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REVIEW

Adenomyosis and reproductive performance after surgery for rectovaginal and colorectal endometriosis: a systematic review and meta-analysis

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Abstract The relationship between rectovaginal—bowel endometriosis and fertility is unclear. Nevertheless, extirpative surgery, including colorectal resection, is being fostered as a fertility-enhancing procedure. Adenomyosis and deep endometriosis often coexist. As the uterine condition may further impact on reproductive outcome, this work performed a systematic literature review with the objective of identifying all English-language reports on surgical treatment for rectovaginal and colorectal endometriosis, including bowel resection, in which participants were screened preoperatively for uterine adenomyosis. Risk ratios (RR) were then combined in a meta-analysis. In the five selected observational studies, in women seeking pregnancy, 7/59 (11.9%) with concomitant adenomyosis conceived, compared with 74/172 (43.0%) in those without adenomyosis. Adenomyosis was never excised. One in 10 women experienced a major surgical complication. The RR of clinical pregnancy ranged from 0.23 to 0.46, with absence of heterogeneity among studies (I^2 = 0.0%). Pooling of the results yielded a common RR of 0.32 (95% confidence interval 0.16 to 0.66). No small-study effect was detected (Egger's test). Screening for adenomyosis before suggesting difficult and risky procedures may allow

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identification of a subgroup of patients at particularly worse prognosis for which surgery would have a marginal effect on the likelihood of conception.

KEYWORDS: adenomyosis, bowel endometriosis, infertility, rectovaginal endometriosis, surgery, systematic review

Introduction

Rectovaginal and colorectal endometriosis are usually associated with pain symptoms (Chopin et al., 2005), but the role of these severe disease forms in causing infertility is less clear (de Ziegler et al., 2010; Vercellini et al., 2009a). In spite of this, radical surgery, including vaginal excision and colorectal resection, has been proposed as a fertility-enhancing procedure (Bianchi et al., 2009; Darai et al., 2010a, 2011; Mohr et al., 2005; Stepniewska et al., 2009). According to three comprehensive literature reviews (de Ziegler et al., 2010; Meuleman et al., 2011a; Vercellini et al., 2009a), pregnancy rates after excision of rectovaginal and colorectal endometriosis vary between 42% and 44%. However, interpretation of data is complicated by the often-undefined baseline fertility status of the study population. Considering only women who were infertile before surgery and who achieved conception spontaneously after surgery results in much less optimistic estimates, raising doubts on the real magnitude of the effect, if any (Vercellini et al., 2012). Unfortunately, randomized controlled trials to clarify this issue are not available and probably will never be.

Moreover, surgery for rectovaginal and colorectal endometriosis is associated with a high incidence of complications (e.g. permanent neurological bladder dysfunction and rectovaginal fistula formation). In particular, bowel resection is the main determinant of major morbidity (De Cicco et al., 2011; Douay-Hauser et al., 2011; Kondo et al., 2011a; Vercellini et al., 2009b), and some authors suggest less aggressive approaches in the absence of subocclusive symptoms (Donnez and Squifflet, 2010; Roman et al., 2013). Therefore, the preoperative counselling of infertile women whose main objective is conception is difficult, as the caring gynaecologist should balance accurately risks and benefits before suggesting the procedure. Behind the usual unfavourable prognostic factors, such as advanced age, a long period of infertility and coexisting dyspermia, attention should also be paid to concomitant conditions that could further interfere with fertility. In particular, an association has been repeatedly reported between deeply infiltrating endometriosis and uterine adenomyosis (Bazot et al., 2004; Larsen et al., 2011; Levy et al., 2013). According to Kunz et al. (2005) and Kissler et al. (2006), adenomyosis is an even more important cause of infertility than endometriosis *per se*.

Thus, patients with coexistent deep endometriosis and uterine adenomyosis may constitute a subgroup with particularly poor reproductive prognosis. Mathieu d'Argent et al. (2010) reported that the outcome of IVF in women with colorectal endometriosis is similar to that observed in women with tubal or male factor infertility. However, the same group subsequently demonstrated that the likelihood of conception is significantly reduced if IVF is performed in women with uterine adenomyosis in addition to colorectal endometriosis compared with women with colorectal endometriosis but no concomitant adenomyosis (Ballester et al., 2012).

Indeed, the relationship between adenomyosis and infertility is still unclear, and literature data are inconsistent (Campo et al., 2012; Leyendecker et al., 2006; Maheshwari et al., 2012; Matalliotakis et al., 2005; Sunkara and Khan, 2012; Tocci et al., 2008; Tomassetti et al., 2013; Vercellini et al., 2006a). Adenomyosis is currently reliably detected by both transvaginal ultrasonography (TVUS) and magnetic resonance imaging (MRI) without the need for histological examination of a biopsy specimen (Dueholm and Lundorf, 2007; Meredith et al., 2009). Therefore, the present work deemed it interesting to perform a systematic literature review and meta-analysis with the aim of defining the pregnancy rate after surgery for deep endometriosis, including colorectal resection, specifically in patients who were screened preoperatively for the presence of uterine adenomyosis associated with rectovaginal endometriosis. The study hypothesis was that patients with uterine adenomyosis in addition to rectovaginal and colorectal endometriosis have a worse reproductive prognosis than those with endometriotic lesions only. Disentangling this issue may have important implications for patient counselling, surgical strategies and women's decisions.

Materials and methods

The present literature overview was conducted according to the PRISMA guidelines for systematic reviews (Moher et al., 2009). As published, deidentified data were used and this study was exempt from Institutional Review Board approval.

Sources

This review was restricted to published research articles that compared the pregnancy rate after excisional surgery for rectovaginal and colorectal endometriosis in women with adenomyosis detected at TVUS and/or pelvic MRI with that observed in women without adenomyosis. Different strategies were adopted to identify medical papers published in the last decade on the effect of adenomyosis on reproductive outcome after surgery for deep endometriosis. A Medline search was conducted for literature published from January 2003 to August 2013 using combinations of the medical subject heading terms 'rectovaginal endometriosis', 'colorectal endometriosis', 'rectosigmoid endometriosis', 'intestinal endometriosis', 'bowel endometriosis', 'deeply infiltrating endometriosis', 'surgery', 'infertility' and 'adenomyosis'. Only those publications written in English were included. All pertinent articles were retrieved