Best Practice & Research Clinical Obstetrics and Gynaecology 59 (2019) 132–136

Contents lists available at ScienceDirect

Best Practice & Research Clinical Obstetrics and Gynaecology

journal homepage: www.elsevier.com/locate/bpobgyn

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Role of general gynaecologists in the prevention of infertility

Ertan Saridogan, MD, PhD, FRCOG

Consultant in Reproductive Medicine and Minimal Access Surgery, University College London Hospitals, UK

Keywords:
Infertility
Prevention
Gynaecologists
Pelvic surgery
Adhesions

A B S T R A C T

Gynaecologists are frequently involved in the management of conditions that may result in reduced fertility or treatments they administer can lead to infertility. Sexually transmitted infections and pelvic inflammatory disease are the most common cause of tubal damage. Gynaecologists can play an important role in the identification and early treatment of these diseases. Pelvic surgery for conditions such as leiomyoma, ovarian cysts and endometriosis can lead to pelvic adhesions and iatrogenic infertility. By avoiding unnecessary operations by careful assessment of women with these conditions and by identifying those who can be managed without surgery, the future risk of infertility can be avoided. When surgery is clinically indicated, primary prevention of pelvic adhesions would be of paramount importance. A reliable surgical technique and the use of anti-adhesion agents may reduce the development of pelvic adhesions. Ovarian surgery for endometriomas and other benign cysts should be performed in the hands of experienced surgeons or in 'centres of clinical expertise', and maximum efforts should be made to preserve normal ovarian tissue as much as possible.

Infertility is estimated to affect approximately one in six couples [1]. Whilst some of the causes of infertility are not preventable, others may be avoidable or risk-reducing strategies may be applicable to limit occurrence or impact. Gynaecologists are frequently involved in the management of conditions that may result in reduced fertility or treatments they administer can lead to infertility. Furthermore,

E-mail address: ertan.saridogan@nhs.net.

https://doi.org/10.1016/j.bpobgyn.2019.01.014
1521-6934/

they have a role in educating their patients, and the population in general, and are in a position to increase awareness of causes of infertility.

The common causes of female infertility are ovulation disorders, tubal infertility, endometriosis and unexplained infertility [1]. This article provides an overview of what role general gynaecologists play in the prevention of infertility.

Tubal damage secondary to infection

Tubal infertility is most commonly due to pelvic inflammatory disease (PID) secondary to sexually transmitted infections (STIs). Other causes of tubal damage are postsurgical adhesions, endometriosis and intra-abdominal infections secondary to inflammatory gastrointestinal disorders and perforated appendicitis.

STIs mostly affect young population. Infection due to *Chlamydia trachomatis* is the most common reportable disease in the USA and, together with that due to *Neisseria gonorrhoeae*, is a common cause of PID [2]. Approximately 10–20% of women with untreated chlamydial infection develop PID, and up to 18% of women who develop PID eventually suffer from tubal infertility [3]. Even subclinical chlamydial and gonorrhoeal infections are associated with tubal infertility [4]. Although detection and treatment of subclinical infection may not necessarily prevent subsequent infertility [4], it is well understood that women who delay seeking treatment have a high risk of infertility [2]. Hence, identification and treatment of these women in general gynaecology clinics are likely to reduce risk of future infertility. This requires identification and screening of women at risk of STIs, low threshold for suspicion of subclinical or clinical PID, appropriate testing, early treatment and partner screening/treatment.

Postsurgical adhesions

Postsurgical adhesions are one of the most frequent side effects of abdominal and pelvic surgery. Whilst the majority of women with postoperative adhesions may not suffer any adverse outcomes, a significant number will experience infertility by distorting the pelvic anatomy and interfering with gamete and embryo transfer [5]. High-risk gynaecological procedures for adhesion formation are myomectomy, endometriosis surgery, ovarian cystectomy and tubal surgery [6]. Both laparoscopic and open procedures may cause adhesions. Adhesion formation is an inherent process in endometriosis, but adhesions after ovarian cystectomy or myomectomy are usually de novo events.

The first and most effective approach to prevention of adhesions related to surgical procedures is to avoid unnecessary operations. In the absence of significant symptoms, functional cysts can be managed expectantly, as they almost always resolve spontaneously. Similarly, operations on small and asymptomatic benign ovarian cysts are usually avoidable, as long as there is no uncertainty about the nature of the cyst.

Many women with fibroids are asymptomatic, and anxiety over future fertility may be the only reason why they seek their removal. Although the fibroids are common, they are thought to be the only cause of infertility in only 1–3% of infertile patients [7]. Adhesions are found in up to 96% of women after a laparoscopic or open myomectomy [8]. For these reasons, gynaecologists should resist the temptation to agree to a myomectomy operation in asymptomatic women who have not tried to become pregnant.

The second step of prevention is the use of a reliable surgical technique. Some of the surgical principles that may reduce adhesion formation include careful/atraumatic tissue handling, avoidance of starch-containing gloves and dry towels/sponges, diligent haemostasis, limiting use of diathermy and suture material, choosing a fine and non-reactive suture material, using frequent irrigation/aspiration to reduce drying of tissues, reducing pneumoperitoneum pressure for laparoscopic surgery and taking measures to reduce risk of infection [6]. These measures reduce but do not eliminate adhesion formation altogether. Gynaecologists who perform pelvic surgery should adopt these approaches in all women to reduce adhesion formation, particularly in those who have future fertility plans.

Use of adhesion-reducing agents is the last step in the prevention of pelvic adhesions. Site-specific mechanical barriers as physical separators are the most promising agents that aim to separate

traumatised peritoneal surfaces during the postoperative 3–5 days when peritoneal healing occurs [6]. A systematic review suggests these agents are potentially effective in reducing postoperative adhesion formation, but evidence is lacking on improved fertility outcomes [9].

Adhesion formation inside uterine cavity is another cause of infertility. Intrauterine adhesions (IUA) may form following pregnancy-related complications or intrauterine surgery. Prolonged retention of products of conception or placental material after a delivery, termination of pregnancy or surgical management of miscarriage in the presence of inflammation/infection is a well-known predisposing factor for IUA. Intrauterine surgical procedures such as hysteroscopic myomectomy and division of septum (septoplasty or metroplasty) are the other common causes of IUA. Hysteroscopic surgery, which does not extend to the level of myometrium, such as polyp removal, is less likely to cause adhesions [10]. The best approach for the management of prolonged products of conception to prevent IUA is not clearly known. As expected, avoidance of leaving placental material in the uterine cavity after delivery or ensuring complete evacuation of the uterine cavity during a termination of pregnancy or surgical management of miscarriage would be the most effective way of prevention by avoiding prolonged retention of products of conception and subsequent inflammation. Once prolonged retention occurs, the least traumatic elimination of the products of conception, use of ultrasound guidance and administration of intrauterine anti-adhesion agents may be helpful. The role of hysteroscopic tissue removal systems remains to be proven, but these systems are likely to be useful by targeted removal of the retained tissue and due avoidance of unnecessary trauma to the unaffected part of the cavity.

Hysteroscopic myomectomy is known to be associated with a significant risk of IUA. IUA formation was reported in 7.5% infertile women who underwent fibroid resection [11]. The use of a reliable surgical technique, avoiding the use of excessive diathermy and preservation of endometrium as much as possible are important steps in reducing the risk. This risk is significantly high in the presence of multiple fibroids [12]. Exposure of myometrium on opposing walls of the uterus is probably the main mechanism in this situation. Hence, resecting fibroids on opposing walls of the uterus in different sittings may be a favourable strategy to reduce the risk of IUA.

Endometriosis

Women with endometriosis are more likely to experience infertility. A prospective study showed that women with laparoscopically diagnosed endometriosis are 1.78 times more likely to experience infertility in the future [13]. It is therefore important to manage endometriosis carefully in women who have not tried for a pregnancy yet, particularly by paying attention to preservation of ovarian reserve and prevention of adhesions. Some of these women may eventually require treatment with assisted reproductive technologies, and good ovarian reserve would probably optimise their chances of a successful outcome. A Joint Working Group of European Society for Gynaecological Endoscopy, European Society of Human Reproduction and Embryology and World Endometriosis Society published recommendations on the optimal surgical techniques for endometriomas [14] and described approaches to preserve ovarian reserve. These approaches include assessment of the ovarian reserve before deciding on surgery, possible fertility preservation if ovarian reserve is already compromised, use of the least traumatic technique, application of anti-adhesion agents and referring the woman to a centre of expertise where the necessary skills for surgery are available. Post-operatively, long-term use of combined oral contraceptives, either cyclically or continuously, has been demonstrated to reduce endometrioma recurrence, and these contraceptives should be offered to those women who do not plan to become pregnant [15].

Ovarian cysts

Ovarian cysts in women are relatively common, and some of these cysts require surgical treatment because of either symptoms or anxiety on the nature of the tumour or future risk of ovarian torsion. Sometimes, repeat operations are performed for recurrent cysts or ovaries are removed because of the inability to preserve healthy ovarian tissue or clinical suspicion of possible malignancy. These operations result in diminishing ovarian function and can compromise the woman's fertility or fertility treatment in the future, as explained in the endometriosis section above. Good diagnostic assessment,

use of high quality imaging and tumour markers, when required, are essential before deciding on surgical management. Operating on functional cysts should be avoided; relatively small asymptomatic benign cysts can usually be managed expectantly, whereas normal ovarian tissue can be preserved when surgery for benign cysts is required, even if the cyst is very large. Oophorectomy for benign cysts in young women or girls is usually unnecessary. The recommendations described for the management of endometriomas above would be applicable to the other benign ovarian cysts.

Summary

General gynaecologists have a significant role to play in the prevention of infertility. Some of the causes of infertility are iatrogenic and secondary to pelvic surgery. Careful assessment of women with gynaecological conditions such as fibroids and ovarian cysts and identification of those who can be managed without surgery may avoid potentially eliminate fertility difficulties secondary to pelvic adhesions in these women. When surgery is clinically indicated, primary prevention of pelvic adhesions would be of paramount importance. The measures to avoid postoperative adhesions include the use of a reliable surgical technique and potential use of anti-adhesion agents. Ovarian surgery for endometriomas and other benign cysts should be performed in the hands of experienced surgeons or in 'centres of clinical expertise'; maximum efforts are exercised to preserve normal ovarian tissue as much as possible. General gynaecologists also have a role in the identification and early treatment of subclinical and overt STIs and pelvic infections; these efforts are likely to reduce likelihood of tubal damage and subsequent infertility.

Practice points

- Identify and treat subclinical and clinical pelvic infections
- Avoid unnecessary operations for benign conditions such as fibroids or ovarian cysts unless there is an obvious indication
- Use a reliable surgical technique to reduce pelvic or intrauterine adhesion formation
- Consider using anti-adhesion agents after pelvic and intrauterine surgery
- Aim to preserve ovarian tissue and avoid oophorectomy during surgical treatment of benign ovarian lesions

Conflict of interest

The author has no conflict of interest in relation to this article.

Appendix A. Supplementary data

Supplementary data to this article can be found online at https://doi.org/10.1016/j.bpobgyn.2019.01.014.

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