# Benefits of pregnancy on endometriosis: can we dispel the myths?

Regression of endometriotic lesions during pregnancy was first described by Sampson in 1921. Since that time pregnancy has often been recommended by health professionals as a useful strategy to reduce disease progression and symptoms. Lack of symptoms before menarche and after menopause, both associated with amenorrhoea, further supported the hypothesis that pregnancy was beneficial. Progesterone induces endometrial atrophy and endometriotic lesions show cyclic changes such as endometrial growth and luteal transformation throughout the menstrual cycle. Progesterone levels also greatly rise during pregnancy, resulting in hormonal milieu that has been suggested to favour regression of endometriosis. On this background of "pseudopregnancy," progesterone treatment has been developed as a therapeutic approach against endometriosis and continues to be part of the therapeutic strategy against endometriosis even today.

On the other hand, endometriosis may result in severe complications during pregnancy such as intra-abdominal bleeding because of rupture of lesions (1). Therefore, knowing about the effect of pregnancy on the development of endometriosis is important to outweigh beneficial and harmful effect in medical counseling of women with endometriosis. This is particularly important as the co-occurrence of endometriosis and pregnancy becomes more and more prevalent due to increasing success rates of modern assisted reproductive technology.

Understanding the influence of pregnancy on endometriosis is challenging. Although the use of transvaginal ultrasound has led to increased detection rates of endometriosis in pregnancy, sonographic evaluation of the ovaries is not part of routine investigations in prenatal care, and sonography does not allow reliable monitoring of non-ovarian endometriotic lesions. Retrospective studies are often biased as symptomatic lesions are more likely to be assessed and reported than asymptomatic lesions. Few studies include systematic longitudinal monitoring of endometriotic lesions throughout pregnancy and especially the years following pregnancy. In addition, the studies are heterogenous with regard to times and techniques of investigation (clinical, ultrasound, magnetic resonance imaging, surgery, histology), types of lesions investigated (ovarian, non-ovarian, specific locations), information on lesions collected (size, number, structure), other parameters, and analytical approaches. Finally, most of the studies are small, old, and most often data are extracted retrospectively from databases designed for other purposes.

We have only identified five studies of 141 women reporting longitudinal development of endometriotic lesions during and after pregnancy (2). A further six case reports provide data on the size and/or structure of endometriotic lesions during and after pregnancy (2). The results of these reports are confusing with 15% to 50% of endometriotic lesions disappearing, 34% to 65% regressing and the remaining lesions either increasing (9% to 39%) or remaining unchaned (25%) during pregnancy. Anecdotal reports also describe reduction of non-ovarian lesions or regression of endometriotic lesions during the early puerperium period, however, the majority of lesions seem not to regress (3).

Not only is the data on the general development of endometriotic lesions during pregnancy sparse, factors potentially influencing the development of endometriosis are even more difficult to evaluate. The few available studies support regression more often in the second or third than in the trimester or the lactation period. Imaging and histopathology studies of endometriotic lesions during pregnancy show that they may grow rapidly during pregnancy, making differentiation from malignant tumours challenging (3). The enlargement of endometriotic lesions and suspicious sono-morphological appearance is the most frequent reason for surgical interventions during pregnancy. Such changes are most often a result from decidualization. Decidualization has been reported in up to 77% of endometriomas, and to comparable degree (0–77%) in peritoneal, cutaneous, vesical and pulmonary endometriotic lesions although this will be impacted by the difficulty of diagnosis and monitoring of the latter during pregnancy (1, 3, 4). Decidualization is considered to be the first step towards regression, and additionally, decidualized endometriotic lesions appear to have a decreased ability to transplant. Both these mechanisms support a potentially beneficial effect of pregnancy on endometriosis. They could also explain the variations in development of endometriotic lesions as decidualization does not occur in all lesions and the degree of dezidualization may vary. The few available histopathological results show lesions with an atrophic epithelial lining, sometimes leading to diagnosing ectopic decidua instead of endometriosis (2). The currently available data do not allow any reliable conclusion on the association between disease stage and the likelihood of regression during pregnancy.

The question of whether or not pregnancy may reduce endometriosis-associated symptoms such as pain is poorly studied. While some small case series found no effect, others report a beneficial effect for different pain symptoms during pregnancy with a high recurrence after pregnancy (2, 5). However, the conclusion that pregnancy supports resolution of disease symptoms has to be interpreted with caution as endometriosis-related subfertility likely biases such association. At the same time, endometriosis-related pain often leads to ultrasound evaluation of the ovaries which in turn may eventually lead to surgical intervention during pregnancy (3, 4). In summary, currently available studies do not allow the conclusion that pregnancy may help against endometriosis-associated pain in the longer term.

In contrast to this limited data on a beneficial effect of pregnancy, a variety of studies report complications of endometriosis in pregnancy, including rupture of endometriomas, intestinal perforation, spontaneous hemoperitoneum due to ruptured blood vessels, and infection of endometriotic lesions. An association between endometriosis and increased risk for miscarriage, and preterm birth has also been described (1).

It is difficult to answer the question of whether or not pregnancy prevents recurrence of endometriosis as this association is also related to the association between endometriosis and infertility. However, it has been reported that a higher number of births is associated with a lower risk for recurrence of endometriosis (2). Although there are case reports of women diagnosed with endometriosis who were monitored through several pregnancies, the outcomes were mixed.

Although pregnancy is often recommended to reduce the development and symptoms of endometriosis, the quantity and quality of available data does not provide evidence that pregnancy is beneficial except in the cessation of menstruation and associated dysmenorrhoea. Instead the progress of endometriosis during pregnancy is variable and unpredictable. While pregnancy-associated amenorrhea likely reduces the risk for the development of new endometriotic lesions, we have limited understanding about the impact on the underlying lesions and related disease symptoms either during or following pregnancy. It is our view that pregnancy should not be suggested to women with endometriosis as a strategy for managing symptoms and reducing progression of endometriosis. The decision to have children should not be influenced by any perceived benefit of improving endometriosis but should be made solely on the wish for parenthood.

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