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Comparative study of incidence of bowel obstruction post laparoscopic versus open appendectomy

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Comparative study of incidence of bowel obstruction post open versus Laparoscopic Appendectomy

A thesis study protocol submitted for partial fulfillment of master's degree in General Surgery

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Introduction

Acute appendicitis is one of the most common causes of acute abdominal pain requiring surgical intervention, with appendectomy being the definitive treatment [(1)]. Traditionally performed through an open approach, appendectomy has evolved significantly with the advent of minimally invasive surgery. Since its introduction in the late 1980s, laparoscopic appendectomy has gained widespread acceptance and is now often preferred due to its well-documented advantages, including reduced postoperative pain, shorter hospital stay, quicker return to normal activity, and improved cosmetic outcomes [(2)]. Despite these benefits, concerns remain regarding the long-term postoperative complications associated with both laparoscopic and open approaches, one of the most clinically significant being bowel obstruction [(3)].

Postoperative bowel obstruction, often resulting from intra-abdominal adhesions, is a common and sometimes serious complication following abdominal surgeries. The pathogenesis of these adhesions can be influenced by several factors, including the extent of tissue handling, exposure of peritoneal surfaces, the degree of inflammation presents during surgery, and the surgical technique used [(4)].

Open surgery, by its nature, involves a larger incision and greater manipulation of intra-abdominal structures, which may predispose patients to more extensive adhesion formation and, subsequently, higher rates of bowel obstruction. On the other hand, laparoscopic surgery, with its minimal access approach, is associated with less tissue trauma and reduced adhesion formation in various abdominal procedures. However, it is not entirely devoid of risk, and rare but serious complications such as internal herniation and port site adhesions can also lead to bowel obstruction in laparoscopic cases [(5)].

The clinical presentation of postoperative bowel obstruction can vary widely, ranging from mild intermittent symptoms to complete mechanical obstruction requiring urgent reoperation. Understanding the relative risk and

nature of bowel obstruction following laparoscopic versus open appendectomy is essential for both surgical decision-making and informed patient counseling. Moreover, identifying differences in the timing, severity, and management outcomes of this complication between the two surgical approaches may help refine perioperative strategies to minimize patient morbidity [6].

While several studies have attempted to compare postoperative outcomes between laparoscopic and open appendectomy, data specifically focusing on the incidence and characteristics of bowel obstruction are less abundant and sometimes conflicting [7, 8]. Some retrospective reviews suggest a lower incidence of bowel obstruction following laparoscopic appendectomy, while others report no significant difference. Variations in surgical technique, patient selection, underlying pathology, and follow-up duration may all contribute to these discrepancies [9, 10].

Aim of the Work

The aim of this study is to compare incidence of bowel obstruction post open versus laparoscopic appendectomy

Patients and Methods

-Place of the study:

This study will be performed in Sohag University Hospitals after approval from the institutional ethical committee.

-Type of the study:

This study will be a prospective study which will be conducted on 50 patients who undergo open and laparoscopic appendectomy at General, Laparoscopic and Oncologic Surgery Department, Sohag University Hospital.

- Laparoscopic Appendectomy (LA) Group(n=25): Patients will undergo appendectomy using a minimally invasive laparoscopic technique

- Open Appendectomy (OA) Group(n=25): Patients will undergo a traditional open surgical approach.

- Inclusion Criteria:

- Patients aged ≥12 years.
- Both genders.
- Confirmed diagnosis of acute appendicitis (simple or complicated).
- Patients undergo laparoscopic or open appendectomy.

- Exclusion Criteria:

- Appendectomy performed as part of another surgical procedure.
- Prior history of major abdominal surgery or known intra-abdominal adhesions.
- Patient shows signs of generalized peritonitis

- Ethical considerations:

Informed consent from patients will be taken before surgery. There are adequate provisions to maintain the privacy of participants and confidentiality of the data are as follows:

- The patients will be given the option of not participating in the study if they do not want to.
- We put code numbers to each participant with the name and address kept in a special file.
- We hid the patients' names when we used the research.
- We used the results of the study only in a scientific manner and not to use it in any other aims.

- Method of study:

Preoperative:

All patients will be subjected to:

- Demographic data: age, sex, weight, duration of surgery, and type of surgery.
- Clinical Examination: Detailed assessment of presenting symptoms (e.g., right lower quadrant pain, fever, nausea, vomiting) and signs of peritoneal irritation.
- Laboratory Investigations: Complete blood count (CBC), C-reactive protein (CRP), serum electrolytes, and renal function tests.
- Imaging:

  Ultrasound: Used as the first-line imaging modality, especially in pediatric and female patients.
- Abdominal CT scan: Performed in patient not diagnosed clinically or by ultrasound.
- Patients will be evaluated for comorbidities (e.g., diabetes, cardiovascular disease), the history of prior abdominal surgery.

Postoperative:

After the operation all the patients will be nil per os (NPO) and receive antibiotics for 48hours. The routine analgesic used for patients is nonsteroidal anti-inflammatory drugs (NSAIDs). Soft diet will start after 24 hours and patients will be discharged after normal diet was tolerated. Post operation follows up. The visits will be in weeks 1, 2 and 4. Patients will be asked to contact the therapy team in case of any abdominal problem.

- Pain Assessment:

Degree of pain will be assessed using numerical rating scale (NRS) [11].

- Monitoring and Early Recovery:

Vital signs were monitored closely in all patients during the immediate postoperative period. Early mobilization is encouraged within the first 24 hours after surgery to facilitate recovery and minimize postoperative complications.

- Dietary Progression:

Patients were initially kept nil per os (NPO) until the return of bowel sounds. Once gastrointestinal function resumed, diet is gradually advanced from clear liquids to a soft diet as tolerated by the patient.

- Antibiotic Therapy:

Postoperative antibiotics will be continued for 7days in cases of uncomplicated appendicitis. In patients with complicated appendicitis, such as those with perforation or intra-abdominal abscess, antibiotic therapy is extended based on the clinical response and intraoperative findings.

- Discharge Criteria:

Patients were considered fit for discharge once they were tolerating oral intake, had adequate pain control with oral medications, remained afebrile for at least 24 hours, and exhibited no signs of surgical site infection or other complications.

Follow-Up and Surveillance:

- Outpatient follow-up scheduled at 1–2 weeks post-discharge.
- Patients were instructed to return earlier if symptoms of bowel obstruction (e.g., abdominal pain, vomiting, bloating, constipation) developed.
- Long-term follow-up data were collected through clinic visits, readmission records, or telephone interviews to detect delayed bowel obstruction during 6 months.

Outcomes:

Primary outcome:

- Compare bowel obstruction post open versus laparoscopic.

Secondary outcome:

- Operative time
- Postoperative pain
- Analgesic requirement
- Length of hospital stay (LOS).
- Postoperative complications.

Statistical method of study:

The results will be processed and analyzed by using SPSS, version 18. Numerical data will be expressed by means and standard deviation. Categorical data will be presented by figures, pie and column charts. Data will be analyzed by suitable analytic programs.

References

1. Moris D, Paulson EK and Pappas TN. Diagnosis and management of acute appendicitis in adults: a review. Jama. 2021;326(22):2299-311.
2. Naidoo M, Thirayan V, Kong V, Govindasamy V, Dasrath A, Mills B, et al. Trends in adoption of laparoscopic appendicectomy in a developing country: closing the gap. World J Surg. 2022;46(5):1015-21.
3. Jensen SA-MS, Fonnes S, Gram-Hanssen A, Andresen K and Rosenberg J. Long-term mortality and intestinal obstruction after laparoscopic cholecystectomy: A systematic review and meta-analysis. Int J Surg. 2022;105(8):106-841.
4. Sturm MC, Abazid A and Stope MB. Tissue adhesion after surgical interventions. Exp Ther Med. 2025;29(5):97-115.
5. Ghobrial S, Ott J and Parry JP. An overview of postoperative intraabdominal adhesions and their role on female infertility: a narrative review. J Clin Med. 2023;12(6):22-63.
6. Hoi H, Grünbart M, Paal P, de Cillia M, Hell T, Weiss H, et al. Surgeon and patient-specific factors influencing the decision for minimally invasive or open surgery in acute bowel obstruction: A retrospective single-center analysis. Langenbecks Arch Surg. 2022;407(8):3747-54.
7. Ibraheem M, Sayed AAA and Raafat I. A comparative study of laparoscopic and open appendectomy. Med J Cairo Univ. 2021;89(3):155-61.
8. Fujishiro J, Watanabe E, Hirahara N, Terui K, Tomita H, Ishimaru T, et al. Laparoscopic versus open appendectomy for acute appendicitis in children: a nationwide retrospective study on postoperative outcomes. J Gastrointest Surg. 2021;25(4):1036-44.
9. Neogi S, Banerjee A, Panda SS, Ratan SK and Narang R. Laparoscopic versus open appendicectomy for complicated appendicitis in children: A systematic review and meta-analysis. J Pediatr Surg. 2022;57(3):394-405.
10. Elnemr M, Habeeb T, Heggy IA and Wasefy T. Retrospective Observational Study of the Role of Laparoscopy in Lower Gastrointestinal Surgical Emergencies in Adults. Surg Gastroenterol Oncol. 2022;27(3):182-90.
11. Sahli L, Hagenbuch N, Ballmer PE, Rühlin M and Imoberdorf R. NRS-2002 components, nutritional score and severity of disease score, and their

association with hospital length of stay and mortality. Swiss Med Wkly. 2021;151:517-8.

دراسة للمقارنة ما بين معدل حدوث الانسداد المعوي ما بعد استئصال الزائدة الدودية بالتقنية الجراحية المفتوحة والمنظار الجراحي

بروتوكول للتوطئة للحصول على درجة الماجستير في الجراحة العامة

مقدم من

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الملخص العربي

ي عد التهاب الزائدة الدودية الحاد أحد أكثر أسباب آلام البطن الحادة شيوع ا مما يتطلب تدخل ا جراحي ا وي عتبر استئصال الزائدة الدودية العلاج الأمثل. كان استئصال الزائدة الدودية ي جرى تقليدي ا من خلال الجراحة المفتوحة وقد تطور بشكل ملحوظ مع ظهور الجراحة طفيفة التوغل. منذ طرحه في أواخر ثمانينيات القرن الماضي حظي استئصال الزائدة الدودية بالمنظار بقبول واسع وأصبح الآن الخيار المفضل نظر ا لمزاياه الموثقة جيد ا بما في ذلك تقليل الألم بعد الجراحة وقصر مدة الإقامة في المستشفى والعودة السريعة إلى النشاط الطبيعي وتحسين النتائج التجميلية. على الرغم من هذه المزايا لا تزال هناك مخاوف بشأن المضاعفات طويلة الأمد بعد الجراحة المرتبطة بكل من الجراحة بالمنظار والجراحات المفتوحة ومن أهمها انسداد الأمعاء.

ي عد انسداد الأمعاء بعد الجراحة والذي غالب ا ما ينتج عن التصاقات داخل البطن من المضاعفات الشائعة والخطيرة أحيان ا بعد جراحات البطن. يمكن أن تتأثر مسببات هذه الالتصاقات بعدة عوامل بما في ذلك مدى التعامل مع الأنسجة وانكشاف الأسطح الصفاقية ودرجة الالتهاب أثناء الجراحة والتقنية الجراحية المستخدمة.

تتضمن الجراحة المفتوحة بطبيعتها شق ا أكبر ومعالجة أكبر للهياكل داخل البطن مما قد ي هيئ المرضى لتكوين التصاقات أوسع نطاق ا وبالتالي معدلات أعلى من انسداد الأمعاء. من ناحية أخرى ترتبط الجراحة بالمنظار بنهجها ذي الوصول المحدود بصدمات أقل للأنسجة وتقليل تكوين الالتصاقات في مختلف الإجراءات البطنية. ومع ذلك فهي ليست خالية تمام ا من المخاطر ويمكن أن تؤدي المضاعفات النادرة ولكن الخطيرة مثل الفتق الداخلي والالتصاقات في موقع المنفذ أيض ا إلى انسداد الأمعاء في حالات المنظار.

يمكن أن يختلف العرض السريري لانسداد الأمعاء بعد الجراحة بشكل كبير بدء ا من أعراض متقطعة خفيفة إلى انسداد ميكانيكي كامل يتطلب إعادة عملية جراحية عاجلة. إن فهم المخاطر النسبية وطبيعة انسداد الأمعاء بعد استئصال الزائدة الدودية بالمنظار مقابل الجراحة المفتوحة أمر ضروري لاتخاذ القرارات الجراحية وتقديم المشورة المستنيرة للمريض. علاوة على ذلك فإن تحديد الاختلافات في توقيت وشدة ونتائج إدارة هذه المضاعفات بين النهجين الجراحيين قد يساعد في تحسين استراتيجيات ما حول الجراحة لتقليل معدلات اعتلال المريض.

في حين حاولت العديد من الدراسات مقارنة النتائج بعد الجراحة بين استئصال الزائدة الدودية بالمنظار والجراحية المفتوحة فإن البيانات التي تركز بشكل خاص على معدل حدوث وخصائص انسداد الأمعاء أقل وفرة وأحيان ا متضاربة. تشير بعض المراجعات بأثر رجعي إلى انخفاض معدل حدوث انسداد الأمعاء بعد استئصال الزائدة الدودية بالمنظار بينما لا تشير دراسات أخرى إلى وجود فرق كبير. قد تساهم الاختلافات في التقنية الجراحية واختيار المريض وعلم الأمراض الأساسي ومدة المتابعة في هذه التناقضات.