

Prevention of Adhesions in Gynecological Surgery: The 2016 Experts Recommendations on Adhesion Prophylaxis

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Abstract

Post-operative adhesions are frequent sequela of abdominal and gynaecological surgery. They are associated with a high level of morbidity. This “field guideline” was written by a panel of European experts (anti-adhesions in gynecology expert group (ANGEL) and the European Society of Gynaecological Endoscopy (ESGE), adhesion research special interest group. It aims to provide surgeons with a quick reference guide to adhesion prevention adapted to the conditions of their daily practice.

Keywords: Adhesions; Adhesiolysis; Adhesion prevention; Treatment guidelines; Anti-adhesion agents

Adhesion Prevention

It is well known that peritoneal adhesions, which could appear consequently to an inflammatory process or after surgical trauma, involve a broad spectrum of expensive, painful and difficult to treat sequela. Indistinctly of open or endoscopic surgery, the most frequent morbidities associated to adhesions are infertility, chronic abdominal pain, bowel obstruction, dyspareunia, and inadvertent enterotomy in subsequent abdominal procedures [1].

After operative hysteroscopy and sharp curettage, intrauterine adhesions also may cause amenor- or hypomenorrhea, cyclic pelvic pain, infertility, recurrent pregnancy loss and abnormal placentation [2]. Although the clinical consequences of intrauterine adhesions besides hypo- and amenorrhoea have not been elucidated yet, an association with infertility, miscarriage, premature delivery and abnormal placental invasion of the myometrium in subsequent pregnancies is suspected [2,3].

Additionally, the lysis of adhesions is followed by adhesion reformation [4] and no anti-adhesion agent had proved to prevent them at all. Therefore, symptoms related with adhesions or their complications increase the necessity of re-interventions, longer

hospital stays, extend re-intervention times and limit the use of minimally-invasive techniques [5].

Consequently, the cost to patients and the health system increases: in the UK readmissions cost £24.2 and £95.2 million at 2 and 5 years after surgery, respectively [6]. Despite this evidence, little has been invested in adhesion related research, prevention and or treatment. Moreover, many physicians are not aware of its impact on health-cost, litigation claims [7], and finally on the quality of life of their patients.

In order to enhance the awareness of adhesions, to promote scientific research and to improve adhesion-related outcomes after gynaecological surgeries, we have updated our ANGEL statement [5], providing physicians a quick reference guide to adhesion prevention, based on the best scientific evidence and expertise.

This up-dated “field guideline” (Table 1), is adapted to clinical routine and could be used as a tool in the decision-making process during the pre-surgical counselling of patients, answering frequent patients concerns on the problematic of post-operative adhesions. Again, we encourage surgeons to adopt effective measures to prevent postoperative adhesions [5,8,20-23], by following five basic rules of post-operative adhesion prevention suggested in our previous statement (Table 2), to which we added new recommendations when planning endometriosis surgery (Rule 3b) [23,24], or intrauterine procedures (Rules 3f, 4p and 4q) [23, 25]. In regards to routine second

look hysteroscopy as a prophylactic action, there is weak evidence favoring it to prevent intrauterine synechiae (Table 2) [25].

Concern	What does the evidence says?	References
When do adhesions appear?	Abdominopelvic adhesions could develop after an abdominal or pelvic infection, or after an abdominal and gynecological surgery.	[8]
How often does this occur?	1.5% in general population. 93% of patients after any abdominal or pelvic surgery. 19-90% after a postpartum uterine curettage. 33% after a hysteroscopic resection of sub-mucosal fibroids.	[2,3,9,10].
Which are the consequences of adhesions?	30% of patients will be readmitted due a complication within 10 years. 74% of cases of bowel obstruction are due to post-surgical adhesions. 56% of complications following re-interventions. 19% of enterotomy in subsequent open abdominal surgeries. 10-25% of enterotomy in subsequent laparoscopic surgeries. 20-40% of secondary female infertility.	[11-15]
Could future pregnancies be affected?	Adhesions could increase the risk of miscarriage, premature delivery and placental invasion of the myometrium.	[2,16]
Is there any difference between open and endoscopic procedures?	There is an overall risk of adhesion-related readmission following either laparoscopic or open surgery. Adhesions limit the use of minimal invasive techniques.	[17,18]
How do adhesions impact the health costs?	More re-admissions and re-interventions. Longer operation times. Longer hospital stays. More disability.	[6,19]
Based on, modified and updated from the ANGEL statement [5].		

Table 1: Quick reference guide to counsel patient on the problematic adhesions.

The present field-guideline is also provided with a flow chart when the usage of an adhesion barrier is considered during an abdominal surgery, either by laparoscopy or laparotomy (Figure 1). The decision should be based on the preoperative and intraoperative risks, according to our previously published Adhesion Risk Score, ARS [25] and to the desire of the patient. Because of the amount of variables to be calculated to establish the individual preoperative and perioperative risk, ongoing studies of our group report that, to have the ARS available as a poster or screen in the operating room facilitates this calculation in few minutes and helps surgeons to apply anti-adhesion agents only to patients who benefit most of them.

The preoperative risk sub-score evaluates the presence of previous abdominal/pelvic surgery, history of post-surgical adhesions, concomitant abdominal or gynecological inflammation and/or infection, endometriosis, cancer, radiation therapy in intra-abdominal cancer, keloid scarring, intraperitoneal bleeding, postoperative infection and postoperative complications e.g. fistulas, abscesses. The perioperative risk assessment focuses on quality of existing adhesions, severity of adhesions, procedure duration, type and site of surgery, use of electrical scalpel, excessive bleeding, procedure complexity or extent of surgery e.g. enterotomy, oncological surgery, surgery in multiple quadrants e.g. adhesiolysis, ovarian carcinoma surgery, excessive coagulation, >2 cm² intra-abdominal placement of foreign bodies e.g. meshes, and peritoneal closing. The summarizing score establishes if the surgery is at low, medium or high risk of postoperative adhesions.

The medium to high-risk range suggests the use of an anti-adhesion agent, especially after extensive adhesiolysis, procedures on the tubes, ovaries and after fertility surgeries. Although adequate surgical technique is the basis of adhesion prevention, the use of anti-adhesion agents is clinically beneficial and economically justifiable, because they reduce the burden of complications, improve the patient's quality of life, and reduce costs associated with peritoneal adhesions to the health system [22,26-28].

1. The risk of post-operative adhesions should be systematically discussed with any patient scheduled for open or laparoscopic abdominal or intrauterine surgery prior to obtaining his/her informed consent.
2. Surgeons need to act to reduce post-operative adhesions in order to fulfill their duty of care towards patients undergoing abdominal-pelvic or intrauterine surgery.
3. Surgeons should adopt a routine adhesion reduction strategy at least for patients undergoing high-risk surgery based on the previously published ANGEL Adhesion score [23]. Interventions include:
 - a) Ovarian surgery
 - b) Endometriosis surgery [24]
 - c) Tubal surgery
 - d) Myomectomy
 - e) Adhesiolysis
 - f) Uterine curettage and hysteroscopic surgery (Adhesiolysis, myomectomy, septum resection).

4. Good surgical technique is fundamental to any adhesion reduction strategy:

- a) Carefully handle tissue with field enhancement (magnification) techniques.
- b) Focus on planned surgery and, if any secondary pathology is identified, question the risk: benefit ratio of surgical treatment before proceeding.
- c) Perform diligent haemostasis and ensure adequate use of cautery.
- d) Reduce cautery time and frequency and aspirate aerosolised tissue following cautery.
- e) Exercise tissue rather than coagulate to reduce fulguration, e.g. in endometriosis.
- f) Reduce duration of surgery.
- g) Reduce pressure and duration of pneumoperitoneum in laparoscopic surgery.
- h) Reduce risk of infection.
- i) Reduce drying of tissues.
- j) Use frequent irrigation and aspiration in laparoscopic and laparotomic surgery.
- k) Limit use of sutures and choose fine non-reactive sutures.
- l) Avoid foreign bodies when possible.
- m) Avoid non-peritonised implants and meshes.
- n) Minimize use of dry towels or sponges in laparotomy.
- o) Use starch- and latex-free gloves in laparotomy.
- p) Avoid mechanical uterine curettage. Medical management of spontaneous or induced abortion may be recommended rather than surgical management. In case of uterine curettage - use aspiration technique.
- q) Reduce the use of electrosurgical energy in hysteroscopic surgery (rather use "cold" mechanical instruments).

5. Surgeons should consider the use of adhesion reduction agents as part of the adhesion reduction strategy:

- a) Give special consideration to agents with data supporting safety in routine surgery and efficacy in adhesion prevention.
- b) Practicality, ease of use, and cost of agents should influence selection for routine practice.

Based and updated from the ANGEL statement [5].

Table 2: The five basic rules of postoperative adhesions prevention in gynaecological surgery—updated 2016.

Modern non-pharmacological agents are available as films, gels, powder or fluids, and have shown to be safe and effective to reduce the risk of post-operative adhesions [29], although, the new substances lack long-term evidence [30-32]. The selection will depend on the type of surgery, extension of the surface to be covered, presence of diffuse bleeding, expected use of post-operative drainage and costs. For example, some substances should not be applied on bleeding surfaces, on sutured bowel or in the uterine cavity, and films should not be overlapped [32]. In addition, surgeons should follow the mode of use specified by the producer, and keep in mind that most of agents are not recommended in presence of infection, malignancy, bowel leakage or for intravascular use. On the other hand, non-pharmacological agents [5], which have proved to be ineffective or to impair with the normal postsurgical re-epithelialization process, like colloids, crystalloids or steroids should not be used.

Regarding operative hysteroscopy, there is limited evidence of the effectivity of hormonal or antibiotic therapies, alone or in combination with other products, to reduce the risk of uterine synechiae after gynaecological and obstetrical procedures [25,33]. In contrast, anti-adhesion gels have shown to be safe and effective (Level of evidence 1b), but more evidence is needed to establish which group of women would benefit most of this practice [25].

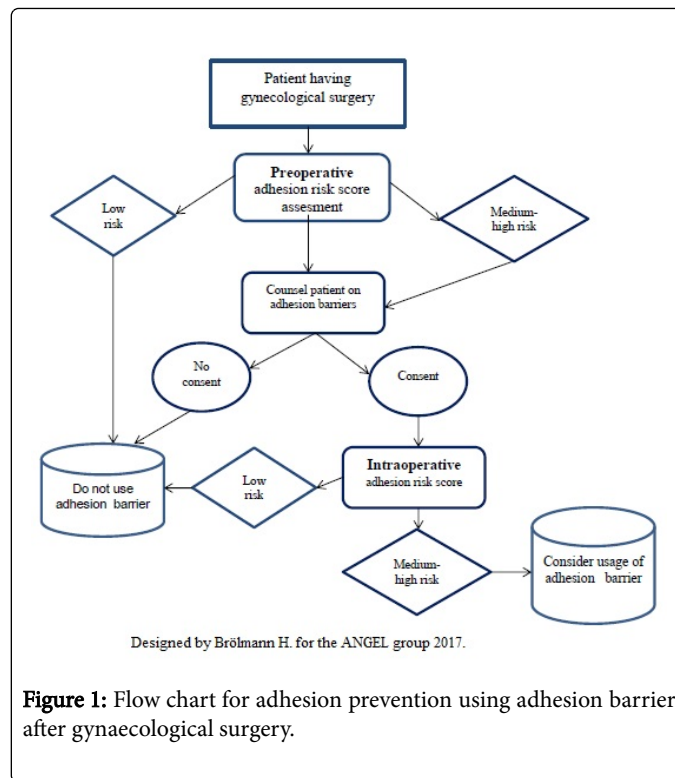


Figure 1: Flow chart for adhesion prevention using adhesion barrier after gynaecological surgery.

Conclusion

The burden of disease of peritoneal adhesions continues to be a challenge for surgeons and patients. We do encourage physicians to follow the present recommendations and flow chart, that could facilitate their own daily practice and, thereby, giving patients the best medical care. In the meanwhile, we will be paying attention to new evidence in order to up-date our risk score, flow chart and recommendations.

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Authorship

All named authors meet the International Committee of Medical Journal Editors (ICMJE) criteria for authorship for this manuscript, take responsibility for the integrity of the work as a whole, and have given final approval to the version to be published.

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Disclosure

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