



TWO-PORT VERSUS CONVENTIONAL THREE-PORT LAPAROSCOPIC APPENDECTOMY: A PROSPECTIVE OBSERVATIONAL COMPARISON OF POSTOPERATIVE RECOVERY AND SAFETY

Surgery

Dr. Vikram Sahoo

Dr. Raja Srinivas
Reddy*

ABSTRACT

Background: Laparoscopic appendectomy is commonly performed with three ports, although reduced-port approaches may decrease abdominal wall trauma. This study compared postoperative pain, early recovery and safety between two-port and conventional three-port laparoscopic appendectomy. **Methods:** The supplied dataset contains 100 records, including 50 two-port and 50 three-port procedures. The source protocol describes a prospective observational study of adults aged 18–60 years with uncomplicated acute appendicitis and ASA physical status I–II. Outcomes included operative time, pain scores at 12 and 24 hours, analgesic requirement, time to oral intake, ambulation, length of stay, additional-port requirement and postoperative complications. Welch's t-test and Fisher's exact test were used as appropriate. **Results:** At 24 hours, mean VAS pain was 2.28 ± 0.63 in the two-port group and 3.03 ± 0.60 in the three-port group (mean difference -0.75 , 95% CI -0.99 to -0.50 ; $p < 0.001$). Operative time was also shorter (58.42 ± 7.77 vs 62.00 ± 6.21 minutes; $p = 0.012$). Oral intake and ambulation occurred earlier, and fewer analgesic doses were required in the two-port group ($p < 0.001$ for each). Length of stay was similar (1.10 ± 0.30 vs 1.20 ± 0.40 days; $p = 0.165$). An additional port was required in 3/50 (6.0%) two-port procedures. Complications occurred in 4.0% and 8.0% of patients, respectively ($p = 1.000$). **Conclusion:** In the supplied illustrative dataset, two-port appendectomy was associated with less early pain and faster early recovery without an apparent increase in complications. These findings remain hypothesis-generating and require verification against the original patient records.

KEYWORDS

laparoscopic appendectomy; two-port technique; three-port technique; postoperative recovery

1. INTRODUCTION

Acute appendicitis is a common surgical emergency. Laparoscopic appendectomy is widely used because it provides small incisions, less wound morbidity and rapid recovery compared with open surgery (Sauerland et al., 2004). The conventional approach uses an umbilical camera port and working ports in the suprapubic and right iliac fossa regions.

Reduced-port surgery may decrease abdominal wall trauma and improve cosmesis. In two-port appendectomy, the appendix is retracted with a percutaneous needle or suture loop, allowing work through two formal ports. The key concern is whether reduced access can maintain adequate exposure and haemostasis. Previous reports support feasibility in selected patients, although outcomes have varied (Rammohan et al., 2012; Mhatre et al., 2015).

This study compared two-port and conventional three-port laparoscopic appendectomy, focusing on postoperative pain at 24 hours as the primary outcome. Operative time, analgesic requirement, early oral intake, ambulation, hospital stay, complications and the need for an additional port were also assessed.

2. MATERIALS AND METHODS

2.1 Study Design and Participants

The source material describes a prospective observational study at the Department of General Surgery, Kalinga Institute of Medical Sciences, KIIT Deemed to be University, Bhubaneswar. Adults aged 18–60 years with uncomplicated acute appendicitis and ASA I–II were included. Patients with perforation, abscess or mass, generalized peritonitis, severe sepsis, haemodynamic instability, pregnancy, relevant previous lower abdominal surgery, significant uncontrolled comorbidity, unreliable pain assessment or refusal were excluded.

2.2 Operative Technique

The two-port procedure used a 10-mm umbilical camera port and 5-mm suprapubic working port, with appendix retraction by a percutaneous needle or suture loop through the right iliac fossa. The mesoappendix and appendicular artery were controlled with diathermy and the base was ligated. The three-port procedure added a 5-mm right iliac fossa port. An additional port was inserted whenever exposure, traction or haemostasis was inadequate.

2.3 Outcomes and Statistical Analysis

The primary endpoint was VAS pain at 24 hours. Other outcomes were VAS at 12 hours, analgesic doses, operative time, oral intake, ambulation, length of stay, day-1 discharge, additional-port requirement and complications. Continuous variables were compared using Welch's t-test and categorical variables using Fisher's exact test. Tests were two-sided with $p < 0.05$ considered significant.

2.4 Ethics and Consent

The source dissertation states that institutional ethics approval and written informed consent were part of the study protocol.

3. RESULTS

3.1 Baseline Characteristics

The supplied dataset included 100 records, with 50 patients in each group. Baseline characteristics were broadly similar. Mean age was 28.74 ± 6.35 years in the two-port group and 30.64 ± 6.82 years in the three-port group ($p = 0.153$). Men comprised 60.0% and 54.0% of the groups, respectively ($p = 0.686$). ASA I status was recorded in 62.0% and 76.0% ($p = 0.194$).

Table 1. Baseline Characteristics.

Variable	Two-port (n=50)	Three-port (n=50)	p value
Age, years	28.74 ± 6.35	30.64 ± 6.82	0.153
Male sex	30 (60.0%)	27 (54.0%)	0.686
Female sex	20 (40.0%)	23 (46.0%)	0.686
ASA I	31 (62.0%)	38 (76.0%)	0.194
ASA II	19 (38.0%)	12 (24.0%)	0.194

3.2 Postoperative pain and Analgesic use

Pain scores were lower with the two-port approach at both measured time points. At 12 hours, mean VAS was 3.02 ± 0.70 compared with 3.60 ± 0.54 in the three-port group ($p < 0.001$). At 24 hours, the primary endpoint, scores were 2.28 ± 0.63 and 3.03 ± 0.60 , respectively. The mean difference was -0.75 points (95% CI -0.99 to -0.50 ; $p < 0.001$). Analgesic use during the first 24 hours was also lower: 2.04 ± 0.70 versus 2.60 ± 0.57 doses ($p < 0.001$).

Table 2. Postoperative Pain and Analgesic Requirement.

Outcome	Two-port (n=50)	Three-port (n=50)	p value
VAS at 12 h	3.02 ± 0.70	3.60 ± 0.54	< 0.001
VAS at 24 h	2.28 ± 0.63	3.03 ± 0.60	< 0.001
Analgesic doses, 0–24 h	2.04 ± 0.70	2.60 ± 0.57	< 0.001

3.3 Operative Time and Early Recovery

Mean operative time was 58.42 ± 7.77 minutes with two ports and 62.00 ± 6.21 minutes with three ports ($p = 0.012$). Patients in the two-port group reached oral intake earlier (5.82 ± 0.70 vs 7.03 ± 0.85 hours) and ambulated earlier (9.57 ± 1.11 vs 11.35 ± 1.32 hours), with $p < 0.001$ for both outcomes. Length of stay was not significantly different (1.10 ± 0.30 vs 1.20 ± 0.40 days; $p = 0.165$). Postoperative day-1 discharge occurred in 90.0% and 80.0% of cases ($p = 0.262$).

Table 3. Operative and Early Postoperative Recovery Outcomes.

Outcome	Two-port (n=50)	Three-port (n=50)	p value
Operative time, min	58.42 ± 7.77	62.00 ± 6.21	0.012
Time to oral intake, h	5.82 ± 0.70	7.03 ± 0.85	< 0.001

Time to ambulation, h	9.57 ± 1.11	11.35 ± 1.32	<0.001
Length of stay, days	1.10 ± 0.30	1.20 ± 0.40	0.165
Discharged on postoperative day 1	45 (90.0%)	40 (80.0%)	0.262

3.4 Additional-port Requirement and Complications

An additional port was required in 3 of 50 two-port procedures (6.0%). Postoperative complications occurred in 2/50 (4.0%) two-port cases and 4/50 (8.0%) three-port cases ($p=1.000$). In the two-port group, one patient had a superficial port-site infection and one had transient postoperative ileus. In the three-port group, there were two superficial port-site infections, one transient postoperative ileus and one small port-site seroma.

Table 4. Additional-port Requirement and Postoperative Complications.

Outcome	Two-port (n=50)	Three-port (n=50)	p value
Additional port required	3 (6.0%)	0	0.242
Any postoperative complication	2 (4.0%)	4 (8.0%)	1.000
Superficial port-site infection	1 (2.0%)	2 (4.0%)	1.000
Transient postoperative ileus	1 (2.0%)	1 (2.0%)	1.000
Port-site seroma	0	1 (2.0%)	1.000

4. DISCUSSION

The clearest finding is the lower 24-hour pain score in the two-port group, accompanied by lower analgesic use and earlier oral intake and ambulation. Avoiding one incision may explain the lower early wound discomfort.

These findings are broadly consistent with reports supporting reduced-port appendectomy in selected patients. Rammohan et al. (2012) reported comparable outcomes, while Mhatre et al. (2015) found comparable complications but longer two-port procedures. Needle-assisted approaches may also offer cosmetic benefits (Sato et al., 2004).

The shorter operative time should be interpreted cautiously because duration depends on surgeon experience, anatomy and the threshold for adding a port. The 6% additional-port rate is clinically relevant; reduced-port surgery should not be pursued at the expense of safe exposure or haemostasis.

Complications and hospital stay were similar between groups; discharge may also depend on local postoperative pathways.

4.1 STRENGTHS AND LIMITATIONS

The study evaluates pain and functional recovery and allows an additional port when needed for safety. The major limitation is that the supplied numerical dataset is explicitly synthetic and illustrative. It cannot be considered clinical evidence until verified against the original records. The observational design permits selection bias and confounding; the sample is small for uncommon complications, and pain assessment cannot be blinded to port number. Other planned outcomes were unavailable and have not been invented.

4.2 Clinical Implications

If confirmed using the original records, two-port appendectomy may be useful in selected uncomplicated cases. Safe exposure and haemostasis should take priority over maintaining a two-port approach.

5. CONCLUSION

In the supplied illustrative dataset, two-port laparoscopic appendectomy was associated with lower early postoperative pain and analgesic requirement and with earlier oral intake and ambulation than conventional three-port appendectomy. Complication rates were low and comparable, while 6% of attempted two-port procedures required an additional port. These findings are promising but should be treated as hypothesis-generating until verified against the original clinical records.

6. DECLARATIONS

6.1 Ethics Approval and Consent

The source study material states that institutional ethics approval and written informed consent were part of the protocol.

6.2 Conflict of Interest

The authors declare no conflict of interest.

6.3 Funding

No external funding is stated in the supplied material.

6.4 Data Availability

The verified patient-level dataset is retained by the investigators in accordance with institutional policy and applicable ethics requirements.

7. REFERENCES

1. Semm, K. (1983). Endoscopic appendectomy. *Endoscopy*, 15, 59–64.
2. Sauerland, S., Lefering, R., & Neugebauer, E. A. M. (2004). Laparoscopic versus open surgery for suspected appendicitis. *Cochrane Database of Systematic Reviews*, (4), CD001546.
3. Rammohan, A., Jothishankar, P., Manimaran, A. B., & Naidu, R. M. (2012). Two-port vs. three-port laparoscopic appendectomy: A bridge to least invasive surgery. *Journal of Minimal Access Surgery*, 8, 140–144.
4. Mhatre, H. P., Kanake, V. B., & Nandu, V. V. (2015). Two-port vs. conventional (three-port) laparoscopic appendectomy: A new technique in laparoscopic appendectomy. *International Journal of Scientific Reports*, 1, 215–219.
5. Yagnik, V. D., Rathod, J. B., & Phatak, A. G. (2010). A retrospective study of two-port appendectomy and its comparison with open appendectomy and three-port appendectomy. *Saudi Journal of Gastroenterology*, 16, 268–271.
6. Sato, N., Kojika, M., Yaegashi, Y., et al. (2004). Mini-laparoscopic appendectomy using a needle loop retractor offers optimal cosmetic results. *Surgical Endoscopy*, 18, 1578–1581.
7. Fazili, F. M., Al-Bouq, Y., El-Hassan, O. M., & Gaffar, H. F. (2006). Laparoscope-assisted appendectomy in adults: The two-trocar technique. *Annals of Saudi Medicine*, 26, 100–104.
8. Li, X., Zhang, J., Sang, L., et al. (2010). Laparoscopic versus conventional appendectomy—A meta-analysis of randomized controlled trials. *BMC Gastroenterology*, 10, 129.