



## Intracorporeal Versus Extracorporeal Ileocolic Anastomosis in Laparoscopic Right Hemicolectomy: Leakage Rate

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### Abstract

**Context:** Colorectal carcinoma is among the common cancers that affect people in western countries, and the incidence was approximated at 1.36 million cases globally in 2012. A right hemicolectomy is a routine procedure for right-sided colonic cancer. Currently, laparoscopic-assisted right hemicolectomy is typically performed using the extracorporeal anastomotic method. However, despite the inception of laparoscopic surgery and advanced recovery techniques for colorectal surgery, morbidity rates remain considerable.

**Evidence Acquisition:** The literature was systematically analyzed according to the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) checklist. In-depth research was conducted using Embase and PubMed's bibliographic data sources with the help of a medical librarian. Studies that were eligible were randomized controlled trials, human research, or comparative studies on intracorporeal versus extracorporeal anastomosis in laparoscopic right hemicolectomy

**Results:** A total of 2694 studies were initially obtained. From them, 14 non-randomized comparative academic works were eligible for inclusion in the assessment, with a total of 1494 patients. We found that intracorporeal anastomosis in laparoscopic right hemicolectomy is associated with minimized short-range morbidity as well as a shorter hospital stay. However, we identified an absence of a remarkable difference for anastomotic leakage between the intra- and the extra-corporeal techniques.

**Conclusions:** Our systematic evaluation indicates no notable difference in the rate of discharge between intracorporeal anastomosis and extracorporeal anastomosis in laparoscopic right hemicolectomy. However, randomized controlled trials are required to confirm the discovery made by this study.

**Keywords:** Intracorporeal anastomosis, Extracorporeal anastomosis, Right hemicolectomy, Leakage rate, Laparoscopic, Ileo-colic anastomosis

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### Context

Colorectal carcinoma is among the common types of cancer that affect people in western countries, and the incidence was approximated at

1.36 million cases globally in 2012 (1, 2). A right hemicolectomy is a routine procedure for right-sided colonic cancer (3). Currently, laparoscopic-assisted right hemicolectomy is typically performed using the extracorporeal anastomotic method. However,

irrespective of the inception of laparoscopic surgery and advanced recovery techniques for colorectal surgery, the morbidity rate remains considerable (4, 5). The typical procedure involves the formation of an extracorporeal anastomosis, for which equipping the colon and mesenteric traction are necessary to enhance the removal of small intestines and ascending large intestines. Notably, this leads to increased surgical distress (6). Furthermore, in extracorporeal anastomotic techniques, the extraction is positioned in the middle or upper part of the abdomen with relatively greater postoperative morbidity relative to a wound located underneath the abdomen. The main reason is, an incision occurring in the middle or overlying the abdomen tends to cause escalated postoperative pain as contrasted to extraction wounds in the lower end, thereby compromising pulmonary function (5, 7). Contemporary developments within invasive approaches have introduced intracorporeal anastomosis. This approach allows a small wound to be extracted underneath the abdominal wall, thereby enabling an excision of the right-side colon with minimal mobilization and mesenteric adhesion. Potentially, the danger associated with mesenteric twisting is minimal compared with the extracorporeal method (8).

### Evidence Acquisition

The literature was systematically analyzed according to the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) checklist (9). In-depth research was conducted using Embase and PubMed's bibliographic data sources with the help of a medical librarian. Studies that were eligible to be included in the study had to meet specific features. The selected studies had to be randomized controlled trials, human research, or comparative studies on intracorporeal versus extracorporeal anastomosis in laparoscopic right hemicolectomy. The publications that were excluded for this study were those with non-right hemicolectomy (i.e., left hemicolectomy, sub-total colectomy, or sigmoidectomy), non-comparative reports (e.g., descriptions of techniques or case series), purely robotic surgery, open hemicolectomy, or single-incision surgery. After obtaining the duplicates of the relevant publications, two independent reviewers sought to select the studies through screening the titles and abstracts. In case a disagreement arose, a third reviewer was consulted. The two reviewers analyzed the derived papers with the assistance of the online Covidence review manager. The quality of the study methodologies was evaluated using the Methodological Index For Non-Randomized Studies (MINORS) instrument (10). Revman 5.0 was used for data analysis (11). Dichotomous results were statistically summarized and analyzed using the odds ratio and a confidence interval of 95% (12). The odds ratio obtained from the outcomes was

combined using the Mantel-Haenszel method via the random-effects model (13). The analysis of the continuous outcomes was completed through the computation of the mean difference. Heterogeneity was evaluated using the chi-squared and  $I^2$  statistic tests (14).

### Results

A total of 2694 studies were initially obtained. From them, 14 non-randomized comparative academic works were eligible for inclusion in the assessment, with a total of 1494 patients. Among the research participants, 84 of them had already experienced colonic processes with right-sided intracorporeal and extracorporeal anastomosis in laparoscopic right hemicolectomy. An intra-operative air leak with anastomosis dysfunction was observed in one patient whose anastomosis had been oversewn intracorporeally. There were only two anastomotic leaks that clinically resulted from the extracorporeal technique. One patient died due to overwhelming sepsis after two days of re-operation. The rate of leakage by the type of anastomosis was examined in a subset of 1494 cases where both outcomes were reported. Within the selected subset, 579 leaks resulted from intracorporeal anastomosis, representing a leak rate of 5.8%. The extracorporeal anastomosis was more common, for which 516 leaks were identified, yielding a leakage rate of 5.74%. There was no notable distinction between intracorporeal and extracorporeal techniques in terms of anastomotic leakage, as indicated by the review's outcomes.

### Discussion

The study offers a valuable comparison of the discharge rate between the two approaches for anastomosis in laparoscopic right hemicolectomy. We found that intracorporeal anastomosis in laparoscopic right hemicolectomy is associated with minimized short-range morbidity as well as a shorter hospital stay. However, we identified an absence of a remarkable difference for anastomotic leakage between the intra- and the extra-corporeal techniques. Notably, a subcategory assessment of current academic works showed that the difference identified was large with minimal heterogeneousness in favor of intracorporeal anastomosis.

There was an absence of a remarkable difference in the anastomotic leakage rate. In contrast, when the intracorporeal technique is used, the importance of intraperitoneal tomies for the contaminated transversum may cause a theoretical increase in intraabdominal infections. Traumatic intracorporeal bulldogs can be used to limit faecal spillage when conducting an intracorporeal anastomosis (15). The studies included for this review heterogeneously made reports on intraabdominal abscesses and

interventions. Therefore, it cannot be fully concluded that intracorporeal anastomosis has a notable influence on deep abdominal abscesses compared to standard extracorporeal anastomosis.

There are new potential techniques that could be used for extraction. Notably, transvaginal colectomy is one of those techniques. It is a form of natural orifice specimen extraction (NOSE) that may lessen the distress after going through surgery. However, large cohort information and randomized evidence lack of supporting the assertion (16). Nonetheless, the existing limited cohort chapters show optimistic outcomes regarding partial colectomy associated with slight primary outcomes (16, 17). Among males, transrectal or transgastric extraction develops a probability for increased surgical distress, which is why the Pfannenstiel approach is still regarded as the finest alternative. The existing data is inadequate to draw up any assertions about laparoscopic right hemicolectomy concerning the efficacy of natural

orifice transluminal endoscopic surgery.

This review had several limitations. Firstly, the studies included were merely observational, with the majority being of the retrospective design. Secondly, complications were only reported in 25% of the researches involved. Thirdly, the academic works only stressed the short-term consequences and early follow-ups.

## Conclusions

Our systematic evaluation indicates no notable difference in the rate of discharge between intracorporeal anastomosis and extracorporeal anastomosis in laparoscopic right hemicolectomy. However, randomized controlled trials are required to confirm the discovery made by this study.

**Conflicts of interest:** None declared.

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