dependent tissues, which leads to the inactivation and atrophy of endometriosis foci and the stabilization or reduction of fibroid volume.

The most notable clinical result of this strategy is a significant reduction in dysmenorrhea, chronic pelvic pain, and the intensity of abnormal uterine bleeding, which directly translates into a significant gain in the patient's well-being and daily functioning. However, it is imperative to understand that the action of these medications is suppressive, not curative. The benefit lasts while treatment is in use, but discontinuation of therapy usually leads to recurrence of symptoms, since the anatomical pathology has not been removed. Thus, hormone therapy is strategically positioned as a long-term management for women who do not seek pregnancy, or as an adjuvant therapy, either to prepare for surgery or to prevent postoperative recurrences.

The diversity of therapeutic options, each with a distinct profile of benefits, risks and impact on fertility, makes individualized care an absolute necessity in modern gynecology. The decision-making process does not follow a rigid and universal algorithm; on the contrary, it requires a multifactorial and holistic assessment that considers the particularities of each case. This detailed mapping takes into account, on the one hand, the factors of the disease, such as the specific diagnosis, the severity of the symptoms and the anatomical characteristics of the lesions (for example, the location of a fibroid or the depth of an endometriosis focus). On the other hand, and with equal or greater importance, the patient's factors are considered, such as her age, ovarian reserve, comorbidities and, crucially, her priorities and life plan.

The vehicle for this personalization is the practice of shared decision making (SDM). In this partnership model, the healthcare team provides clear, evidence-based information about the different treatment pathways, including their success rates, potential complications, and impact on each outcome of interest. The patient, in turn, contributes her unique expertise about her own life: her values, her risk tolerance, her social context, and, most importantly, the weight she places on motherhood in relation to pain relief. The ultimate goal is not persuasion, but the joint construction of a treatment plan that is both technically sound and deeply aligned with the woman's biography and desires, which has been shown to increase satisfaction and adherence to treatment.

Thus, the basis of treatment for infertility in women with PCOS, especially those who are overweight or obese, is unequivocally lifestyle modification (LSM). Implementing a diet and regular physical activity plan, even if it results in modest weight loss, has a profound impact on improving insulin sensitivity, reducing androgen levels, and, consequently, restoring menstrual cyclicity and spontaneous ovulation in a significant proportion of patients. When LSM proves insufficient, the first-line pharmacological therapy for ovulation induction, according to the most current guidelines, is letrozole, an aromatase inhibitor that has higher live birth rates than traditional clomiphene citrate. Surgical intervention, such as laparoscopic ovarian drilling, currently occupies a second- or

third-line position, reserved for specific cases of drug resistance, a role notably distinct from the centrality that surgery occupies in the management of infertility associated with anatomical causes.

In parallel with the evolution of clinical strategies, the rise of minimally invasive surgery represents a revolution in the surgical approach to endometriosis and uterine fibroids, fundamentally changing the risk-benefit calculation for patients. This approach mainly encompasses laparoscopy and hysteroscopy, which allow complex procedures to be performed through minimal incisions or via natural routes. Through these techniques, it is possible to precisely perform the excision of foci of endometriosis, the lysis of pelvic adhesions (adhesiolysis) and myomectomy, as well as the removal of submucosal fibroids and polyps via hysteroscopic surgery, which projects directly into the uterine cavity and is crucial for fertility.

When compared to traditional laparotomy surgery (abdominal incision), the minimally invasive approach offers substantial advantages that directly impact postoperative quality of life. These benefits, proven by numerous studies, include less pain, a significant reduction in intraoperative blood loss, a shorter hospital stay, and a considerably faster return to daily and professional activities. With regard to fertility, minimally invasive surgery not only demonstrates success rates comparable to those of the open approach, but it is postulated that, by reducing tissue trauma, it can minimize the formation of postoperative pelvic adhesions, a critical factor in maintaining tubal and ovarian function.

At a different strategic level, the role of Assisted Reproductive Technologies (ART), with In Vitro Fertilization (IVF) as its main exponent, has evolved from a mere last resort to a primary therapeutic route in specific scenarios. The decision of when and whether to indicate ART in the management of infertility associated with these diseases is today one of the most important discussions. Factors such as the woman's advanced age and low ovarian reserve, for example, may lead to the indication of direct IVF, bypassing surgery for endometriosis that could, paradoxically, further reduce the egg reserve. Likewise, in cases of bilateral tubal obstruction due to endometriosis, ART is the most direct and effective route to pregnancy.

The mechanism by which IVF works is to circumvent several barriers imposed by the disease. Specifically in endometriosis, it overcomes the obstacle of damaged fallopian tubes and the pelvic inflammatory environment by performing fertilization in the laboratory. For women with fibroids that do not distort the uterine cavity, IVF may be an option to avoid complex surgery. In the context of PCOS, the technology offers superior control over the ovarian response, allowing the transfer of a single embryo and drastically reducing the risk of multiple pregnancies, a frequent complication of ovulation induction with gonadotropins. Therefore, ART is not only an alternative, but a strategic tool that, when carefully integrated into surgical and clinical planning, optimizes the chances of reproductive success.

IV. Conclusion

A comprehensive review of the scientific literature on the treatment of endometriosis, uterine fibroids and polycystic ovary syndrome (PCOS) led to the overwhelming conclusion that there was no universally superior therapy, but rather a spectrum of options whose efficacy was strictly dependent on the objectives and clinical context of each patient. The evidence unequivocally demonstrated the existence of a fundamental therapeutic dichotomy between symptom control to improve quality of life and fertility optimization. It was consistently observed that hormonal therapies, by suppressing the hormonal axis, were highly effective in managing chronic pelvic pain and abnormal uterine bleeding, but this efficacy came at the cost of an anovulatory state, inherently incompatible with immediate conception.

In this context, surgical intervention has had its dual role solidified. Conservative surgery, driven by the rise of minimally invasive techniques such as laparoscopy and hysteroscopy, has been confirmed as the gold standard approach for women with reproductive desire, as it allows the removal of pathology while preserving anatomy and fertility potential, in addition to offering a faster recovery. In contrast, radical surgery, such as hysterectomy, has been established as a definitive and highly effective solution for symptomatic relief in women with established offspring and refractory disease. Furthermore, it has been elucidated that PCOS required a distinct approach, focused primarily on lifestyle modification and pharmacological induction of ovulation, rather than on structural surgical interventions.

Finally, it was concluded that Assisted Reproductive Technologies, especially in vitro fertilization, have evolved from a last resort to a primary strategic option in many scenarios, offering a parallel and effective route to motherhood. The most relevant conclusion that emerged from the body of evidence was, therefore, that the optimal management of these conditions resided in the individualization of care. The best therapeutic approach was the one that resulted from a process of shared decision-making, in which medical evidence was carefully weighed together with the values, priorities and life project of each woman, establishing this model of patient-centered care as the pillar of modern gynecology.

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