EARLY DIAGNOSIS OF ENDOMETRIOSIS, FERTILITY IMPLICATIONS AND THE INVESTIGATIONAL ROLE OF INOSITOL: A NARRATIVE REVIEW

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Abstract

Endometriosis is a chronic inflammatory disease that brings pelvic pain, infertility and a reduced quality of life. Recognising it earlier, and assessing patients with ultrasound early in the work-up, can shorten the diagnostic journey. This thesis summarises the evidence on sonographic diagnosis, fertility-focused management and the investigational role of myo-inositol and D-chiro-inositol. Transvaginal ultrasound remains the first-line imaging test for ovarian and deep disease, although superficial lesions can still escape detection. Inositol derivatives have biologically plausible effects on cell signalling and metabolism, but findings from PCOS research and animal models cannot, by themselves, establish therapeutic efficacy in endometriosis. Controlled studies in women with endometriosis are needed before inositol can be recommended for fertility or any other clinical outcome.

Keywords

endometriosis; early diagnosis; transvaginal ultrasound; infertility; myo-inositol; D-chiro-inositol; assisted reproductive technology.

Introduction

Endometriosis affects an estimated 190 million women of reproductive age worldwide and is defined by endometrium-like tissue outside the uterine cavity, usually accompanied by inflammation. Its presentation varies enormously: symptoms can be severe when very little disease is visible, while extensive lesions may cause surprisingly

few complaints. This variability is what makes timely recognition difficult. The ESHRE guideline advises clinicians to consider endometriosis in patients with dysmenorrhoea, deep dyspareunia, dysuria, dyschezia, cyclical bleeding from non-genital sites, fatigue or infertility [1].

Interest has also grown in nutritional and metabolic approaches, inositol derivatives among them. Most research on their use has been done in polycystic ovary syndrome, and whatever is proposed about endometriosis has to be judged on its own evidence rather than borrowed from that literature. The aim of this thesis is to summarise what is currently understood about early diagnosis and fertility in endometriosis and to take a critical look at the case for inositol supplementation.

Main part

Clinical assessment and classification. Typical complaints include painful menstruation, chronic pelvic pain, deep dyspareunia and difficulty conceiving. None of these is specific to endometriosis, so gynaecological, gastrointestinal, urinary and musculoskeletal alternatives need to be kept in view. The revised ASRM system assigns stages I–IV based on the extent of lesions and adhesions, but the stage says little about how much a patient hurts or about her chances of conceiving, so fertility counselling should never rest on stage alone [2].

Ultrasound as the first-line tool. Transvaginal ultrasound is the usual first step for identifying ovarian endometriomas and certain forms of deep disease, while a negative scan does not rule out endometriosis — least of all superficial peritoneal lesions [1]. During clinical work the author obtained illustrative transvaginal ultrasound images. One of them, shown in Figure 1, demonstrates an ovarian endometrioma measuring approximately 23 × 27 mm. A second case — a reported 7-cm left ovarian endometrioma with infertility and suspected deep infiltrating disease — illustrates how imaging and

laparoscopic surgical findings complement each other, although a single case cannot establish that ultrasound is generally superior to laparoscopy.

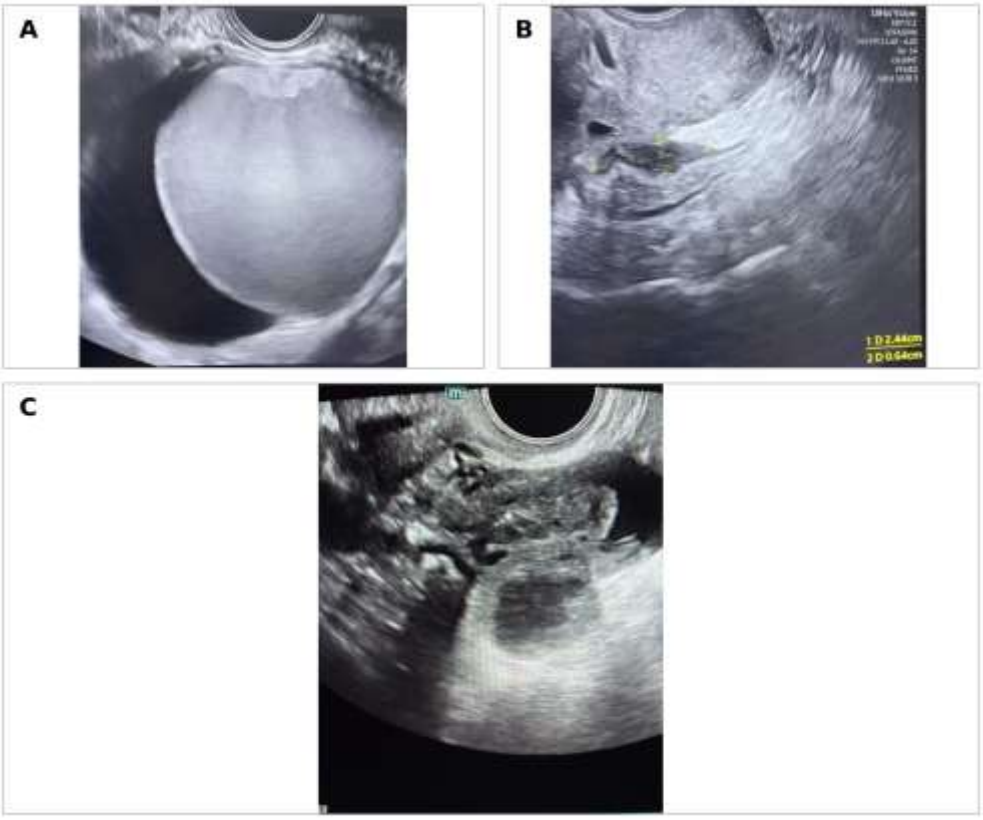


Figure 1. Author-acquired transvaginal ultrasound images of endometriosis during patient checkup with infertility. Descriptive clinical observation, not an independently verified diagnostic finding.

Fertility implications. Endometriosis-associated infertility is a heterogeneous, multifactorial process: adhesions and anatomical distortion, chronic inflammation, altered ovarian reserve and impaired endometrial receptivity all contribute, in different proportions in different patients [2]. Diagnostic delay matters all the more because ovarian reserve declines with age, and endometriomas and ovarian surgery carry particular weight in reproductive planning. Age, anti-Müllerian hormone and antral

follicle count where clinically appropriate, previous surgery and pregnancy plans inform counselling, but none of them, on its own, predicts fertility definitively.

Hormonal therapies can ease pain but generally prevent conception while in use, and ESHRE recommends against ovarian suppression given purely to improve fertility [1]. Early diagnosis, then, should not be equated with automatic surgery or one standard treatment; its real value lies in cutting short diagnostic uncertainty and clarifying reproductive priorities.

Inositol: what the evidence actually shows. A Cochrane review of inositol in subfertile women with PCOS pooled 13 trials with 1,472 participants and rated the evidence for key fertility outcomes as low or very low quality [3]. These results cannot be transplanted to endometriosis. In a preclinical mouse model, D-chiro-inositol reduced lesion counts compared with untreated controls (3.86 ± 0.69 versus 8.71 ± 1.11) and sharply reduced vascularised lesions (0.43 ± 0.55 versus 7.00 ± 1.12) [4]. These are animal findings, and mouse doses cannot be translated into a recommended human treatment. A 2025 prospective study of 205 women found that quality of life improved significantly after treatment in both early- and delayed-diagnosis groups (from about 51.7 to 38.9 and 41.4 respectively), yet the difference between the groups was not statistically significant ($p = 0.303$) [5]. Treatment, in other words, helped women regardless of when the diagnosis arrived — which tempers, without dismissing, the case for early detection.

A registered trial of D-chiro-inositol in women with endometriosis (ENDO-DCI, NCT06314126) marks a real step beyond animal research, but a completed trial is not a positive trial until its results are available.

Conclusion

Current guidance supports timely, patient-centred assessment and individualised reproductive counselling. Transvaginal ultrasound remains the first-line imaging test,

and its findings — as illustrated here — should be interpreted alongside symptoms, ovarian reserve and the patient's goals. Inositol derivatives remain an investigational option: biologically plausible, but not yet supported by controlled human evidence in endometriosis. Future trials should measure the outcomes that actually matter to patients — pain scores, quality of life, time to pregnancy, clinical pregnancy and live birth — before any recommendation can be made.

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