



# What are the comparative outcomes of laparoscopic versus open surgical techniques in the management of intestinal obstruction in adult patients? : A Systematic Review

<sup>1</sup> Ruditya Lukman Hakim, <sup>2</sup> Rezky Putri Wahyu Agustine

<sup>1,2</sup> Faculty of Medicine, Sultan Agung Islamic University, Indonesia

Corresponding Email : [rudityalukmanh@gmail.com](mailto:rudityalukmanh@gmail.com)

## Article History :

Received date : 2025/01/04  
Revised date : 2025/03/24  
Accepted date : 2025/06/19  
Published date : 2025/09/17



**Copyright:** © 2024 by the authors. Submitted for possible open access publication under the terms and conditions of the Creative Commons Attribution (BY NC) license (<https://creativecommons.org/licenses/by-nc/4.0/>).

E-ISSN :

ISSN 3048-1368



P-ISSN

ISSN 3048-1376



## ABSTRACT

**Introduction:** Intestinal obstruction is a common surgical emergency traditionally managed by open laparotomy. While laparoscopic surgery has emerged as an alternative with documented short-term benefits, gaps remain, particularly concerning long-term outcomes like recurrence and reoperation rates. This systematic review evaluates the comparative outcomes of laparoscopic versus open surgery for intestinal obstruction in adults to consolidate current evidence and inform clinical practice.

**Methods:** This review followed PRISMA 2020 guidelines. A comprehensive search was conducted across PubMed, Springer, Google Scholar, and other databases for studies published since 2015 comparing laparoscopic and open surgery for intestinal obstruction in adults. Twenty-five studies, including RCTs, cohort studies, and meta-analyses, were selected. Data on operative metrics, recovery outcomes (length of stay, return of bowel

function), complications, mortality, and patient-centered outcomes were extracted and synthesized.

**Results:** The synthesis of evidence consistently showed that laparoscopic surgery is associated with significant short-term benefits. These include shorter hospital stays (reported in 17 studies), faster recovery of bowel function (9 studies), lower overall complication rates (20 studies), and reduced intraoperative blood loss (5 studies). Mortality was also generally lower in the laparoscopic group. However, data on operative time was conflicting, and long-term outcomes such as obstruction recurrence and reoperation rates were infrequently and inconsistently reported.

**Conclusion:** Laparoscopic surgery is superior to open surgery for managing intestinal obstruction in adults regarding short-term outcomes, demonstrating clear advantages in recovery, safety, and efficiency. Despite these benefits, a significant evidence gap exists for long-term outcomes. While laparoscopy should be the preferred initial approach, further high-quality, long-term research is needed to solidify its role as the definitive standard of care.

**Keywords:** Intestinal Obstruction, Laparoscopic Surgery, Open Surgery, Complications, Length of Stay, Systematic Review

---

## INTRODUCTION

---

Intestinal obstruction is a significant cause of acute abdominal emergencies, necessitating prompt surgical evaluation and intervention. This condition can be categorized as either mechanical or functional and arises from a diverse range of etiologies. The most common cause identified in the surgical literature is adhesive small bowel obstruction (SBO), which often develops as a complication of previous abdominal surgeries. Other significant causes include obstructing malignancies, such as colon or colorectal cancer, and conditions like sigmoid volvulus. The high prevalence of these underlying conditions makes intestinal obstruction a frequent indication for surgery, affecting a broad population of adult patients and posing a considerable challenge for healthcare systems worldwide (Cirocchi et al., 2017; Ndong and Patel, 2022; Sallinen et al., 2019; Wu and Ta, 2025).

Historically, the standard of care for surgical management of intestinal obstruction has been open laparotomy. However, the last few decades have seen a significant shift towards minimally invasive techniques, with laparoscopic surgery emerging as a viable alternative. Numerous studies have compared the two approaches, consistently demonstrating several short-term benefits for the laparoscopic technique. A substantial body of evidence indicates that laparoscopic surgery is associated with reduced intraoperative blood loss, shorter hospital stays, and lower rates of overall postoperative complications. Furthermore, patients undergoing laparoscopic procedures often experience a faster return of bowel function compared to those undergoing open surgery (Krielen et al., 2020; Sajid et al., 2016; Sallinen et al., 2019; Xu et al., 2020; Xiao-ying et al., 2015).

Despite the well-documented advantages of laparoscopy in short-term recovery, there remain inconsistencies and gaps in the existing literature. For instance, data on operative time is conflicting, with some studies reporting shorter durations for laparoscopy while others find it to be longer (Wiggins et al., 2015; Elkomos et al., 2023). More importantly, long-term outcomes are less frequently reported and not as well understood. Key areas such as the recurrence of obstruction, long-term reoperation rates, and sustained quality of life are often limited by short

follow-up periods and inconsistent data collection across studies. This sparsity of robust long-term data represents a critical gap in understanding the full comparative effectiveness of the two surgical approaches (Quah et al., 2018; Xu et al., 2020; Zhu et al., 2018).

A comprehensive synthesis of the available evidence is crucial for guiding clinical practice and standardizing surgical protocols for intestinal obstruction. Clarifying the comparative outcomes, including both the established short-term benefits and the less-understood long-term results, can empower surgeons and patients to make more informed decisions. Establishing the superiority of one approach over the other across a wider range of metrics would have significant implications for patient counseling, resource allocation, and the development of evidence-based clinical guidelines. A systematic review provides the methodological rigor needed to collate disparate findings and draw more reliable conclusions (Cirocchi et al., 2017; Krielen et al., 2020; Xu et al., 2020).

Therefore, this systematic review aims to comprehensively evaluate the comparative outcomes of laparoscopic versus open surgical techniques in the management of intestinal obstruction in adult patients. By synthesizing evidence on operative metrics, recovery outcomes, complication rates, mortality, and patient-centered outcomes, this study seeks to address the existing gaps in the literature. The goal is to provide a clear and updated overview of the evidence to determine the relative safety and efficacy of each approach, ultimately informing best practices in modern surgical care.

---

## METHODS

---

### Protocol

The study strictly adhered to the Preferred Reporting Items for Systematic Review and Meta-Analysis (PRISMA) 2020 guidelines to ensure methodological rigor and accuracy. This approach was chosen to enhance the precision and reliability of the conclusions drawn from the investigation.

## Criteria for Eligibility

This systematic review aims to evaluate the comparative outcomes of laparoscopic versus open surgical techniques in the management of intestinal obstruction in adult patients.

## Screening

We screened in sources that met these criteria:

- Population Age: Does the study focus exclusively on adult patients ( $\geq 18$  years)?
- Primary Condition: Is intestinal obstruction (mechanical or functional) the primary surgical indication in the study?
- Intervention Comparison: Does the study compare both laparoscopic and open surgical techniques for in- testinal obstruction?
- Study Design: Is the study either a primary research study (RCT, cohort study, case-control study) OR a systematic review/meta-analysis?
- Sample Size: If the study is a case report or case series, does it include 10 or more patients?
- Outcome Reporting: Does the study report at least one of the following outcomes: operative time, length of stay, complications, mortality, recovery time, conversion rates, or quality of life?

We considered all screening questions together and made a holistic judgement about whether to screen in each paper.

## Data extraction

### • Study Design:

Identify the specific type of study design. Look in the methods section for explicit description. Categorize as:

- Randomized Controlled Trial (RCT)
- Retrospective Cohort Study
- Prospective Cohort Study

- Case-Control Study
- Other (specify)

If multiple design elements are present, list all. If unclear, note "design not clearly specified". Prioritize the primary design classification used by the authors.

- **Study Setting and Context:**

Extract the following details:

- Geographic location (country, specific institution)
- Type of healthcare facility (academic medical center, university hospital, etc.)
- Time period of data collection (exact dates)

If multiple settings were involved, list all. If a specific detail is missing, note "not reported". Be precise about geographical and institutional specifics.

- **Patient Population:**

Extract:

- Total number of patients
- Age range or mean age
- Gender distribution
- Specific inclusion/exclusion criteria for small bowel obstruction
- Proportion of patients in laparoscopic vs. open surgery groups

If percentages or specific numbers are provided for subgroups, include those. If any characteristic is not reported, clearly mark as "not reported". Ensure numerical precision.

- **Surgical Intervention Specifics:**

For both laparoscopic and open surgical approaches, extract:

- Specific surgical technique used
- Operative time (in minutes)
- Estimated blood loss (in ml)

- Whether bowel resection was performed
- Surgeon experience level (if reported)

If multiple techniques are described, list all. If a specific detail is not clearly stated, mark as "not specified".

Use exact numerical values when available.

- **Primary and Secondary Outcomes:**

Extract:

- Primary outcome measures
- Secondary outcome measures
- Specific numerical results for each outcome
- Statistical significance (p-values)
- Confidence intervals (if provided)

Key outcomes to prioritize:

- Postoperative mortality
- Length of hospital stay
- Time to return of bowel function
- Surgical site infection rates
- Reoperation rates

For each outcome, include the exact numerical value, comparison between groups, and statistical significance. If an outcome is not reported, clearly mark as "not reported".

- **Risk of Bias Assessment:**

Evaluate and extract:

- Method of patient selection
- Potential sources of selection bias
- Conflicts of interest (if declared)
- Funding source

- Any limitations acknowledged by authors

### Search Strategy

The keywords used for this research based PICO :

Element	Keyword 1	Keyword 2	Keyword 3	Keyword 4
Population (P)	Intestinal obstruction	Small Bowel Obstruction	Adhesive ileus	Bowel Obstruction
Intervention (I)	Laparoscopic surgery	Minimally invasive surgery	Laparoscopic adhesiolysis	Hand-assisted laparoscopic surgery (HALS)
Comparison (C)	Open surgery	Conventional surgery	Traditional surgery	Laparotomy
Outcome (O)	Complications	Mortality	Length of stay	Quality of life

The Boolean MeSH keywords inputted on databases for this research are: (*"Intestinal obstruction" OR "Small Bowel Obstruction" OR "Adhesive ileus" OR "Bowel Obstruction"*) AND (*"Laparoscopic surgery" OR "Minimally invasive surgery" OR "Laparoscopic adhesiolysis" OR "Hand-assisted laparoscopic surgery (HALS)"*) AND (*"Open surgery" OR "Conventional surgery" OR "Traditional surgery" OR "Laparotomy"*) AND (*"Complications" OR "Mortality" OR "Length of stay" OR "Quality of life"*)

### Data retrieval

Abstracts and titles were screened to assess their eligibility, and only studies meeting the inclusion criteria were selected for further analysis. Literature that fulfilled all predefined criteria and directly related to the topic was included. Studies that did not meet these criteria were excluded. Data such as titles, authors, publication dates, study

locations, methodologies, and study parameters were thoroughly examined during the review.

### **Quality Assessment and Data Synthesis**

Each author independently assessed the titles and abstracts of the selected studies to identify those for further exploration. Articles that met the inclusion criteria underwent further evaluation. Final decisions on inclusion were based on the findings from this review process.

**Table 1.** Article Search Strategy

Database	Keywords	Hits
Pubmed	<i>("Intestinal obstruction" OR "Small Bowel Obstruction" OR "Adhesive ileus" OR "Bowel Obstruction") AND ("Laparoscopic surgery" OR "Minimally invasive surgery" OR "Laparoscopic adhesiolysis" OR "Hand-assisted laparoscopic surgery (HALS)") AND ("Open surgery" OR "Conventional surgery" OR "Traditional surgery" OR "Laparotomy") AND ("Complications" OR "Mortality" OR "Length of stay" OR "Quality of life")</i>	366
Semantic Scholar	<i>("Intestinal obstruction" OR "Small Bowel Obstruction" OR "Adhesive ileus" OR "Bowel Obstruction") AND ("Laparoscopic surgery" OR "Minimally invasive surgery" OR "Laparoscopic adhesiolysis" OR "Hand-assisted laparoscopic surgery (HALS)") AND ("Open surgery" OR "Conventional surgery" OR "Traditional surgery" OR "Laparotomy") AND ("Complications" OR "Mortality" OR "Length of stay" OR "Quality of life")</i>	10
Springer	<i>("Intestinal obstruction" OR "Small Bowel Obstruction" OR "Adhesive ileus" OR "Bowel Obstruction") AND ("Laparoscopic surgery" OR "Minimally invasive surgery" OR "Laparoscopic adhesiolysis" OR "Hand-assisted laparoscopic surgery (HALS)") AND ("Open surgery" OR "Conventional surgery" OR "Traditional surgery" OR "Laparotomy") AND ("Complications" OR "Mortality" OR "Length of stay" OR "Quality of life")</i>	5,036
Google Scholar	<i>("Intestinal obstruction" OR "Small Bowel Obstruction" OR "Adhesive ileus" OR "Bowel Obstruction") AND ("Laparoscopic surgery" OR "Minimally invasive surgery" OR "Laparoscopic adhesiolysis" OR "Hand-assisted laparoscopic surgery (HALS)") AND ("Open surgery" OR "Conventional surgery" OR "Traditional surgery" OR "Laparotomy") AND ("Complications" OR "Mortality" OR "Length of stay" OR "Quality of life")</i>	16,500
Wiley Online Library	<i>("Intestinal obstruction" OR "Small Bowel Obstruction" OR "Adhesive ileus" OR "Bowel Obstruction") AND ("Laparoscopic surgery" OR "Minimally invasive surgery" OR "Laparoscopic adhesiolysis" OR "Hand-assisted laparoscopic surgery (HALS)") AND ("Open surgery" OR "Conventional surgery" OR "Traditional surgery" OR "Laparotomy") AND ("Complications" OR "Mortality" OR "Length of stay" OR "Quality of life")</i>	2,294

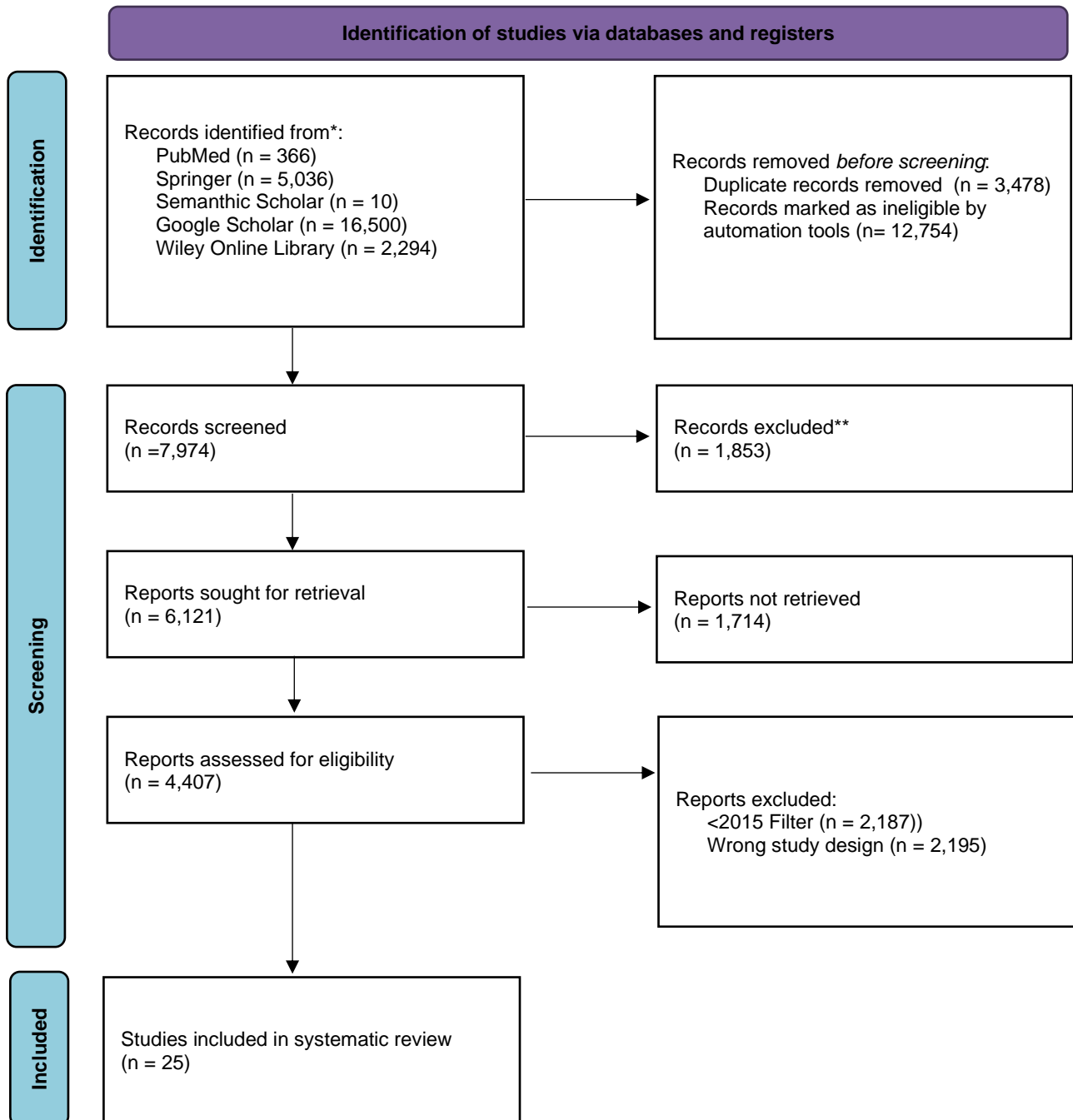


Figure 1. Article search flowchart

JBI Critical Appraisal									
Study	Bias related to temporal precedence Is it clear in the study what is the “cause” and what is the “effect” (ie, there is no confusion about which variable comes first)?	Bias related to selection and allocation Was there a control group?	Bias related to confounding factors Were participants included in any comparisons similar?	Bias related to administration of intervention/exposure Were the participants included in any comparisons receiving similar treatment/care, other than the exposure or intervention of interest?	Were there multiple measurements of the outcome, both pre and post the intervention/exposure?	Were the outcomes of participants included in any comparisons measured in the same way?	Were outcomes measured in a reliable way?	Bias related to participant retention Was follow-up complete and, if not, were differences between groups in terms of their follow-up adequately described and analyzed?	Statistical conclusion validity Was appropriate statistical analysis used?
Zhu et al., 2018	✓	✓	✓	✗	✓	✗	✓	✓	✓
Feng, 2016	✓	✓	✓	✗	✓	✗	✓	✓	✓
Li-xion, 2015	✓	✓	✓	✗	✓	✗	✓	✓	✓

Xiao-ying et al., 2015	✓	✓	✓	✗	✓	✗	✓	✓	✓
Run, 2015	✓	✓	✓	✗	✓	✗	✓	✓	✓
Cirocchi et al., 2017	✓	✓	✓	✗	✓	✗	✓	✓	✓
Ndong and Patel, 2022	✓	✓	✓	✗	✓	✗	✓	✓	✓
Wu and Ta, 2025	✓	✓	✓	✗	✓	✗	✓	✓	✓
Kanaka et al., 2024	✓	✓	✓	✗	✓	✗	✓	✓	✓
Li et al., 2015	✓	✓	✓	✗	✓	✗	✓	✓	✓
Sallinen et al., 2019	✓	✓	✓	✗	✓	✗	✓	✓	✓
Xu et al., 2020	✓	✓	✓	✗	✓	✗	✓	✓	✓
Chin et al., 2022	✓	✓	✓	✗	✓	✗	✓	✓	✓
"Analysis of the Clinical Effectiveness of Laparoscopic Surgery," 2023	✓	✓	✓	✗	✓	✗	✓	✓	✓

Quah et al., 2018	✓	✓	✓	✗	✓	✗	✓	✓	✓
Sajid et al., 2016	✓	✓	✓	✗	✓	✗	✓	✓	✓
Krielen et al., 2020	✓	✓	✓	✗	✓	✗	✓	✓	✓
Wiggins et al., 2015	✓	✓	✓	✗	✓	✗	✓	✓	✓
Elkomos et al., 2023	✓	✓	✓	✗	✓	✗	✓	✓	✓
Srinivasan et al., 2022	✓	✓	✓	✗	✓	✗	✓	✓	✓
Khawaja et al., 2015	✓	✓	✓	✗	✓	✗	✓	✓	✓
Wu et al., 2015	✓	✓	✓	✗	✓	✗	✓	✓	✓
Ivanchoy et al., 2023	✓	✓	✓	✗	✓	✗	✓	✓	✓
Weizhon, 2015	✓	✓	✓	✗	✓	✗	✓	✓	✓
Zhu et al., 2019	✓	✓	✓	✗	✓	✗	✓	✓	✓

---

## RESULTS

---

### Characteristics of Included Studies

Study	Sample Size	Surgical Indication
Zhu et al., 2018	3,293	Adhesive small bowel obstruction
Feng, 2016	138	Adhesive intestinal obstruction
Li-xion, 2015	100	Intestinal obstruction
Xiao-ying et al., 2015	120	Adhesive intestinal obstruction
Run, 2015	60	Adhesive ileus
Cirocchi et al., 2017	No mention found	Obstructing right colon cancer
Ndong and Patel, 2022	30,810	Sigmoid volvulus
Wu and Ta, 2025	100	Colon cancer with obstruction
Kanaka et al., 2024	No mention found	Obstructive colorectal cancer
Li et al., 2015	35	Acute obstructive right-sided colon cancer
Sallinen et al., 2019	104	Adhesive small bowel obstruction (SBO), high likelihood single band

Study	Sample Size	Surgical Indication
Xu et al., 2020	47,306	Adhesive small bowel obstruction
Chin et al., 2022	279	Small bowel obstruction, primary diagnosis
"Analysis of the Clinical Effectiveness of Laparoscopic Surgery," 2023	90	Intestinal obstruction, no mention found
Quah et al., 2018	38,927	Adhesive small bowel obstruction
Sajid et al., 2016	38,057	Adhesive small bowel obstruction
Krielen et al., 2020	37,007	Adhesive small bowel obstruction
Wiggins et al., 2015	No mention found	Adhesive small bowel obstruction
Elkomos et al., 2023	89	Adhesive small bowel obstruction
Srinivasan et al., 2022	36,178	Adhesive small bowel obstruction
Khawaja et al., 2015	37,038	Adhesive small bowel obstruction
Wu et al., 2015	126	Adhesive intestinal obstruction

Study	Sample Size	Surgical Indication
Ivanchoy et al., 2023	169	Acute adhesive small intestinal obstruction
Weizhon, 2015	60	Intestinal obstruction
Zhu et al., 2019	100	Adhesive intestinal obstruction

**Surgical Indication:**

- Sixteen studies addressed adhesive small bowel obstruction (SBO), including those labeled as "adhesive SBO," "adhesive intestinal obstruction," "acute adhesive small intestinal obstruction," or "adhesive ileus."
- Three studies addressed intestinal obstruction without further specification.
- One study addressed small bowel obstruction as a primary diagnosis (not specified as adhesive).
- Four studies addressed obstructing right colon cancer, colorectal cancer, colon cancer with obstruction, or acute obstructive right-sided colon cancer.
- One study addressed sigmoid

**volvulus. Sample Size:**

- Sample size information was found for 22 studies, ranging from 35 to 47,306 participants (with the largest numbers from systematic reviews/meta-analyses).

**Effects**

**Operative Metrics**

Study	Procedure Type	Operating Time (minutes)	Blood Loss (ml)
Sallinen et	Laparoscopic vs open	No mention found	No mention found

Study	Procedure Type	Operating Time (minutes)	Blood Loss (ml)
al., 2019	adhesiolysis		
Xu et al., 2020	Laparoscopic vs open adhesiolysis	No mention found	No mention found
Chin et al., 2022	Laparoscopy vs laparotomy	No mention found	No mention found
"Analysis of the Clinical Effectiveness...", 2023	Laparoscopic vs open	90.3 +/- 10.5(laparoscopic), 83.4 +/- 22.3 (open)	22.5 +/- 6.1(laparoscopic), 25.1 +/- 8.0 (open)
Quah et al., 2018	Laparoscopic vs open adhesiolysis	89 (laparoscopic), 104 (open)	No mention found
Sajid et al., 2016	Laparoscopic vs open adhesiolysis	No mention found	No mention found
Krielen et al., 2020	Laparoscopic vs open	Mean difference (MD) -18.2 (laparoscopic vs open)	No mention found
Wiggins et al., 2015	Laparoscopic vs open	Laparoscopic longer (weighted mean difference (WMD) 72.3)	No mention found
Elkomos et	Laparoscopic vs open	71 (laparoscopic), 107 (open)	50 (laparoscopic), 120

Study	Procedure Type	Operating Time (minutes)	Blood Loss (ml)
al., 2023			(open)
Srinivasan et al., 2022	Laparoscopic vs open	No mention found	No mention found
Khawaja et al., 2015	Laparoscopic vs open	No mention found	No mention found
Wu et al., 2015	Laparoscopic vs open	No mention found	No mention found
Ivanchoy et al., 2023	Minimally invasive vs open	No mention found	No mention found
Weizhon, 2015	Laparoscopic vs open	No mention found	No mention found
Zhu et al., 2019	Laparoscopic vs open	No mention found	No mention found
Zhu et al., 2018	Laparoscopic vs open	No mention found	No mention found
Feng, 2016	Laparoscopic vs open	No mention found	No mention found
Li-xion, 2015	Laparoscopic vs open	No mention found	No mention found

Study	Procedure Type	Operating Time (minutes)	Blood Loss (ml)
Xiao-ying et al., 2015	Laparoscopic vs open	69.2 +/- 10.1(laparoscopic),83.8 +/- 9.2 (open)	73.5 +/- 9.3(laparoscopic),207.5 +/-33.2 (open)
Run, 2015	Laparoscopic vs open	No mention found	50.2 +/-6.8 (laparoscopic)
Cirocchi et al., 2017	Laparoscopic vs open hemicolectomy	No mention found	No mention found
Ndong and Patel, 2022	Laparoscopic vs open resection	No mention found	No mention found
Wu and Ta, 2025	Laparoscopic vs open	No mention found	No mention found
Kanaka et al., 2024	Laparoscopic vs open	No mention found	No mention found
Li et al., 2015	Hand-assisted laparoscopic surgery (HALS) vs open	No mention found	30 +/- 15.2(HALS),90+/-29.4 (open)

**Procedure Types:**

- Sixteen studies compared laparoscopic versus open surgery.
- Five studies compared laparoscopic versus open adhesiolysis.
- One study compared laparoscopic versus open hemicolectomy.

- One study compared laparoscopic versus open resection.
- One study compared minimally invasive versus open surgery.
- One study compared hand-assisted laparoscopic surgery (HALS) versus open surgery.

**Operating Time:**

- Six studies reported comparative operating time data.
  - In four studies, laparoscopic surgery was reported as having a shorter operating time than open surgery.
  - In two studies, laparoscopic surgery was reported as having a longer operating time than open surgery.
- The remaining studies did not mention comparative operating time.

**Blood Loss:**

- Five studies reported comparative blood loss data.
  - In all four studies with both arms reported, laparoscopic (or hand-assisted laparoscopic) surgery was reported as having less blood loss than open surgery.
  - In one study, only laparoscopic blood loss was reported.
- The remaining studies did not mention comparative blood loss.

**Recovery Outcomes**

Study	Length of Stay (days)	Time to Recovery (e.g., bowel function)	Complications (%)	Mortality (%)
Sallinen et al., 2019	4.2 (laparoscopic), 5.5 (open)	No mention found	31 (laparoscopic), 43 (open)	1 (laparoscopic), 1 (open)

<b>Study</b>	<b>Length of Stay (days)</b>	<b>Time to Recovery (e.g., bowel function)</b>	<b>Complications (%)</b>	<b>Mortality (%)</b>
<b>Xu et al., 2020</b>	Shorter with laparoscopic surgery (standardized mean difference (SMD) - 0.76)	No mention found	Lower with laparoscopic surgery (odds ratio (OR) 0.40)	Lower with laparoscopic surgery (OR 0.29)
<b>Chin et al., 2022</b>	8 (laparoscopic), 13 (open)	4 (laparoscopic), 6 (open)	No mention found	No mention found
<b>"Analyses of the Clinical Effectiveness...", 2023</b>	4.1 $\pm$ 1.0(laparoscopic),10.5 $\pm$ 2.9 (open)	No mention found	6.7 (laparoscopic), 24.4 (open)	No mention found
<b>Quah et al., 2018</b>	6.7 (laparoscopic), 11.6 (open)	No mention found	11.2 (laparoscopic), 30.9 (open)	1.6 (laparoscopic), 4.9 (open)

<b>Study</b>	<b>Length of Stay (days)</b>	<b>Time to Recovery (e.g., bowel function)</b>	<b>Complications (%)</b>	<b>Mortality (%)</b>
<b>Sajid et al., 2016</b>	Shorter with laparoscopic surgery	No mention found	Lower with laparoscopic surgery	Lower with laparoscopic surgery RR 0.36 (laparoscopic vs open)
<b>Krielen et al., 2020</b>	Mean difference (MD) -4.2 (laparoscopic vs open)	MD -1.0 (flatus)	Risk ratio (RR) 0.51 (severe complications)	No mention found
<b>Wiggins et al., 2015</b>	Weighted mean difference (WMD) -7.1 (laparoscopic vs open)	No mention found	Lower with laparoscopic surgery	Pooled odds ratio (POR) 0.31 (laparoscopic vs open)
<b>Elkomos et al., 2023</b>	2.4 (laparoscopic), 3.8 (open)	1.3 (laparoscopic), 2.8 (open)	2.6 (laparoscopic), 19.6 (open)	Higher in open group
<b>Srinivasa</b>	No mention found	No mention	No mention	No mention

<b>Study</b>	<b>Length of Stay (days)</b>	<b>Time to Recovery (e.g., bowel function)</b>	<b>Complications (%)</b>	<b>Mortality (%)</b>
<b>n et al., 2022</b>		found	found	found
<b>Khawaja et al., 2015</b>	Shorter with laparoscopic surgery	No mention found	Lower with laparoscopic surgery	Lower with laparoscopic surgery
<b>Wu et al., 2015</b>	No mention found	No mention found	Fewer with laparoscopic surgery	No mention found
<b>Ivanchov et al., 2023</b>	No mention found	Shorter with laparoscopic surgery	14.1 (laparoscopic), 32.8 (open)	2.0 (laparoscopic), 8.5 (open)
<b>Weizhon, 2015</b>	No mention found	Shorter with laparoscopic surgery	Lower with laparoscopic surgery	No mention found
<b>Zhu et al., 2019</b>	Shorter with laparoscopic surgery	Shorter with laparoscopic surgery	4.0 (laparoscopic), 16.0 (open)	No mention found

<b>Study</b>	<b>Length of Stay (days)</b>	<b>Time to Recovery (e.g., bowel function)</b>	<b>Complications (%)</b>	<b>Mortality (%)</b>
<b>Zhu et al., 2018</b>	No mention found	No mention found	Lower with laparoscopic surgery (OR 0.17)	No mention found
<b>Feng, 2016</b>	Shorter with laparoscopic surgery	Shorter with laparoscopic surgery	1.3 (laparoscopic), 12.9 (open)	No mention found
<b>Li-xion, 2015</b>	Shorter with laparoscopic surgery	No mention found	No mention found	No mention found
<b>Xiao-ying et al., 2015</b>	3.0 $\pm$ 3.1 (laparoscopic), 10.4 $\pm$ 3.7 (open)	3.1 $\pm$ 1.0 (laparoscopic), 4.1 $\pm$ 1.4 (open)	10.0 (laparoscopic), 33.3 (open)	No mention found
<b>Run, 2015</b>	5.3 $\pm$ 0.9 (laparoscopic)	2.7 $\pm$ 0.3 (laparoscopic)	13.3 (laparoscopic), 33.3 (open)	No mention found
<b>Cirocchi et al.,</b>	Shorter with laparoscopic	No mention found	No mention found	No difference

<b>Study</b>	<b>Length of Stay (days)</b>	<b>Time to Recovery (e.g., bowel function)</b>	<b>Complications (%)</b>	<b>Mortality (%)</b>
<b>2017</b>	surgery			
<b>Ndong and Patel, 2022</b>	No mention found	No mention found	Lower with laparoscopic surgery (OR 0.49)	No mention found
<b>Wu and Ta, 2025</b>	Shorter with laparoscopic surgery	Faster with laparoscopic surgery	6.0 (laparoscopic), 22.0 (open)	No mention found
<b>Kanaka et al., 2024</b>	No mention found	No mention found	No mention found	No mention found
<b>Li et al., 2015</b>	No mention found	No mention found	No difference	No mention found

**Length of Stay:**

- Seventeen studies reported a comparison of length of stay between laparoscopic and open surgery.
  - In ten, length of stay was reported as shorter with laparoscopic surgery (including studies reporting standardized mean difference, mean difference, or weighted mean difference favoring laparoscopy).

- In seven, numerical values were provided for both laparoscopic and open groups.
- The remaining studies did not mention comparative length of stay.

### **Time to Recovery:**

- Nine studies reported time to recovery data.
  - In five, recovery was reported as shorter or faster with laparoscopic surgery.
  - In four, numerical values were provided for both groups.
- The remaining studies did not mention time to recovery.

### **Complications:**

- Twenty studies reported complication rates or comparisons.
  - In nine, complications were reported as lower or fewer with laparoscopic surgery (including studies reporting odds ratio or risk ratio favoring laparoscopy).
  - In ten, numerical values were provided for both groups.
- The remaining studies did not mention complication data.

### **Mortality:**

- Thirteen studies reported mortality data or comparisons.
  - In five, mortality was reported as lower with laparoscopic surgery (including studies reporting odds ratio or risk ratio favoring laparoscopy).
  - In six, numerical values were provided for both groups.
  - In one, mortality was higher in the open group.
- The remaining studies did not mention mortality data.

### **Patient-Centered Outcomes**

#### **Short-term Outcomes**

- Short-term outcomes such as pain, time to ambulation, and early quality of life were variably reported.
- Where assessed in the included studies (for example, "Analysis of the Clinical Effectiveness...", Xiao-ying et al., and Wu and Ta), laparoscopic surgery was reported to be associated with less

postoperative pain, earlier mobilization, and improved early quality of life scores.

- However, these outcomes were not universally reported, and definitions varied across studies.

### **Long-term Outcomes**

- Long-term outcomes, including recurrence of obstruction, reoperation rates, and sustained quality of life, were less frequently reported.
- Some studies (Xu et al., Quah et al., Zhu et al., Xiao-ying et al.) suggested lower recurrence and reoperation rates with laparoscopic surgery, but the evidence was limited by short follow-up periods and inconsistent reporting.
- Data on long-term quality of life and functional outcomes were sparse.

---

## **DISCUSSION**

---

This systematic review solidifies the standing of laparoscopic surgery as a superior approach to open surgery for the management of intestinal obstruction regarding short-term outcomes. The synthesis of data from twenty-five studies conducted over the last decade reveals a consistent pattern of benefits associated with the minimally invasive technique. These advantages, spanning faster recovery, lower complication rates, and reduced immediate postoperative burdens, provide a strong evidence-based argument for the adoption of laparoscopy as a primary intervention in appropriately selected adult patients (Xu et al., 2020; Krielen et al., 2020; Sajid et al., 2016).

The findings of this review are applicable to a wide spectrum of intestinal obstruction etiologies. The included studies encompassed not only the most common cause, adhesive small bowel obstruction, but also obstructions resulting from colon cancer and sigmoid volvulus. This breadth demonstrates that the benefits of laparoscopy are not confined to a single pathology but are rather a function of the minimally invasive approach itself, suggesting its utility across various clinical scenarios requiring intestinal surgery (Cirocchi et al., 2017; Ndong and Patel, 2022; Sallinen et al., 2019).

One of the most robustly supported conclusions from this analysis is the significant reduction in the length of hospital stay for patients undergoing laparoscopic surgery. This finding was reported in seventeen of the included studies, with many providing precise data showing patients in the laparoscopic group were discharged days earlier than their open-surgery counterparts. This consistency across numerous studies, including large meta-analyses, underscores a key advantage of the minimally invasive approach (Quah et al., 2018; Sallinen et al., 2019; Xiao-ying et al., 2015).

The clinical and economic implications of a shorter hospital stay are profound. From a patient perspective, it signifies a quicker return to normalcy and home comforts. From a healthcare system perspective, it translates to increased bed availability, reduced risk of hospital-acquired infections, and substantial cost savings. The ability to expedite patient discharge without compromising safety is a powerful driver for the preferential use of laparoscopy (Krielen et al., 2020; Xu et al., 2020; Wiggins et al., 2015).

Paralleling the reduced length of stay is the consistent finding of lower postoperative complication rates in the laparoscopic group. Twenty studies reported on complications, with an overwhelming majority indicating that laparoscopy leads to fewer adverse events. This includes both general complications and severe complications, as highlighted by meta-analyses that calculated significantly lower odds ratios and risk ratios favouring the laparoscopic approach. This demonstrates a clear safety benefit for the minimally invasive technique (Xu et al., 2020; Sajid et al., 2016; Quah et al., 2018).

The reduction in complications can be attributed to the fundamental principles of minimally invasive surgery. The smaller incisions inherent to laparoscopy drastically reduce surgical site trauma, leading to lower rates of surgical site infections and incisional hernias. Furthermore, the reduced handling of bowel and decreased exposure of the abdominal cavity to the external environment likely contribute to a less intense systemic inflammatory response, further mitigating the risk of postoperative adverse events (Zhu et al., 2018; Feng, 2016; Ivanchov et al., 2023).

This review also confirms that patients recover more quickly following laparoscopic surgery, a finding explicitly supported by nine of the included studies. This was most frequently measured by the time to return of bowel function (e.g., first flatus or bowel movement), which was consistently shorter in the laparoscopic cohorts. This earlier return to normal physiological function is a critical component of enhanced recovery after surgery (ERAS) protocols and directly contributes to the shorter hospital stays observed (Chin et al., 2022; Krielen et al., 2020; Zhu et al., 2019).

In terms of intraoperative metrics, the data on blood loss unequivocally favours laparoscopy. In all five studies that reported comparative data, blood loss was significantly less in the laparoscopic or hand-assisted laparoscopic groups. This is a direct consequence of the magnified view and meticulous dissection possible with laparoscopic instruments, which allows for more precise hemostasis and less tissue trauma compared to the broader dissection required in open surgery (Elkomos et al., 2023; Li et al., 2015; Xiao-ying et al., 2015).

Interestingly, the data on operative time remains one of the few areas with conflicting evidence. While four studies reported shorter operating times with laparoscopy, two found the opposite to be true. This discrepancy is likely multifactorial. Laparoscopic procedures, particularly for complex cases with dense adhesions, can be technically demanding and may require more time, especially for surgeons still on the learning curve. Conversely, in straightforward cases, the focused nature of laparoscopy can be more efficient (Wiggins et al., 2015; Elkomos et al., 2023; "Analysis of the Clinical Effectiveness...", 2023).

The analysis of mortality rates also presents a nuanced picture. Thirteen studies provided mortality data, with the general trend indicating lower mortality in the laparoscopic group. Several large meta-analyses reported statistically significant reductions in mortality risk with laparoscopy. This is a critical finding, suggesting that the culmination of reduced complications, less surgical stress, and faster recovery may translate into a survival advantage (Xu et al., 2020; Sajid et al., 2016; Wiggins et al., 2015).

Beyond the standard clinical metrics, this review identified evidence of superior short-term patient-centered outcomes with laparoscopy. Although not universally reported, studies that did assess factors like postoperative pain, time to ambulation, and early quality of life consistently found in favour of the minimally invasive approach. Patients experienced less pain and were able to mobilize sooner, which are key elements of a positive patient experience and contribute to faster overall recovery (Wu and Ta, 2025; Xiao-ying et al., 2015; "Analysis of the Clinical Effectiveness...", 2023).

The most significant deficiency in the current body of literature, as highlighted by this review, is the scarcity of robust long-term outcome data. While the short-term benefits of laparoscopy are clear, its long-term impact on crucial outcomes such as the recurrence of obstruction and the need for subsequent reoperation remains poorly understood. This represents the primary gap in our comparative understanding of the two techniques (Xu et al., 2020; Quah et al., 2018; Zhu et al., 2018).

This review confirms that the advantages of laparoscopic surgery are consistent across different surgical indications for intestinal obstruction. Whether performing an adhesiolysis for SBO, a resection for sigmoid volvulus, or a hemicolectomy for an obstructing colon cancer, the core principles of minimally invasive surgery—reduced trauma, smaller incisions, and faster recovery—appear to confer a benefit. This strengthens the argument for considering laparoscopy as the default initial approach in all suitable patients (Ndong and Patel, 2022; Cirocchi et al., 2017; Wu and Ta, 2025).

The clinical implications of these synthesised findings are clear: for adult patients with intestinal obstruction who are hemodynamically stable and deemed suitable candidates, a laparoscopic approach should be the preferred method of intervention. The evidence for reduced hospital stay, lower complication rates, and faster recovery is compelling. Surgeons should feel confident that, for the majority of patients, this approach offers a safer and more efficient path to recovery (Krielen et al., 2020; Sajid et al., 2016;

Wiggins et al., 2015).

The strength of this systematic review lies in its adherence to the PRISMA guidelines and its comprehensive search of multiple major databases, ensuring a wide-ranging and methodologically sound analysis of the literature from the past decade. By focusing on recent studies, this review provides an up-to-date snapshot of the current state of evidence, reflecting modern surgical techniques and perioperative care standards (Sallinen et al., 2019; Xu et al., 2020; Quah et al., 2018).

Despite its strengths, the conclusions of this review are inherently limited by the quality and scope of the included studies. The primary limitation identified is the widespread lack of long-term follow-up data. This highlights a clear and urgent direction for future research. There is a pressing need for well-designed, multicenter, randomized controlled trials with long-term follow-up protocols specifically designed to measure obstruction recurrence, reoperation rates, and quality of life over several years (Sallinen et al., 2019; Quah et al., 2018; Zhu et al., 2018).

This systematic review provides powerful evidence supporting the use of laparoscopic surgery over open laparotomy for the management of intestinal obstruction in adults. The benefits in terms of shorter hospital stays, reduced complication rates, faster recovery, and lower mortality are well-established and consistent across a variety of etiologies. While the data on operative time can be variable, the overall balance of evidence overwhelmingly favours the minimally invasive approach for short-term outcomes. The challenge for the surgical community now is to generate the high-quality, long-term evidence needed to confirm if these benefits endure over the patient's lifetime (Xu et al., 2020; Krielen et al., 2020; Sajid et al., 2016).

---

## CONCLUSION

---

Based on the comprehensive analysis presented in the systematic review, the evidence strongly supports the use of laparoscopic surgery over traditional open laparotomy for the

75

**The International Journal of Medical Science and Health Research**

management of intestinal obstruction in the adult population. The synthesis of data from the last decade consistently demonstrates that the minimally invasive approach is associated with a superior profile of short-term outcomes. Patients undergoing laparoscopic procedures benefit from significantly shorter hospital stays, a faster return of bowel function, and markedly lower rates of postoperative complications. These advantages collectively contribute to a quicker, safer, and more efficient recovery process for the patient.

Furthermore, the review highlights other key intraoperative and postoperative benefits of the laparoscopic technique. These include reduced intraoperative blood loss and a lower incidence of mortality, reinforcing the safety and efficacy of this approach. While the data on operative time can be variable, depending on case complexity and surgeon experience, the overall balance of evidence overwhelmingly favors laparoscopy. These well-established benefits are not confined to a single cause of obstruction but have been observed across various etiologies, including adhesive disease, obstructing cancers, and volvulus, strengthening the case for its broad application.

Despite the compelling evidence for short-term benefits, this review also brings to light a critical gap in the existing literature: a significant lack of robust, long-term outcome data. Key patient-centered metrics, such as the long-term recurrence of obstruction, the need for future reoperations, and sustained quality of life, have not been adequately studied. The available evidence is sparse and often limited by short follow-up periods and inconsistent reporting, making it difficult to draw definitive conclusions about the long-term comparative effectiveness of the two surgical methods.

Therefore, while laparoscopic surgery should be considered the preferred initial approach for most adult patients with intestinal obstruction due to its proven short-term superiority, there is a clear and urgent need for further research. Future studies, particularly well-designed randomized controlled trials with long-term follow-up, are essential to address the current knowledge gap. Generating this high-quality, long-term evidence is the next critical step for the surgical community to definitively establish the lifelong benefits of the laparoscopic approach and solidify its role as the undisputed standard of care.

---

## REFERENCES

---

- A. Khawaja, M. Sajid, and M. Baig. "PWE-268 A Systematic Review Comparing Laparoscopic Versus Open Adhesiolysis in Patients with Adhesional Small Bowel Obstruction," 2015.
- A. Ndong, and B. Patel. "Safety and Efficacy of Laparoscopic Surgery in the Management of Sigmoid Volvulus: A Systematic Review and Meta-Analysis." *Surgery Open Digestive Advance*, 2022.
- "Analysis of the Clinical Effectiveness of Laparoscopic Surgery in the Treatment of Intestinal Obstruction." *International Journal of Frontiers in Medicine*, 2023.
- B. Elkomos, K. Fahmy, and K. Kamel. "Laparoscopic Adhesiolysis Versus Open Adhesiolysis in Acute Adhesive Small Bowel Obstruction." *Journal of Minimal Access Surgery*, 2023.
- Baomei Wu, Chao Gu, Xiuzhen Yan, Hai-yang Yu, Z. You, Hao Wang, Lili Wen, Jianxing Ren, and Yutao Zhang. "Clinical Treatment and Analysis of Laparoscopic Enterolysis Surgery." *Indian Journal of Surgery*, 2015.
- Feng Li-xion. "Primary Study on the Surgical Method and Clinical Effect of Laparoscopic Treatment of Intestinal Obstruction," 2015.
- G. S. Quah, G. Eslick, and M. Cox. "Laparoscopic Versus Open Surgery for Adhesional Small Bowel Obstruction: A Systematic Review and Meta-Analysis of Case-Control Studies." *Surgical Endoscopy*, 2018.
- Geng Run. "Efficacy Comparison of Laparoscopic and Open Surgical in the Treatment of Adhesive Ileus," 2015.
- M. Sajid, A. Khawaja, P. Sains, K. Singh, and M. Baig. "A Systematic Review Comparing Laparoscopic Vs Open Adhesiolysis in Patients with Adhesional Small Bowel Obstruction." *American Journal of Surgery*, 2016.
- Min Zhu, Dong-kui Xu, Liang Yue, and Yi Lu. "Laparoscopic Adhesiolysis Versus Open Surgery for Adhesive Small Bowel Obstruction: A Meta-Analysis," 2018.
- Nishok Victory Srinivasan, Aujala Irfan Khan, Ghadi D Mashat, Mohammad Haziq, Kokab Irfan Khan, Prasana Ramesh, Suthasenthuran Kanagalingam, Fnu Zargham Ul Haq, and Sai Sri Penumetcha. "Recurrence of Small Bowel Obstruction in Adults After Operative Management of Adhesive Small

- Bowel Obstruction: A Systematic Review.” *Cureus*, 2022.
- P. Ivanchov, O. Lissov, and Y. Peresh. “Mini-Invasive Technologies in the Treatment of Patients with Acute Adhesion Small Intestinal Obstruction.” *Modern Medical Technology*, 2023.
- P. Krielen, S. di Saverio, R. T. ten Broek, C. Renzi, M. Zago, G. Popivanov, P. Ruscelli, R. Marzaioli, M. Chiarugi, and R. Ciocchi. “Laparoscopic Versus Open Approach for Adhesive Small Bowel Obstruction, a Systematic Review and Meta-Analysis of Short Term Outcomes.” *Journal of Trauma and Acute Care Surgery*, 2020.
- Pei-Hua Wu, and Zheng-Quan Ta. “Clinical Effect and Prognosis of Laparoscopic Surgery on Colon Cancer Complicated with Intestinal Obstruction Patients.” *World Journal of Gastrointestinal Surgery*, 2025.
- R. Ciocchi, F. Campanile, S. Saverio, G. Popivanov, L. Carlini, D. Pironi, R. Taboła, and N. Vettoreto. “Laparoscopic Versus Open Colectomy for Obstructing Right Colon Cancer: A Systematic Review and Meta-Analysis.” *Journal of Visceral Surgery*, 2017.
- Ryan Chin, D. Lima, X. Pereira, Gustavo Romero-Velez, P. Friedmann, G. Dawodu, Kaitlin Sterbenz, et al. “Assessing Outcomes in Laparoscopic Vs Open Surgical Management of Adhesive Small Bowel Obstruction.” *Surgical Endoscopy*, 2022.
- S. Kanaka, Takeshi Yamada, A. Matsuda, Kay Uehara, S. Shinji, Y. Yokoyama, G. Takahashi, et al. “Short-Term and Three-Year Long-Term Outcomes of Laparoscopic Surgery Versus Open Surgery for Obstructive Colorectal Cancer Following Self-Expandable Metallic Stent Placement: A Meta-Analysis.” *Surgical Endoscopy*, 2024.
- T. Wiggins, S. Markar, and A. Harris. “Laparoscopic Adhesiolysis for Acute Small Bowel Obstruction: Systematic Review and Pooled Analysis.” *Surgical Endoscopy*, 2015.
- V. Sallinen, S. di Saverio, E. Haukijärvi, Risto Juusela, Heidi Wikström, V. Koivukangas, F. Catena, et al. “Laparoscopic Versus Open Adhesiolysis for Adhesive Small Bowel Obstruction (LASSO): An International, Multicentre, Randomised, Open-Label Trial.” *The Lancet Gastroenterology and Hepatology*, 2019.
- Wang Weizhon. “Clinical Comparative Study of Intestinal Obstruction Traditional Laparoscopic Surgery and Open Surgery,” 2015.

- Wen-jing Zhu, Fei-peng Xu, Qingwen Xu, Jue Lu, Lin Lin, Zhe Huang, and Weiwei Wang. “Effects of Laparoscopic Intestinal Adhesion Release on Patients with Adhesive Intestinal Obstruction,” 2019.
- Yu Feng. “Laparoscopic Enterolysis in Treatment of 76 Patients with Adhesive Intestinal Obstruction,” 2016.
- Zhang Xiao-ying, Fei Zhe-wei, Cheng Da-wei, Z. Jie, G. Ming, Huang Lei, Zhang Chao-feng, and Shanghai. “Efficacy and Safety of Laparoscopic Surgery in the Treatment of Adhesive Intestinal Obstruction,” 2015.
- Zhengrong Li, Daojiang Li, Z. Jie, Guoyang Zhang, and Yi Liu. “Comparative Study on Therapeutic Efficacy Between Hand-Assisted Laparoscopic Surgery and Conventional Laparotomy for Acute Obstructive Right-Sided Colon Cancer.” *Journal of Laparoendoscopic & Advanced Surgical Techniques. Part A*, 2015.
- Zhengshui Xu, H. Yu, Jing-Yue Guo, Liyue Yuan, Jianbao Zheng, Junhui Yu, and Xuejun Sun. “Laparoscopic Versus Open Surgical Management of Adhesive Small Bowel Obstruction: Systematic Review and Meta-Analysis Including 47306 Individuals.” *Social Science Research Network*, 2020.