

Technical Difficulties and Complications During Hartmann's Reversal: 5-Year Experience At Tertiary Care Hospital

Shahneela Manzoor,^{1*} Muhammad Naeem Khan,¹ Shabina Jaffar,¹ Mazhar Iqbal,¹ Mariyah Anwer,¹ Hira Moosa¹

ABSTRACT

Objective To find out the technical difficulties and complications during Hartmann's reversal procedure.

Study design Cross sectional observational study..

Place & Duration of study Department of General Surgery Ward-2, Jinnah Postgraduate Medical Center Karachi, from December 2017 to December 2022.

Methodology All patients in whom Hartmann's reversal procedure done, were included in the study. Technical difficulties during operation, postoperative complications, morbidity and mortality were recorded. Descriptive statistics were used to present the data. Confidence interval and z-values were calculated. A p value of <0.05 was taken as statistically significant.

Results A total of 71 patients were operated. There were 34 (47.89%) males and 37 (52.11%) female patients. The age was from 14 years to 71 years with the mean age of 41.02±14.89 years. The median age was 41 years. In 41 (57.75%) patients early reversal and in 30 (42.25%) late reversal procedure was done. In 53 (74.64%) patients surgical stapler was used for the anastomosis and in 15 (21.13%) it was hand sewn.

Complications occurred in 23 (32.39%) patients. This include hemorrhage (n=1 -1.41%), ureteral injury (n=1 - 1.41%), urinary bladder injury (n=5 - 7.04%), anastomotic leakage (n=4 - 5.63%), burst abdomen (n=5 - 7.04%), stricture formation (n=5 - 7.04%), and rectovaginal fistula (n=2 - 2.82%). More complications were observed with stapled anastomosis (n=19) than hand sewn technique (n=4). Complications occurred in 19 patients of early and 04 of late reversal group. Procedure was abandoned in 03 (4.23%) patients. This was due to dense adhesions in 02 (2.82%) and vascular injury in 01 (1.41%) patient. One patient among this group expired.

Conclusion Morbidity in early reversal patients was more common as compared to late reversal groups. Complications were noted more often in stapled than hand sewn anastomosis technique.

Key words Hartmann's procedure, Reversal, Complications, Technical difficulties, Anastomotic leak.

¹ Department of General Surgery JPMC, Karachi.

Correspondence:

Dr. Shahneela Manzoor ^{1*}

Department of General Surgery Ward-2

Jinnah Postgraduate Medical Center

Karachi

Email: a.shani@live.com

INTRODUCTION:

Henri Albert Hartmann, a French surgeon, first explained the Hartmann's procedure, in 1921, as a distinctive approach to overcome increased rates of morbidity and mortality after resection and primary anastomosis of left-sided colonic obstruction.¹ This procedure since then has been performed for number of other abdominal pathologies.² In Hartmann's

reversal procedure the intestinal continuity is restored. Hartmann's procedure is generally done in old, frail, septic, hemodynamically unstable patients and in some emergency situations. Hartmann's procedure requires a prolong recovery time. The success of Hartmann's reversal procedure is higher in benign surgical conditions.

Technical challenges in reversal include dense pelvic adhesions, chronic pelvic infection, difficulty in identification of rectal stump and anastomosis with a short rectal stump. Stoma closure is challenging in patients with comorbid and history of previous surgery.³ Hartmann's reversal procedure is therefore not done in large number of patients who are left with a permanent stoma.^{4,5} Due to high morbidity and mortality rates of Hartmann's reversal, permanent stoma remained in 35% of patients even if the procedure was performed for a benign condition.⁶ In the absence of established guidelines, it is the decision of the surgeon and patient after thorough discussion on pros and cons, whether to restore bowel continuity or not. Factors that favor reversal with low complication rate are American Society of Anesthesiologists (ASA) low score, younger age, benign disease, male gender, few comorbid conditions and experience of the operating surgeons.^{7,8} This study was conducted to document the complications, morbidity and mortality of Hartman's reversal procedure in a tertiary care hospital and compare the data with the reported literature. This adds to evidence based new knowledge on the subject that may guide others.

METHODOLOGY:

This was a cross sectional observational study, conducted at Jinnah Postgraduate Medical Center Karachi, from December 2017 to December 2022. Patients who underwent Hartmann's reversal procedure, above 14 years of age of both gender were included. Patients of metastatic carcinoma, and recurrence of growth of rectum were excluded. Early reversal was labeled when procedure was done within three months in benign conditions. In delayed reversal category the procedure was done after six months and in malignant diseases. Ethical review board permission was taken. Sample size was obtained through non-probability purposive technique. Informed consent, where applicable assent, was obtained.

Detailed history was taken and examination done. The indication of Hartmann's procedure was noted. This included recto-sigmoid growth, colonic perforation or obstruction, gangrene due to sigmoid volvulus, Hirschsprung's disease and trauma. Proctoscopy was done during clinical examination.

Barium enema and sigmoidoscopy were done to assess the size of the rectal stump. All investigations like complete blood count, blood biochemistry and electrolytes were carried out. Anesthesia fitness was taken.

Hartmann's reversal procedure was done either by stapler or hand sewn techniques. Hand sewn technique was used in long stump that extended up to the pelvic brim. In short stumps below the pelvic brim stapler was used. During surgery, the technical difficulties faced, were noted. Postoperative early complications like hemorrhage, ureteral injury, bladder injury, anastomotic leakage, burst abdomen, stricture formation and postoperative incontinence of urine were recorded. Mortality was also noted.

A database was developed on SPSS version 23. The outcome of complications was presented by their frequencies along with proportions of total cases. A 95% confidence interval was calculated for each proportion and tested by one sample test for binominal proportion against null hypothesis of $p < 0.5$. The results were considered significant with $p < 0.05$ normal theory method.

RESULTS:

In 102 patients Hartmann's procedure was performed. In 31/102(30.39%) reversal was not done due to loss of follow up, locally advanced malignancy or colorectal carcinoma. In 71/102 (69.61%) patients reversal was done. The details are given in table I. Hartmann's reversal was done in 37 (52.11%) females and 34 (47.89%) males. The age was from 14 years to 71 years with the mean age of 41.02 ± 14.89 years. The median age was 41 years and minimum age 14 years. Procedure was abandoned in 3 (4.23%) patients. This was due to dense adhesions in 02 (2.82%) and vascular injury in 01 (1.41%). One (1.41%) patient in this group expired.

In 53 (74.64%) patients staplers were used while hand sewn anastomosis was done in 15 (21.13%). Complications were observed in 23 (32.39%) patients. Details are given in table II. The most common injury during surgery was urinary bladder perforation ($n=5$ -7.04%). All complications were statistically significant with $p < 0.001$. More complications were observed in patients where stapler was used ($n=19$ -53%). In hand sewn anastomosis group complication were noted in 4 (26.66%) patients. Complications occurred in 19 /41(46.34%) patients of early and 04/30 (13.33%) of late reversal group.

Table I: Indications of Hartmann's Procedure (n=71)

Hartmann's Indications	Number of Patients n (%)	95% CI	p-value	z- value
Sigmoid volvulus	31 (43.66%)	32.49-55.34	0.28	1.06
Carcinoma recto-sigmoid	30 (42.25%)	31.18-53.94	0.19	1.30
Trauma	4 (5.63%)	1.81-13.03	0.001	7.47
Hirschsprung's disease	6 (8.45%)	3.49-16.75	0.001	7.00

*CI=Confidence Interval

Table II: Postoperative Complications of Hartmann's Reversal

Postoperative Complications	Number of Complications n (%)	95% CI	p-value	z- value
Hemorrhage	1 (1.41%)	0.007-6.74	0.001	8.18
Ureteral Injury	1 (1.41%)	0.07-6.74	0.001	8.18
Urinary bladder injury	5 (7.04%)	2.62-14.92	0.001	7.23
Anastomotic leakage	4 (5.63%)	1.81-13.03	0.001	7.47
Burst abdomen	5 (7.04%)	2.62-14.92	0.001	7.23
Stricture	5 (7.04%)	2.62-14.92	0.001	7.23
Rectovaginal fistula	2 (2.82%)	0.47-8.99	0.001	7.95

DISCUSSION:

Hartmann's procedure and its reversal, both are challenging for the surgeons. This study provided evidence based data on the subject of Hartmann's reversal procedure from a tertiary care center. The popularity of primary anastomotic procedures in recent era to treat left colonic pathologies is on increase. However, there are situations when Hartmann's procedure is preferred like in patients with diffuse peritonitis, sepsis and obstruction. This is more of a damage control procedure done in an emergency situation where saving life is preferred over restoring bowel continuity. However, Hartmann's reversal procedure is equally demanding. It is technically difficult and fraught with many challenges, not only for the primary disease for which the surgery was performed but due to many associated conditions in these patients as well.

Hodgson et al reported that age less than 70 years was the only significant factor for performing Hartmann's reversal.⁹ Royo-Aznar et al reported that Hartmann's reversal mostly done in patients aged less than 69 years.¹⁰ Hess et al mentioned slightly different age for this procedure.¹¹ Although there are different cut-of ages, these studies showed that age is a significant factor to decide for reversal. In this study only one patient was above 70 years of age.

There may be technical difficulties in Hartmann's reversal following Hartmann's procedure. Patients having abdominal wall defects and dense adhesions

are most likely to develop organ injuries. In patients with malignancy, the radiotherapy and chemotherapy distort the surgical field. Technical difficulties result from prolonged pelvic infections, short and buried rectal stump which may be difficult to identify deep in pelvis, and may of short length.^{5,12} In this study main technical difficulties were similar to those reported by other researchers. In this study, only 69.61% patients underwent Hartmann's reversal procedure, which is comparable to reported literature.¹⁰ Overall complication rate of 22.9% - 68.4%, and a mortality rate of 0% - 4.7% are reported previously.^{10,13}

Clinically when there is peritonitis as a result of anastomotic dehiscence, feculent material in drain may be noticed. This may be apparent radiologically as intra-abdominal collection.¹⁴ This is a drastic complication with significant morbidity. This can be as high as 37. 5%.¹⁵ In this study complications occurred in 23 patients. This included hemorrhage as well organ injuries. Anastomotic leak fortunately occurred in 5.63% patients only. One patient died in this series.

LIMITATIONS OF THE STUDY:

All patients of Hartmann's procedure were not included and sample size was small. This may affect overall outcome of Hartmann's reversal procedure.

CONCLUSION:

Morbidity in early reversal was more as compared to late reversal cases. Complications were more often noted in patients where stapler was used for anastomosis. Overall complication rate was low with acceptable mortality.

REFERENCES:

1. Sanderson ER. Henri Hartmann and the Hartmann operation. *Arch Surg.* 1980; 115: 792-3. doi: 10.1001/archsurg.1980.01380060088026
2. Barbieux J, Plumereau F, Hamy A. Current indications for the Hartmann procedure. *J Visc Surg.* 2016;153:31-8. <https://doi.org/10.1016/j.jviscsurg.2016.01.002>.
3. Garber A, Hyman N, Osler T. Complications of Hartmann takedown in a decade of preferred primary anastomosis. *Am J Surg.* 2014; 207: 60-4. DOI: 10.1016/j.amjsurg.2013.05.006
4. National Bowel Cancer Audit Project Team. London: Health and Social Care Information Centre. 2015. [Internet] Available from URL [statistical/national-bowel-cancer-audit/national-bowel-cancer-audit-report-2015](http://statistical.national-bowel-cancer-audit/national-bowel-cancer-audit-report-2015) Accessed on January 2023.
5. Hallam S, Mothe BS, Tirumulaju R. Hartmann's procedure, reversal and rate of stoma-free survival. *Ann R Coll Surg Engl.* 2018; 100: 301-7. DOI: 10.1308/rcsann.2018.0006.
6. Horesh N, Rudnicki Y, Dreznik Y, Zbar AP, Gutman M, Zmora O, et al. Reversal of Hartmann's procedure: Still a complicated operation. *Tech Coloproctol.* 2018;22:81-7. DOI: 10.1007/s10151-017-1735-4.
7. Kang JH, Kang BM, Yoon SN, Kim JY, Park JH, Oh BY, et al. Analysis of factors affecting reversal of Hartmann's procedure and post reversal complications. *Sci. Rep.* 2020;10:16820. doi: 10.1038/s41598-020-73791-w
8. Baiocchi GL, Guercioni G, Vettoretto N, Scabin S, Millo, P, Muratore A, et al. ICG fluorescence imaging in colorectal surgery: A snapshot from the ICRAI study group. *BMC Surg.* 2021;21:190. doi: 10.1186/s12893-021-01191-6.
9. Hodgson R, An V, Stupart DA, Guest GD, Watters DA. Who gets Hartmann's reversed in a regional centre?. *Surgeon.* 2016;14:184-9.
10. Royo-Aznar A, Moro-Valdezate D, Martín-Arévalo J, Pla-Martí V, García-Botello S, Espín-Basany E, et al. Reversal of Hartmann's procedure: a single-centre experience of 533 consecutive cases. *Colorectal Dis.* 2018;20:631-8. doi: 10.1111/codi.14049.
11. Hess GF, Schafer J, Rosenthal R, Kettelhack C, Oertli D. Reversal after Hartmann's procedure in patients with complicated sigmoid diverticulitis. *Colorectal Dis.* 2017;19:582-8.
12. Melkonian E, Heine C, Contreras D, Rodriguez M, Opazo P, Silva A, et al. Reversal of the Hartmann's procedure: A comparative study of laparoscopic versus open surgery. *J Minim Access Surg.* 2017;13:47-50. doi: 10.4103/0972-9941.181329.
13. Horesh N, Lessing Y, Rudnicki Y, Kent I, Kammar H, Ben-Yaacov A, et al. Considerations for Hartmann's reversal and Hartmann's reversal outcomes-a multicenter study. *Int J Colorectal Dis.* 2017;32:1577-1582. doi: 10.1007/s00384-017-2897-2. 897-2.
14. Benedetti M, Ciano P, Pergolini I, Ciotti S, Guercioni G, Ruffo G, et al. Early diagnosis of anastomotic leakage after colorectal surgery by the Dutch leakage score, serum procalcitonin and serum C-reactive protein: Study protocol of a prospective multicentre observational study by the Italian ColoRectal Anastomotic Leakage (iCraL). *G. Chir.* 2019;40:20-5. DOI:10.1002/bjs5.50269.
15. Akýncý O, Yurdacan M, Turgut BC, Uludağ SS, Pimpek O. Reversal of Hartmann's procedure is still a high-morbid surgery? *Ulus Travma Acil Cerrahi Derg.* 2020;26:255-9. doi.org/10.14744/tjtes.2019.71725.

Received for publication: 22-05-2023

Accepted after revision: 06-06-2023

Author's Contributions:

Shahneela Manzoor: Data collection and manuscript writing.

Muhammad Naeem Khan: Conceived the idea and designed the study.

Shabina Jaffar: Review of the manuscript.

Mazhar Iqbal: Review of the manuscript.

Mariyah Anwer: Statistical analysis of the data.

Hira Moosa: Data collection.

All authors claim revising the manuscript, final approval of the draft, and agreement to be accountable for the content of the article.

Ethical Statement: Institution review board permission was obtained prior to the study and informed consent and assent where applicable, were taken from the patients.

Competing Interest: The authors declare that they have no competing interest.

Source of Funding: None

How to cite this article:

Manzoor S, Khan MN, Jaffar S, Iqbal M, Anwer M, Moosa H.

Technical difficulties and complications during hartmann's reversal: 5-year experience at tertiary care hospital. J Surg Pakistan. 2023;28(1):9-13.

This is an open access article distributed in accordance with the Creative Commons Attribution (CC BY 4.0) license: <https://creativecommons.org/licenses/by/4.0/> which permits any use, Share — copy and redistribute the material in any medium or format, Adapt — remix, transform, and build upon the material for any purpose, as long as the authors and the original source are properly cited. © The Author(s) 2023