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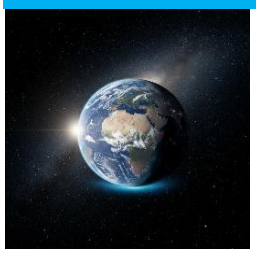

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Multifaceted approach to Endometriosis: A review of clinical challenges, psychological impact, and quality of life

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Abstract

Background: Endometriosis is a chronic, systemic inflammatory condition affecting approximately 10% of women worldwide. Despite its prevalence, it remains characterized by a significant diagnostic delay of 7–10 years and a profound impact on psychological well-being and socio-economic productivity. This review aims to evaluate the shift toward non-invasive diagnostic pathways and the integration of multimodal, patient-centered management strategies.
Methods: A comprehensive literature review was conducted, focusing on the latest clinical guidelines (2022–2024) and emerging innovations through 2026. The analysis includes the role

of high-resolution imaging (TVUS/MRI), molecular biomarkers (salivary miRNA), and the application of Artificial Intelligence in lesion mapping.

Results: Current evidence indicates a definitive paradigm shift from invasive laparoscopy toward a "non-invasive first" diagnostic approach. Innovations in AI-enhanced imaging and phenotype-based classification allow for earlier, more precise interventions. Furthermore, non-pharmacological strategies, particularly Exercise-Induced Hypoalgesia (EIH) and anti-inflammatory nutritional interventions (Low-FODMAP), demonstrate significant efficacy in managing chronic pain and improving Quality of Life (QoL).

Conclusions: Addressing the global burden of endometriosis requires a multidisciplinary approach that transcends traditional gynecological boundaries. Transitioning to phenotype-specific diagnostics and holistic care models is essential for the sustainability of healthcare systems and for restoring the quality of life for millions of affected women by 2050.

Keywords: Endometriosis, Chronic Pelvic Pain, Quality of Life, Artificial Intelligence, Exercise-Induced Hypoalgesia, Personalized Medicine, Non-invasive Diagnostics.

1. Introduction

Endometriosis is a chronic, estrogen-dependent inflammatory condition characterized by the presence of endometrial-like tissue outside the uterine cavity [1, 2]. Affecting approximately 10% of women of reproductive age worldwide, it represents a significant global health burden [2, 3]. Although traditionally viewed as a pelvic disease, contemporary medical perspectives increasingly define it as a complex systemic disorder with far-reaching implications for female health [1]. The ectopic implants, most commonly found on the pelvic peritoneum, ovaries, and rectovaginal septum, trigger a cascade of chronic inflammatory responses, leading to fibrosis, adhesion formation, and debilitating pain [2].

Clinically, the disease manifests in three distinct phenotypes, each posing unique diagnostic and therapeutic challenges [3]:

- Superficial Peritoneal Endometriosis (SUP): often subtle and difficult to detect via conventional imaging.
- Ovarian Endometriomas (OMA): commonly referred to as "chocolate cysts," which serve as a significant marker for disease severity.
- Deep Infiltrating Endometriosis (DIE): the most aggressive form, involving the penetration of the peritoneum by more than 5 mm and often invading adjacent organs, such as the bladder or bowel.

The hallmark of the disease is its multifaceted symptomatology, dominated by chronic pelvic pain, dysmenorrhea, dyspareunia, and infertility [1, 2]. However, the impact of endometriosis extends far beyond physical symptoms, significantly impairing the psychological well-being and social functioning of patients [3, 5, 9]. Despite its high prevalence, the condition remains one of the most underdiagnosed in gynecology. A critical challenge in clinical practice is the "diagnostic delay," which averages between 7 and 10 years from the onset of symptoms to a definitive diagnosis [4]. This delay is often driven by the normalization of menstrual pain by both patients and healthcare providers, as well as a lack of reliable, non-invasive screening tools. Furthermore, prolonged periods without appropriate management may lead to the central sensitization of pain, complicating long-term treatment outcomes [4, 5].

The socio-economic impact of endometriosis is immense, with the disease often compared to other major chronic conditions, such as diabetes or rheumatoid arthritis, in terms of societal cost. Recent evidence emphasizes that this burden is predominantly driven by indirect costs, particularly absenteeism and "presenteeism" (reduced effectiveness at work), which significantly drain national healthcare systems and global economies [5]. These challenges are exacerbated by the fact that the disease primarily affects women during their most educationally and professionally formative years, leading to long-term career disruption and financial instability. Given its systemic nature and the profound diagnostic and economic challenges, a multidisciplinary approach focusing on both clinical outcomes and long-term quality of life (QoL) is essential for modern management [1, 5, 9].

2. Pathogenesis and Pathophysiology

2.1. From Retrograde Menstruation to Modern Theories

The pathogenesis of endometriosis is complex and inherently multifactorial. Historically, the most widely accepted explanation has been Sampson’s theory of retrograde menstruation, which proposes that menstrual blood containing endometrial fragments flows through the fallopian tubes into the peritoneal cavity [2, 7]. However, as retrograde menstruation occurs in the vast majority of women, it is evident that additional factors—such as genetic predisposition, hormonal dysfunction, and immune dysregulation—must be present for the disease to manifest clinically [7]. Contemporary perspectives also incorporate the role of progenitor stem cells and coelomic metaplasia, providing a plausible explanation for cases of extra-pelvic endometriosis [7, 8].

2.2. Genetic and Molecular Foundations

Recent genomic advancements have provided deeper insights into the disease's etiology. Large-scale genome-wide association studies (GWAS) and comprehensive meta-analyses have identified 42 genome-wide significant loci and specific polymorphisms associated with an increased risk of endometriosis [6]. These findings reveal a strong hereditary component and a shared genetic architecture with other chronic pain conditions, such as migraines and inflammatory disorders [6]. Such genetic variations often affect pathways related to cell adhesion and angiogenesis, thereby facilitating the survival, attachment, and proliferation of ectopic endometrial-like tissue [6, 7].

2.3. Inflammation, Oxidative Stress, and Immune Evasion

The persistence of ectopic lesions is sustained by a localized inflammatory environment and significant oxidative stress. These implants escape immune surveillance through complex mechanisms of "immune evasion," where altered macrophage activity and T-cell dysfunction fail to clear the abnormal tissue [7]. This chronic inflammation, coupled with local estrogen production within the lesions, creates a self-perpetuating cycle. This cycle drives lesion growth, induces fibrosis, and promotes the sensitization of peripheral nerves, ultimately leading to the debilitating pain symptoms characteristic of the disease [1, 7].

3. Diagnostics and Clinical Challenges

3.1. The Paradigm Shift Toward Non-invasive Diagnosis

The clinical approach to diagnosing endometriosis has undergone a fundamental transformation. Historically, laparoscopy was considered the mandatory "gold standard" for diagnosis, often contributing to the significant diagnostic delay of 7–10 years observed globally [4]. However, contemporary international guidelines now advocate for a "non-invasive first" approach [3, 8]. High-quality imaging can now reliably identify ovarian endometriomas (OMA) and deep infiltrating endometriosis (DIE) without the need for immediate surgical intervention. This shift significantly reduces the risks associated with unnecessary procedures and allows for earlier initiation of medical management [5, 8].

3.2. Standardized Imaging Protocols: TVUS and MRI

The efficacy of non-invasive diagnosis depends heavily on the use of standardized protocols and expert interpretation. According to the 2024 International Consensus Statement, Transvaginal Ultrasound (TVUS) and Magnetic Resonance Imaging (MRI) are recognized as complementary tools that are highly accurate in detecting deep lesions [8]. While TVUS

remains the preferred first-line tool due to its dynamic nature and ability to assess the 'sliding sign,' MRI is indispensable for mapping extra-pelvic lesions and providing a more comprehensive anatomical overview in complex surgical cases [8]. The integration of both modalities ensures the highest diagnostic sensitivity for DIE, allowing for precise preoperative mapping in the rectovaginal septum, bladder, and bowel—information critical for surgical planning and referral to specialized centers [5, 8].

3.3. Toward Precision Medicine and Holistic Care

The future of endometriosis management lies in the era of precision medicine, where diagnostic strategies are increasingly tailored to the individual's genetic and clinical profile [9]. While a definitive peripheral biomarker for superficial peritoneal endometriosis (SUP) remains a challenge, modern diagnostic algorithms are evolving to integrate clinical history with advanced imaging and molecular insights [6, 9]. This comprehensive approach acknowledges that the disease impacts sexual and reproductive health across the entire lifespan, necessitating a move beyond mere lesion detection toward a holistic assessment of the patient’s overall well-being and quality of life [1, 9].

4. Psychological Impact and Quality of Life (QoL)

4.1. Psychological Distress and Chronic Pain

The burden of endometriosis is intrinsically linked to significant psychological distress. Chronic pelvic pain is not merely a physical symptom but a primary driver of anxiety and depressive disorders, which are observed at high frequencies in clinical populations, including those in Poland [10]. Recent data indicates that the severity of these symptoms is closely correlated with the duration of the disease and the intensity of perceived pain, creating a cycle of distress that requires integrated psychological support within the gynecological framework [3, 10].

4.2. Impact on Daily Functioning and Quality of Life (QoL)

Endometriosis exerts a profound impact on the "lived experience" of patients across multiple domains. Research utilizing standardized QoL assessments reveals that women with endometriosis score significantly lower in areas such as vitality, social functioning, and emotional well-being compared to healthy counterparts [10]. The disease-specific challenges, including dyspareunia and the unpredictability of pain flare-ups, contribute to a diminished sense of femininity and social isolation [9, 10]. Furthermore, the impact on professional life—manifesting as reduced effectiveness and absenteeism—reinforces the status of endometriosis as a major public health issue that demands a holistic, patient-centered approach [5, 10].

4.3. Infertility and Reproductive Distress

Infertility affects approximately 30–50% of women with endometriosis, representing one of the most significant psychological stressors associated with the disease [2, 11]. The complex pathophysiology—ranging from anatomical distortions and pelvic adhesions to altered oocyte quality and impaired implantation—often necessitates long-term assisted reproductive technology (ART) treatments [11]. The intersection of chronic pain and reproductive failure leads to a specific form of "reproductive distress," characterized by heightened anxiety during menstrual cycles and a diminished sense of self-worth. Studies emphasize that for many patients, the threat of permanent infertility is a more dominant factor in the decline of life satisfaction than painful symptoms alone, necessitating early fertility counseling as a core component of holistic management [9, 11].

4.4. Physical Activity and Neuromodulation

The clinical application of exercise in endometriosis management is deeply rooted in the physiological phenomenon of Exercise-Induced Hypoalgesia (EIH). Research demonstrates that structured exercise interventions can effectively modulate pain processing, leading to increased pain thresholds through the activation of endogenous inhibitory pathways [27]. For patients suffering from chronic pelvic pain, where central sensitization often exacerbates symptoms, leveraging the neuromodulatory effects of regular physical activity offers a potent, non-pharmacological strategy to improve both functional capacity and overall quality of life [12, 13, 27].

5. Management and Therapeutic Strategies

5.1. Hormonal and Medical Management

Hormonal therapy remains the cornerstone of medical management for endometriosis, aiming to suppress ovarian function and create a hypoestrogenic environment [3, 5]. This approach is crucial for reducing pain, controlling lesion growth, and preventing disease progression [1, 5]. First-line treatments typically include combined oral contraceptives and progestogens, such as dienogest, which are effective in inhibiting endometrial tissue proliferation and reducing inflammation [16]. Recent expert consensus indicates that long-term dienogest treatment (exceeding 6 months) is both effective and well-tolerated, offering sustained pain relief and a favorable safety profile regarding bone mineral density when managed appropriately [15].

However, for patients with severe symptoms or deep infiltrating endometriosis (DIE), second-line agents are often necessary. The recent development of oral GnRH antagonists, specifically relugolix combination therapy, has revolutionized this field [14]. Phase 3 studies demonstrated

that relugolix significantly reduces both dysmenorrhea and non-cyclic pelvic pain within weeks of initiation, with a substantial portion of patients achieving clinically meaningful pain reduction [14]. Furthermore, this therapy has been shown to improve overall quality of life by mitigating fatigue and improving daily functioning [14]. Additionally, the levonorgestrel-releasing intrauterine system (LNG-IUD) is highly effective in reducing dysmenorrhea and is often recommended for women seeking long-term contraception alongside symptom management [3, 5, 16].

While effective, hormonal therapies are associated with distinct side-effect profiles that necessitate individual tailoring. Dienogest is generally well-tolerated, with irregular bleeding being the most common adverse effect [15]. In contrast, GnRH antagonists provide rapid pain relief but are associated with vasomotor symptoms, such as hot flashes, and a potential, dose-dependent decrease in bone mineral density if used without add-back therapy [14]. The selection of therapy must therefore balance efficacy with the patient's lifestyle and long-term safety profile [3, 5].

5.2. Surgical Management and Precision Techniques

Surgical intervention is indicated for patients with severe pain refractory to medical treatment, infertility associated with anatomical distortions, or complications related to Deep Infiltrating Endometriosis (DIE) [3, 8]. The modern surgical paradigm emphasizes radical excision of all visible lesions rather than ablation. Systematic evidence confirms that excision is associated with significantly lower recurrence rates of both pain and lesion persistence compared to ablation techniques, particularly in cases of minimal to mild disease where long-term symptom relief is the primary goal [5, 16].

In complex cases involving the bowel, bladder, or ureters, a multidisciplinary approach involving colorectal or urological surgeons is essential to minimize surgical risks and ensure optimal outcomes for the patient [5]. Furthermore, precision techniques, including advanced laparoscopy and robot-assisted surgery, allow for superior visualization of pelvic anatomy and meticulous preservation of healthy tissue, which is critical in fertility-sparing procedures for ovarian endometriomas [8, 11].

Robotic-assisted laparoscopy offers particular advantages in navigating complex anatomical planes during the excision of deep infiltrating lesions, enhancing surgical precision in tight pelvic spaces and potentially reducing intraoperative complications [17]. The ultimate goal of surgical management is to restore normal pelvic anatomy and improve functional outcomes, thereby significantly enhancing the patient's long-term quality of life [5, 11].

5.3. Complementary and Integrative Therapies

Given the chronic nature of endometriosis and the limitations of conventional medical and surgical treatments, many patients seek complementary and integrative therapies to enhance their quality of life [11, 13]. Dietary modifications have emerged as a primary supportive strategy; recent evidence highlights that specific anti-inflammatory dietary patterns can significantly alleviate pain intensity and improve overall quality of life, particularly in patients with complex phenotypes such as ovarian and deep infiltrating endometriosis [18]. These nutritional interventions are thought to modulate systemic inflammation and oxidative stress, offering a valuable non-pharmacological adjunct to standard care [18].

Furthermore, the adoption of a low-FODMAP diet has been clinically proven to alleviate the significant gastrointestinal burden often referred to as "endobelly." Results from the EndoFOD randomised controlled trial demonstrate that a structured 28-day low-FODMAP intervention significantly reduces abdominal bloating and gastrointestinal distress, which frequently co-occur with pelvic pain, thereby offering a targeted strategy for managing the complex symptomatology of the disease [19].

Beyond nutrition, pelvic floor physiotherapy is increasingly recognized as an essential component of multidisciplinary care. A recent comprehensive meta-analysis confirmed that targeted physiotherapy interventions significantly reduce endometriosis-associated pelvic pain by addressing pelvic floor hypertonicity and myofascial trigger points that develop as a secondary response to chronic inflammation [20]. These manual and biofeedback techniques lead to improved functional outcomes and sexual health by breaking the cycle of musculoskeletal dysfunction [20].

Finally, psychotherapeutic support, particularly Cognitive-Behavioral Therapy (CBT) and mindfulness-based interventions, plays a vital role in managing the psychological burden of the disease. These therapies empower patients with coping mechanisms to navigate the pain-distress cycle and the anxiety associated with this unpredictable chronic condition, ultimately fostering resilience and long-term well-being [10].

6. Future Directions and Innovations in Endometriosis Care

The landscape of endometriosis management is currently undergoing a transformative shift, driven by the integration of digital health, molecular diagnostics, and personalized medicine. These innovations aim to close the "diagnostic gap" [4] — the period of 7 to 10 years that patients typically wait for a definitive diagnosis — and move toward a more efficient, non-invasive clinical pathway.

6.1. Artificial Intelligence and Machine Learning in Imaging

The integration of Artificial Intelligence (AI) into diagnostic imaging represents a significant leap toward standardizing care. Recent breakthroughs include the development of comprehensive multi-modal pelvic MRI datasets specifically designed for deep learning-based organ and lesion segmentation in endometriosis [21].

Deep learning algorithms, particularly convolutional neural networks (CNNs), are being trained to recognize the subtle "shadow signatures" of deep infiltrating lesions that may be overlooked by non-expert practitioners. These datasets allow for the training of advanced neural networks that can automatically identify and segment pelvic organs, facilitating more accurate localization of deep infiltrating lesions and providing a standardized "surgical roadmap" that enhances safety during complex operations near the ureters or bowel [8, 21].

6.2. Non-Invasive Biomarkers and Salivary Diagnostics

The transition from invasive laparoscopy to molecular diagnostics is spearheaded by the discovery of specific microRNA (miRNA) signatures. miRNAs are stable, non-coding RNA molecules that regulate gene expression; a specific salivary signature has been identified that can distinguish patients with endometriosis with high sensitivity and specificity [22].

However, the quest for a non-invasive "gold standard" encompasses a broader spectrum of biomarkers, including inflammatory cytokines and oxidative stress markers found in blood and urine [23]. While traditional markers like CA-125 suffer from low specificity, current "state of the art" perspectives suggest that a multi-omics approach — integrating genomic, proteomic, and metabolomic data — offers a much more robust diagnostic accuracy than any single marker alone [2, 23]. Furthermore, the development of patient-derived organoids from endometrial tissue now allows for the capture of clinical heterogeneity and high-throughput drug screening, bridging the gap between molecular diagnosis and personalized therapy [24]. This potentially reduces the time to diagnosis from years to days, allowing for earlier intervention and better preservation of fertility [11].

Table 1. Comparative Analysis of Current and Emerging Diagnostic Modalities in Endometriosis Management.

Diagnostic Modality	Type	Sensitivity / Specificity	Advantages	Limitations	Key References
Laparoscopy	Invasive (Gold Standard)	High / High	Allows for direct visualization and immediate surgical intervention.	Requires general anesthesia; carries surgical risks; high cost.	[3, 5]
TVUS / MRI	Non-invasive Imaging	Moderate to High (Expert-dependent)	Widely available; highly effective for detecting deep lesions (DIE).	Highly operator-dependent; often misses superficial lesions.	[8, 21]
Salivary miRNA	Non-invasive Molecular	Very High (>90%)	Rapid and painless; suitable for screening in primary care.	Still transitioning from clinical validation to routine practice.	[22, 23]
AI-Enhanced MRI	Digital Innovation	High (Standardized)	Minimizes inter-observer variability; provides automated mapping; supports phenotype-based classification.	Requires high-quality standardized datasets and specialized software.	[21, 30]

Notes: Abbreviations: DIE, Deep Infiltrating Endometriosis; miRNA, microRNA; MRI, Magnetic Resonance Imaging; TVUS, Transvaginal Ultrasound. Data synthesized by the author based on the clinical guidelines and studies cited in the 'Key References' column.

6.3. Phenotype-Based Classification and Precision Therapeutics

The most recent paradigm shift in 2026 emphasizes that endometriosis should no longer be treated as a monolithic condition, but as a complex systemic disease requiring phenotype-based classification [30]. By integrating clinical symptoms with molecular profiles and imaging data, healthcare providers can now move toward truly personalized therapy. This approach aims to match specific pharmacological agents to the individual's biological phenotype, potentially increasing treatment efficacy and reducing the trial-and-error period that many patients currently endure [9, 30]. Furthermore, this personalized framework incorporates the systemic implications of the disease, addressing co-morbidities and the overall physiological impact beyond the pelvic cavity [1, 30].

7. Socio-Economic Perspectives and Conclusions

7.1. The Economic Burden and Productivity Loss

The global burden of endometriosis transcends individual clinical symptoms, manifesting as a significant socio-economic challenge that impacts national healthcare systems and global economies. Systematic reviews of the economic implications of the disease emphasize that the total cost is comparable to other major chronic conditions, such as diabetes or rheumatoid arthritis [26]. A critical finding in recent pharmacoeconomic analyses is that the majority of these costs are indirect, resulting from productivity loss among women in their most educationally and professionally formative years [26].

This "hidden cost" of endometriosis is primarily driven by absenteeism and "presenteeism"—where patients are physically present at work but function at significantly reduced effectiveness due to chronic pain and fatigue [5, 26]. Furthermore, the financial strain is often exacerbated by the long diagnostic delay, which leads to years of ineffective treatments and repeated consultations before a specialized management plan is established [4, 26].

7.2. Global Trajectory and Future Sustainability

The longitudinal projections provided by the Global Burden of Disease study suggest that without significant intervention, the prevalence of endometriosis will continue its upward trajectory through 2050 [28]. This emphasizes that the clinical and psychological innovations discussed in this review are not merely options, but necessities for the sustainability of future gynecological healthcare. The transition toward non-invasive, phenotype-specific diagnostics is the only viable method to alleviate the impending pressure on global healthcare infrastructures [28, 30].

7.3. Final Remarks

In conclusion, endometriosis is a systemic, life-altering condition that demands a multifaceted response. Bridging the "diagnostic gap" is not only a clinical necessity but an economic and social imperative. By integrating AI-enhanced imaging, salivary biomarkers, and personalized, phenotype-based therapies, the medical community can move toward a proactive, patient-centered model of care. Restoring the quality of life for millions of women worldwide remains the primary goal for the next decade of gynecological excellence [29, 30].

8. Discussion

8.1. The Paradigm Shift in Diagnostics: Beyond the "Gold Standard"

The findings of this review highlight a fundamental shift in the diagnostic approach to endometriosis. For decades, the reliance on laparoscopy as the "gold standard" created an inherent barrier to early intervention, contributing to the systemic diagnostic delay of 7–10 years **[4]**. However, the integration of high-resolution TVUS and MRI protocols, as supported by the 2024 International Consensus **[8]**, suggests that non-invasive mapping is now sufficiently accurate for clinical decision-making. The emergence of salivary miRNA signatures **[22]** and AI-enhanced imaging **[21]** further challenges the requirement for surgery for diagnostic purposes alone. The clinical implication is clear: the "gold standard" is evolving from a purely surgical procedure to a multi-modal, digital-molecular hybrid approach that prioritizes patient safety and early detection.

8.2. Holistic Management: The Role of Physical Activity and Nutrition

A significant finding in this analysis is the potency of non-pharmacological interventions. While hormonal treatments like dienogest or GnRH antagonists remain essential **[14, 15]**, they often fail to address the musculoskeletal and gastrointestinal comorbidities of the disease. The clinical application of Exercise-Induced Hypoalgesia (EIH) **[27]** and pelvic floor physiotherapy **[20]** offers a promising avenue for managing central sensitization—a neurophysiological state where the nervous system remains in a high-alert pain mode even after lesion removal. Furthermore, the success of the EndoFOD trial **[19]** indicates that dietary management of "endobelly" is not merely a lifestyle choice but a therapeutic necessity that significantly improves daily functioning and social confidence.

8.3. Socio-Economic Resilience and the 2050 Challenge

The intersection of epidemiology and economics presented in this review reveals a looming crisis. With projections suggesting an upward trajectory of the global disease burden through

2050 **[28]**, healthcare systems must move away from reactive "crisis management" of advanced DIE. The high cost of productivity loss **[26]** suggests that investing in early, phenotype-based screening **[30]** is economically superior compared to treating the long-term complications of chronic pain and infertility. The "hidden cost" of presenteeism is a call to action for employers and policymakers to recognize endometriosis as a significant factor in female workforce participation and economic stability.

8.4. Limitations and Future Research Directions

Despite the rapid advancement of molecular diagnostics, several gaps remain. The most significant is the lack of a reliable, low-cost biomarker for Superficial Peritoneal Endometriosis (SUP), which remains difficult to detect via conventional imaging. Future research should focus on the "multi-omics" approach—integrating genomic, proteomic, and metabolomic data **[23]**—to create a comprehensive diagnostic profile. Additionally, long-term longitudinal studies are needed to evaluate the efficacy of personalized, phenotype-based therapies **[30]** in reducing recurrence rates and improving reproductive outcomes over the entire lifespan of the patient.

9. Conclusions

The comprehensive analysis of contemporary endometriosis management presented in this review leads to several definitive conclusions:

- **Systemic Nature of the Disease:** Endometriosis must be redefined from a localized gynecological condition to a complex, systemic inflammatory disorder. This paradigm shift is essential for developing therapeutic strategies that address not only pelvic lesions but also the widespread neurological, immunological, and psychological manifestations of the disease.

- **Diagnostic Transformation:** The transition from invasive laparoscopy to a "non-invasive first" diagnostic pathway is now supported by high-quality imaging protocols and emerging molecular biomarkers. Standardized TVUS and MRI, enhanced by Artificial Intelligence, are critical for reducing the diagnostic gap and allowing for earlier, life-changing interventions.

- **Holistic and Multimodal Care:** Optimal management requires the seamless integration of medical therapy, surgical precision, and non-pharmacological interventions. Specifically, the application of Exercise-Induced Hypoalgesia (EIH) and anti-inflammatory nutritional patterns represents a potent, scientifically-backed strategy for managing chronic pain and enhancing the patient’s overall quality of life.

- **Socio-Economic Urgency:** The escalating global burden of endometriosis, with projections extending to 2050, poses a significant threat to global healthcare sustainability and economic productivity. Addressing the "hidden costs" of productivity loss through phenotype-based personalized medicine is no longer an option but a social imperative.
- **Future Imperatives:** Moving forward, the clinical focus must remain on precision medicine. The implementation of personalized, phenotype-specific treatment plans is the only viable path to closing the diagnostic gap and restoring the quality of life for the millions of women affected by this condition worldwide.

Disclosure

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