

What Should I Use? Impact of Adhesion Barriers on Postoperative Abdominal Complications: A Systematic Review

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BACKGROUND

- Abdominal surgery, despite advancements, carries the risk of adhesions → can cause serious complications like intestinal blockages[1-7]
- Various barriers like Seprafilm and sprays are used to physically separate tissues and prevent adhesions[8-10]
- The safety and effectiveness of different adhesion barriers, including newer spray types and repurposed hemostatic powders, are still under investigation[11]
- No single "best" barrier exists, so surgeons need to weigh the benefits and complications of each type for optimal choice

OBJECTIVE

- To analyze the different types of adhesion barriers utilized in abdominal surgeries
- Determine the effects of adhesion barriers on postoperative outcomes in patients undergoing abdominal surgery.
- To provide updated data and insights to clinicians, ultimately to benefit patients undergoing abdominal surgery

METHODS

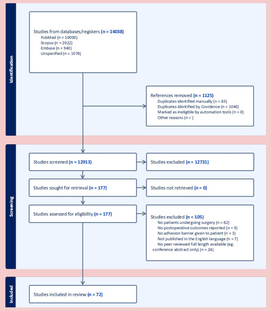
- Adhered to the PRISMA and Cochrane guidelines
- Databases searched: PubMed, EMBASE, and Scopus
- Inclusion criteria were:
  - Patients undergoing abdominal surgery
  - Patients receiving an adhesion barrier
  - Reported postoperative outcomes
  - Peer reviewed, published article
- All stages of the review were done through dual, independent review on Covidence
  - Title/ abstract
  - Full text
  - Data extraction
  - Risk of bias (ROBINS-I)
- Extraction Form:

RESULTS

General Overview:

- 72 included studies[3, 5–10, 12–76]
- 184,780 patients
- Low overall risk of bias

Figure 1: PRISMA Flowchart



Bioresorbable Membrane Adhesion Barriers:

- 48 studies utilized bioresorbable membranes such as Seprafilm and Prevadh (31,860 patients)
- 24 articles showed no statistically significant decrease in the incidence of postoperative adhesions
- Surgery types:
  - Restorative proctocolectomy and ileal J-pouch anal anastomosis with diverting ileostomy followed by second-stage laparoscopy
  - 2-Stage Hepatectomy
  - Gastrectomy
  - Hartmann procedure
  - Laparoscopic adhesiolysis

Spray Adhesion Barriers

- Six studies analyzed the efficacy of spray adhesion barriers such as SprayShield, SprayGel, AdSpray (754 patients)
- Tjandra et al., 2008 found a significant decrease in incidence of adhesions with SprayGel in patients undergoing low anterior resection or ileal pouch-anal anastomosis for rectal cancer (p<.0005)
- 3 articles showed no statistically significant decrease in the incidence of postoperative adhesions

Hyaluronic Acid Based Adhesion Barriers

- Five studies utilized hyaluronic acid-based adhesion barriers, many of which used a powder formulation (556 patients)
- Three randomized controlled trial studies showed a significant (p<.05) reduction in the incidence of postoperative adhesions

Starch Based Adhesion Barriers

- Two studies utilized a starch based medical device known as 4DryField (45 patients)
- Both studies saw a significant (p<.05) reduction in postoperative adhesions

Other Types of Adhesion Barriers

- Surgiwrap and AlloMEM had a significant reduction in postoperative adhesions in patients with colorectal disease (p<.001)
  - Surgiwrap decreased the incidence of peristomal adhesions in 180 patients undergoing laparoscopic colorectal cancer surgery (p <.001)
- Guardix-SG showed a significant reduction in postoperative adhesions in 214 patients who underwent radical gastrectomy due to a gastric adenocarcinoma (p<.05)
- Eight articles showed no statistically significant decrease in the incidence of postoperative adhesions

Table 3: Patient Outcomes Based on Adhesion Barrier Types

Adhesion Barrier Type	Patient Outcomes
Bioresorbable Membrane (e.g. Seprafilm, Prevadh) - **48 studies**	• 4 studies* • 20 studies** • 24 studies***
Spray Adhesion Barrier (e.g. SprayShield, SprayGel, AdSpray) - **6 studies**	• 2 studies* • 1 studies** • 3 studies***
Hyaluronic Acid Based Adhesion Barrier (e.g. Ventralight STTM, Intergel) - **5 studies**	• 3 studies** • 2 studies***
Starch-based Medical Device (e.g. 4DryField) - **2 studies**	• 2 studies**
Other (e.g. Surgiwrap, Guardix-SG, Adept) - **11 studies**	• 2 studies* • 1 studies** • 8 studies***

**Decrease in postoperative adhesions (p<.001)*
***Decrease in postoperative adhesions (p<.05)*
****No decrease in postoperative adhesions*

Patient Complications with the Use of Adhesion Barriers

- Six studies reported statistically significant increases in adverse events when using adhesion barriers compared to the control
- Four studies reported complications with Seprafilm including fistula formation, peritonitis, wound infection, and anastomotic leakage
- Hyaluronic acid based adhesion barriers had increased risk of adverse events for patients undergoing colorectal laparoscopic surgery for colorectal cancer, IBD, or gastrointestinal disease

CONCLUSIONS

- Our study found that in patients with significant abdominal adhesions, certain adhesion barriers may be effective to minimize the risk of postoperative bowel obstruction
- Most adhesion barriers did not demonstrate a statistically significant improvement in postoperative outcomes.
- Adhesion barriers should be considered on a case-by-case basis with respect to the patient's clinical presentation
  - They should not be utilized prophylactically in all abdominal surgeries due to their risk of significant complications
- Limited follow-up periods within included studies limit forming a comprehensive picture of the efficacy of the adhesion barriers tested and heterogeneity within the outcomes and study designs made a meta analysis unfeasible
- Future directions nclude further testing of the less common adhesion barriers such as starch based adhesion barriers, SurgiWrap, and Guardix-SG

References