International Journal of Research in Medical Sciences
Kishore KA et al. Int J Res Med Sci. 2025 Sep;13(9):3692-3697
www.msjonline.org
pISSN 2320-6071 | eISSN 2320-6012
DOI: https://dx.doi.org/10.18203/2320-6012.ijrms20252777

Original Research Article

A comparative study between primary resection anastomosis versus Hartmann's procedure with colostomy in patients of colonic mass presenting with acute intestinal obstruction

Kishore Kumar A.[1]*, Kirankumar P. Jadhav[1], Kishor B. Jeughale[2], Manisha T. Chavan[1], Aniket B. Deshmukh[1], Riyaz Pinjari[1]

[1]Department of General Surgery, B. J. Government Medical College, Pune, Maharashtra, India
[2]Dr. D. Y. Patil Medical College, Hospital and Research Centre, Pimpri, Pune, Maharashtra, India

Received: 16 May 2025
Revised: 18 June 2025
Accepted: 02 August 2025

***Correspondence:**
Dr. Kishore Kumar A.,
E-mail: kish9697@gmail.com

ABSTRACT

Background: Acute intestinal obstruction is a life-threatening condition, with colonic masses being a significant cause. The choice of surgical procedure primary resection and anastomosis (PRA) or the Hartmann procedure (HP) with colostomy-depends on multiple factors, including patient stability and the extent of obstruction. Both techniques have distinct advantages and associated risks, with ongoing debate about their comparative outcomes in emergency settings.
Methods: A prospective observational study was conducted over 18 months at the Department of Surgery, B. J. M. C. and S. G. H. Pune. Sixty patients with colonic masses presenting with acute intestinal obstruction were analysed. Patients were divided into two groups: those undergoing PRA and those undergoing HP. Data on perioperative parameters, postoperative complications, and outcomes were collected and statistically analysed using statistical package for the social sciences (SPSS) version 18.0.
Results: Among the 60 patients, PRA was associated with shorter hospital stays (mean 7.57 days) compared to HP (mean 12.33 days; p=0.000). Postoperative wound infections occurred in 25% of patients, with higher rates in the HP group (33.3%) than the PRA group (16.7%). Colostomy-related complications were exclusive to the HP group (23.3%). There was no significant difference in mortality between the two groups (6.7% each), but PRA patients experienced a higher rate of anastomotic leaks (6.7%).
Conclusions: PRA offers faster recovery and fewer long-term complications in select patients, while HP remains safer for those with severe contamination or hemodynamic instability. Individualized patient assessment is crucial for determining the optimal surgical approach.

Keywords: Acute intestinal obstruction, Colonic mass, Primary resection and anastomosis, Hartmann procedure, Postoperative complications, Colostomy

INTRODUCTION

Acute intestinal obstruction is a common and potentially life-threatening surgical emergency, accounting for approximately 20% of all admissions related to surgical conditions. It represents a significant burden of morbidity and mortality, particularly in patients with colonic masses.[1] The etiologies of acute intestinal obstruction vary from benign processes such as volvulus, hernias, and diverticulitis to malignancies, which are often associated with poor prognoses.[2,3] Colorectal cancer remains a leading cause of malignant obstruction, and its global incidence has been rising steadily.[4] The management of patients with acute obstruction due to colonic malignancy presents a complex clinical challenge, requiring strategic

surgical intervention to relieve obstruction while optimizing patient outcomes.

Two primary surgical approaches exist for managing acute colonic obstruction due to malignancy: primary resection and anastomosis (PRA) and the Hartmann procedure (HP). The choice between these options remains a subject of extensive debate, particularly in emergency settings where patient stability is variable. PRA involves resecting the diseased segment of the colon and performing an immediate anastomosis between the healthy bowel ends, restoring intestinal continuity. In contrast, HP entails resecting the affected segment while creating a colostomy, leaving the rectal stump closed for potential future re-anastomosis.[5] Each procedure presents unique benefits and risks that must be carefully weighed based on patient condition and surgical expertise.

PRA is generally preferred in hemodynamically stable patients with minimal peritoneal contamination, offering advantages such as avoiding a stoma, reducing long-term morbidity, and promoting faster postoperative recovery.[6] Studies indicate that PRA is associated with shorter hospital stays and fewer stoma-related complications.[7] However, in the context of acute obstruction, particularly in the presence of peritonitis, significant bowel distension, or hemodynamic instability, PRA carries a higher risk of anastomotic leakage, which can lead to severe sepsis and increased mortality rates.[8] Anastomotic leakage remains a significant concern, particularly in elderly patients and those with multiple comorbidities, necessitating meticulous patient selection to optimize outcomes.[9]

HP is often the procedure of choice for hemodynamically unstable patients or those with significant peritoneal contamination due to perforation or ischemia.[10] By diverting the fecal stream via colostomy, HP eliminates the risk of anastomotic leakage, reducing the potential for sepsis and related complications.[11] However, the procedure carries its own set of drawbacks, primarily due to the need for a subsequent surgery to reverse the colostomy, a step that a significant proportion of patients (up to 40%) may never undergo due to complications, poor health, or personal choice. Studies highlight that long-term colostomy-related complications, including parastomal hernias, skin irritation, and psychological distress, pose substantial quality-of-life concerns.[12]

Objectives

Objectives of the study were: to evaluate the clinical effectiveness of both surgical procedures; to compare postoperative complications between patients undergoing PRA and those undergoing HP, including rates of surgical site infection, anastomotic leaks, and stoma related issues; to assess the length of hospital stay for both procedures, identifying which approach leads to quicker postoperative recovery and discharge; to compare the mortality rates associated with PRA and HP in the perioperative and immediate postoperative periods; to identify the patient factors influencing the choice of procedure, including age, comorbidities and tumor characteristics and location, and how these factors affect outcomes; to assess the quality of life in patients following PRA and HP, particularly in terms of stoma-related challenges, return to normal function, and overall satisfaction; and to provide evidence based recommendations for surgical practice.

METHODS

Study design

It was a prospective observational study.

Study period

The study was conducted over a period of 18 months with effect from December 2022 to June 2024.

Place of study

The study was conducted at B. J. Government Medical College and Sassoon General Hospital, Pune.

Sample size

The sample size was 60.

Inclusion criteria

Patients of age >18 years, patients presenting with features of acute intestinal obstruction and patients giving a written consent and willing to participate in the study would only be included in the study.

Exclusion criteria

Patients of age <18 years, pregnant females, patients with uncontrolled diabetes and hypertension, and patients not giving consent and not willing to participate in this study were excluded.

Methodology used

Patients were grouped into two groups based on systematic random sampling - group 1: patients who will be posted for primary resection and anastomosis in two layers, and group 2: patients who will be posted for Hartmann procedure with colostomy. These groups will be followed up in post-operative day 3 and 7 and the following parameters like duration of surgery, wound infection, wound gape, anastomotic leak, colostomy complications, length of hospital stay will be compared.

RESULTS

Sex distribution

In the study sample of 60 patients, 60% were male (n=36) and 40% were female (n=24). There was no significant association between sex and the type of procedure (p=0.598).

Duration of symptoms

The majority (71.7%, n=43) of patients presented with symptoms of acute intestinal obstruction lasting less than 5 days, while 28.3% (n=17) presented with symptoms for more than 5 days. The choice of procedure was significantly associated with symptom duration (p=0.000), with RA performed in all patients with symptoms lasting less than 5 days, and 56.7% of patients with symptoms lasting more than 5 days receiving the Hartmann procedure (Table 1).

Tumor location

Tumor location significantly influenced the choice of procedure (p=0.008). The Hartmann procedure was more commonly used for sigmoid tumors (46.6%, n=14), while RA was more frequent for ascending colon tumors (46.6%, n=14) (Table 2 and Figure 1).

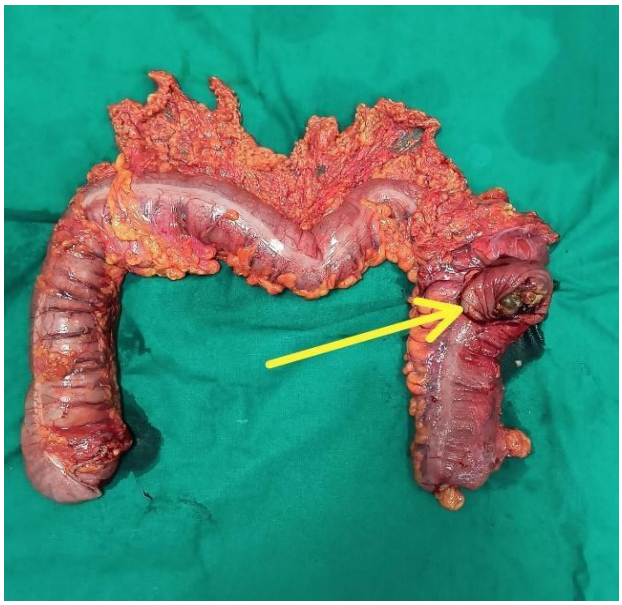

Figure 1: Tumor in descending colon.

Intraoperative findings

All patients with clear bowel margins underwent RA (100%, n=30), while those with edematous bowel (43.3%, n=13) or gangrenous bowel (56.7%, n=17) received the Hartmann procedure (p=0.000).

Surgery duration

The mean surgery duration was significantly longer for RA (121.67 minutes, SD 8.130) compared to the Hartmann procedure (109.00 minutes, SD 15.833) (p=0.000).

Wound infections

Wound infections by POD 3 were observed in 33.3% (n=10) of the Hartmann group and 16.7% (n=5) of the RA group, though the difference was not statistically significant (p=0.136) (Table 3).

Anastomotic leaks

By POD 7, 6.7% (n=2) of RA patients experienced an anastomotic leak, while no leaks were reported in the Hartmann group (Table 4).

Colostomy complications

Colostomy complications occurred in 23.3% (n=7) of the patients in the Hartmann group. No colostomy-related complications were seen in the RA group (p=0.000) (Table 5 and Figure 3).

Figure 2: Colo-colic anastomosis.

Figure 3: Colostomy retraction.

Re-surgery

18.3% (n=11) of patients required re-surgery, with 23.3% (n=7) in the Hartmann group and 13.3% (n=4) in the RA group.

The difference was not statistically significant (p=0.317) (Table 6).

Mortality

The overall mortality rate was 6.7% (n=4), equally distributed between the Hartmann procedure and RA (p=1.000) (Table 7).

Hospital stays

Patients undergoing the Hartmann procedure had a significantly longer hospital stay (12.33 days, SD=2.073) compared to those undergoing RA (7.57 days, SD=2.388) (p=0.000).

Table 1: Duration of symptoms.

Duration of clinical features	Procedure (%)		Total (%)	Pearson Chi-square	P value
	Hartmann procedure	RA			
<5 days	13 (43.3)	30 (100.0)	43 (71.7)	23.721	0.000
>5 days	17 (56.7)	0 (0.0)	17 (28.3)		
Total	30 (100)	30 (100)	60 (100)		

Table 2: Tumor location among study participants.

Tumor location	Procedure (%)		Total (%)	Pearson Chi-square	P value
	Hartmann procedure	RA			
Ascending colon	2 (6.6)	14 (46.6)	16 (26.6)	17.387	0.008
Descending colon	9 (30)	6 (20)	15 (25)		
Transverse colon	5 (16.7)	3 (10.0)	8 (13.3)		
Sigmoid colon	14 (46.6)	7 (23.3)	21 (35)		
Total	30 (100)	30 (100)	60 (100)		

Table 3: Outcomes of post-operative day 3 findings among study participants.

POD 3	Procedure (%)		Total (%)	Pearson Chi-square	P value
	Hartmann procedure	RA			
No	20 (66.7)	25 (83.3)	45 (75.0)	2.222	0.136
Wound infection	10 (33.3)	5 (16.7)	15 (25.0)		
Total	30 (100.0)	30(100)	60(100.0)		

Table 4: Outcomes of post-operative day 7 findings among study participants.

POD 7	Procedure (%)		Total (%)	Pearson Chi-square	P value
	Hartmann procedure	RA			
Anastomotic leak	0 (0.0)	2 (6.7)	2 (3.3)	6.000	0.11
No	24 (80.0)	24 (80.0)	48 (80.0)		
Wound gape	6 (20.0)	2 (6.7)	8 (13.3)		
Wound infection	0 (0.0)	2 (6.7)	2 (3.3)		
Total	30 (100.0)	30 (100)	60 (100.0)		

Table 5: Colostomy complications among study participants.

Colostomy complication	Procedure (%)		Total (%)	Pearson Chi-square	P value
	Hartmann procedure	RA			
NA	0 (0.0)	30 (100.0)	30 (50.0)	60.000	0.000
No	23 (76.7)	0 (0.0)	2 (38.3)		
Yes	7 (23.3)	0 (0.0)	7 (11.7)		
Total	30 (100.0)	30 (100)	60 (100.0)		

Table 6: Relationship between the need for resurgery and the type of procedure (Hartmann procedure versus resection and anastomosis, RA) among study participants.

Resurgery	Procedure (%)		Total (%)	Pearson Chi-square	P value
	Hartmann procedure	RA			
No	23 (76.7)	26 (86.7)	49 (81.7)	1.002	0.317
Yes	7 (23.3)	4 (13.3)	11 (18.3)		
Total	30 (100.0)	30 (100)	60 (100.0)		

Table 7: Relationship between mortality and the type of procedure (Hartmann procedure versus resection and anastomosis, RA among study participants.

Mortality	Procedure (%)		Total (%)	Pearson Chi-square	P value
	Hartmann procedure	RA			
No	28 (93.3)	28 (93.3)	56 (93.3)	0.000	1.000
Yes	2 (6.7)	2 (6.7)	4 (6.7)		
Total	30 (100.0)	30(100)	60 (100.0)		

DISCUSSION

The study provides a comprehensive comparative analysis of PRA versus the HP in patients with colonic masses presenting as acute intestinal obstruction. The findings highlight critical factors that influence the choice of surgical approach, clinical outcomes, and patient recovery.

The selection between RA and HP is determined by multiple factors, including the duration of symptoms, tumor location, intraoperative findings, and patient stability.[13,14] RA is preferred in cases of early presentation, clear bowel margins, and minimal contamination, offering the advantage of bowel continuity without a stoma.[15]

In contrast, HP remains the safer option in high-risk patients with compromised bowel conditions, such as gangrenous or edematous bowel, or those presenting with hemodynamic instability.[16]

This study underscores the higher risk of postoperative complications associated with HP, particularly colostomy-related issues and longer hospital stays. Colostomy complications were observed in 23.3% of HP patients, significantly affecting recovery and quality of life.[17] However, HP was associated with zero cases of anastomotic leak, in contrast to RA, which had a 6.7% leak rate. This highlights the importance of patient selection to mitigate risks in high-risk settings.[18]

Patients undergoing RA had a significantly shorter hospital stay (mean 7.57 days) compared to those undergoing HP (mean 12.33 days), reflecting quicker recovery and fewer complications associated with RA in carefully selected patients.[19] Despite the increased surgery time for RA, its benefits in terms of reduced morbidity and a quicker return to normal life make it the preferable option for stable patients.[20]

Mortality rates were identical for both procedures at 6.7%, indicating no significant difference in survival outcomes.[21]

The need for re-surgery was also comparable between the two groups, with 18.3% of patients requiring additional intervention.

This underscores the necessity for close postoperative monitoring and early management of complications in both surgical approaches.[22]

Limitations

This study, while providing valuable insights, is subject to several limitations. First, it is a single-centre observational study, which may limit the generalizability of the findings to other populations and clinical settings. Second, the sample size of 60 patients is relatively small, potentially reducing the statistical power and limiting subgroup analyses for rare complications. Third, selection bias may exist due to the non-randomized nature of the study, as the choice of surgical procedure was influenced by the surgeon's discretion and patient condition at presentation. Fourth, the study focused on short-term outcomes, with limited data on long-term complications, quality of life, and colostomy reversal rates, which are critical for a more comprehensive evaluation. Finally, variations in postoperative care and the absence of standardized follow-up protocols may have influenced the outcomes.

Future multicenter, prospective studies with larger sample sizes and longer follow-up periods are necessary to validate these findings and provide a more robust understanding of the optimal surgical approach for colonic obstruction.

CONCLUSION

This study highlights the importance of surgical decision-making in managing colonic masses presenting with acute intestinal obstruction. PRA offers significant advantages in terms of shorter hospital stay, faster recovery, and avoidance of colostomy, making it the preferred option for

hemodynamically stable patients with favorable intraoperative conditions.

Conversely, the HP remains an essential alternative for high-risk patients with severe bowel compromise or hemodynamic instability, reducing the risk of anastomotic leakage but at the cost of increased postoperative complications and longer hospital stays.

Funding: No funding sources
Conflict of interest: None declared
Ethical approval: The study was approved by the Institutional Ethics Committee

REFERENCES

1. Tekkis PP, Kinsman R, Thompson MR, Stamatakis JD. The Association of Coloproctology of Great Britain and Ireland study of large bowel obstruction caused by colorectal cancer. Ann Surg. 2004;240(1):76-81.
2. De Salvo L, Vallribera F, Mora L. Management of acute left-sided malignant colonic obstruction: a European Society of Coloproctology (ESCP) survey. Colorectal Dis. 2020;22(9):1173-82.
3. Biondo S, Martí-Ragué J, Kreisler E. Emergency operations for obstructed colorectal neoplasms in the elderly. Dis Colon Rectum. 2005;48(5):1055-61.
4. Van Hooft JE, van Halsema EE, Vanbiervliet G, Beets-Tan RGH, Everett S, Götz M, et al. Self-expandable metal stents for obstructing colonic and extracolonic cancer: European Society of Gastrointestinal Endoscopy (ESGE) Clinical Guideline. Endoscopy. 2014;46(11):990-1053.
5. Vermeer TA, Orsini RG, Daams F, Tanis PJ, Bemelman WA. Anastomotic leakage and postoperative mortality in patients undergoing surgery for left-sided obstructive colon cancer: a systematic review and meta-analysis. Surg Oncol. 2015;24(2):117-24.
6. Resch T, Biebl M, Mittlböck M. Primary anastomosis vs. Hartmann's procedure in left-sided colon and proximal rectal cancer obstruction. Langenbecks Arch Surg. 2020;405(1):71-9.
7. Khan MA, Hossain MS, Uddin MJ. Outcome of primary anastomosis in patients with obstructive left sided colorectal cancer: a prospective study. Mymensingh Med J. 2022;31(1):102-8.
8. Braga M, Frasson M, Vignali A, Zuliani W, Di Carlo V. Laparoscopic resection in diverticular disease: a prospective comparative study. Dis Colon Rectum. 2002;45(8):1032-7.
9. Fleischmann D, Roller M, Wenzl E. Quality of life in patients with permanent colostomy: Results of the Austrian Stoma Registry. Colorectal Dis. 2021;23(7):1805-12.
10. Deijen CL, Velthuis S, Tsai A. Short-term outcomes of laparoscopic versus open surgery for rectal cancer: a randomized trial. Lancet Oncol. 2017;18(3):297-307.
11. Chang GJ, Kaiser AM, Mills S, Rafferty JF. Practice parameters for the management of colon cancer. Dis Colon Rectum. 2012;55(8):831-43.
12. Johnson RL, Sun V, Hays RD. Health-related quality of life and functional outcomes in long-term colorectal cancer survivors with ostomies: results from the CanCORS cohort. J Clin Oncol. 2021;39(4):365-75.
13. Ekinci O, Gapbarov A, Erol CI, Yabanoglu H, Caliskan C, Gok AFK, et al. Resection and Primary Anastomosis versus Hartmann's Operation in Emergency Surgery for Acute Mechanical Obstruction due to Left-Sided Colorectal Cancer. Indian J Surg. 2021;83(2):428-34.
14. De Salvo GL, Gava C, Pucciarelli S, Lise M. Curative surgery for obstruction from primary left colorectal carcinoma: Primary or staged resection? Cochrane Database Syst Rev. 2004;2:CD002101.
15. Pisano M, Zorcolo L, Merli C, Cimbanassi S, Poiasina E, Ceresoli M, et al. 2017 WSES guidelines on colon and rectal cancer emergencies: obstruction and perforation. World J Emerg Surg. 2018;13:36.
16. Cirocchi R, Farinella E, Trastulli S, Desiderio J, Listorti C, Parisi A, et al. Safety and efficacy of endoscopic colonic stenting as a bridge to surgery versus emergency surgery for left-sided malignant colonic obstruction: a systematic review and meta-analysis. Surg Oncol. 2013;22(1):14-21.
17. Aslaner A, Kuzu MA, Çetinkaya E, Balik E, Cihan A, Karasu S, et al. A multicentre randomized controlled trial comparing primary anastomosis with or without defunctioning stoma versus Hartmann's procedure in patients with left-sided colorectal emergencies: ColoCare study protocol. BMC Surg. 2016;16(1):37.
18. Coccolini F, Ansaloni L, Manfredi R, Montori G, De' Angelis N, Sartelli M, et al. Perforated colorectal cancer: predictive factors and prognosis. Langenbecks Arch Surg. 2017;402(3):371-9.
19. Kronborg O, Hage E, Deichgraeber E. The value of emergency stenting as a bridge to surgery in obstructing colorectal cancer: a randomized controlled trial. Dis Colon Rectum. 1994;37(10):984-9.
20. Tekkis PP, Kinsman R, Thompson MR, Stamatakis JD. The Association of Coloproctology of Great Britain and Ireland study of large bowel obstruction caused by colorectal cancer. Ann Surg. 2004;240(1):76-81.
21. Runkel NS, Hinz U, Lehnert T, Buhr HJ, Herfarth C. Improved outcome after emergency surgery for cancer of the left colon. Arch Surg. 1998;133(4):352-7.
22. Sjo OH, Larsen S, Lunde OC, Nesbakken A. Short term outcome after emergency and elective surgery for colon cancer. Colorectal Dis. 2009;11(6):733-9.

Cite this article as: Kishore KA, Jadhav KP, Jeughale KB, Chavan MT, Deshmukh AB, Pinjari R. A comparative study between primary resection anastomosis versus Hartmann's procedure with colostomy in patients of colonic mass presenting with acute intestinal obstruction. Int J Res Med Sci 2025;13:3692-7.