

Reversal of Colostomy: Management and Outcome at Khartoum

Baha E Abbaker^{1*}, Aamir A Hamza²

¹Senior Registrar of General Surgery, Khartoum Teaching Hospital, Khartoum, Sudan

²Professor of Surgery, College of Medicine, University of Bahri, Khartoum, Sudan

DOI: <https://doi.org/10.36347/sjams.2025.v13i11.019>

| Received: 06.01.2015 | Accepted: 27.03.2015 | Published: 17.11.2025

*Corresponding author: Baha E Abbaker

Senior Registrar of General Surgery, Khartoum Teaching Hospital, Khartoum, Sudan

Abstract

Original Research Article

Colostomy may be formed for bowel cancer, inflammatory bowel disease, diverticulitis and injuries to the bowel. Reversing temporal colostomy to reestablish intestinal continuity may result in morbidity and mortality. The objective is to study the management and outcome of colostomy reversal. This is a Prospective, descriptive and hospital-based study of colostomy reversal procedures from 2014-2015 at Khartoum, Sudan. Data collected from patients using a designed questionnaire and analysed using SPSS version 20.0. Forty eight patients had colostomy reversal operations were included in the study. The primary operation were emergency in 41 (85.4%) and electives in seven (14.6%) of the patients. Males were 37 (77.1%) and females were 11 (22.9%). The mean age was 45 ± 12.5 years; range (22-74 years). Diabetes mellitus as risk factor was seen in 22.9% of the patients. The common colostomies reversed were Hartmann procedure 54.2% and by transverse loop colostomy 20.8%. The common indications for colostomy construction were; recto-sigmoid cancer in 45.8% and nonviable sigmoid volvulus in 35.4%. The mean interval for reversal was 3.2 ± 1.9 months (range 1-12 months). Hand sewing method for closure was used in 97.9% and stapled in 2.1%. Most of the patients were discharged uneventfully 34 (70.8%), complications seen in 12 (25%) and two (4.2%) patients died. The common complications were surgical site infection in eight (16.7%), iatrogenic bowel injury in three (6.3%), anastomotic leak in three (6.3%) and seroma in four (8.3%). The mean duration of hospital stay was 7.8 ± 3.2 days (range 2-16 days). In conclusion; the optimal timing of closure varies from patient to patient. All surgeons including surgeon's under-training should be well versed with it. Delayed reversal seems more advantageous and safer as compared to early reversal procedures.

Keywords: Colostomy reversal, Hartmann procedure, Colostomy, Double barrel colostomy.

Copyright © 2025 The Author(s): This is an open-access article distributed under the terms of the Creative Commons Attribution 4.0 International License (CC BY-NC 4.0) which permits unrestricted use, distribution, and reproduction in any medium for non-commercial use provided the original author and source are credited.

INTRODUCTION

Faecal diversions may be required on either a temporary or permanent basis for the management of a variety of pathologic conditions, including congenital anomalies, obstructive or inflammatory disorders, traumatic disruption of the intestinal tract, or gastrointestinal malignancy [1].

Colostomies are now performed for a variety of indications [1, 2]. The commonest indication locally was malignancy in 41.8%, intestinal obstruction in 35.4%, ano-rectal anomalies in 10%, large bowel trauma in 10% and perineal pathology 2.7% [4].

Regionally the most frequent conditions were gangrenous sigmoid volvulus in 36.1%, colonic cancer in 29% and colonic trauma in 20% [5]. However in Western countries the commonest indication was diverticular disease followed by carcinoma [6]. The majority of colostomies were emergent [7, 8].

The interval from the colostomy creation to colostomy closure varied from two months to 18 months with a mean interval of 6.6 months [9]. Hand sewn anastomosis is the commonest method for closure of colostomies [10].

Complications following reversal of Hartmann procedure are common, with morbidity rates of up to 50%, and a mortality rate as high as 10% [11]. Surgical site infections (18%) and anastomotic leak (07.0%) are the common complications [10, 12].

Duration of hospital stay after colostomy reversal is reflecting the outcome and morbidity of the operation. The maximum of median hospital stay 17 days [8]. The minimum of median hospital stay was 6.8 day [13]. Though colostomy creations and reversals are frequently performed by Sudanese surgeons, collected information is lacking concerning the timing of colostomy reversal, the complications of colostomy

closure and final outcome of patients who underwent colostomy reversal procedure. Therefore, this is a first study done in Sudan and is intended to present the patterns of patients who underwent colostomy reversal, the timing of reversal, the frequently witnessed complications and the postoperative outcomes of patients operated upon for colostomy reversal procedure.

PATIENTS AND METHODS

This is a prospective, descriptive and hospital-based study of colostomy reversal. It was conducted over one year, from 2014-2015 at Omdurman Teaching Hospital, Sudan. Included were adult patients presented with colostomy for reversal regardless its type or indication. The variables included patient's gender and age, type and indication of colostomy, interval taken for

closure, technique of reversal, outcome, early post-operative complications, risk factors and duration of hospital stay. Consent and ethical clearance were obtained in advance. Data collected from patients using a designed questionnaire and analysed using SPSS version 20.0, P value was considered significant if ≤ 0.05 .

RESULTS

Forty eight patients had colostomy reversal were included in the study. The initial operation that ended with colostomy were emergency in 41 (85.4%) and electives in seven (14.6%). Male to female ratio was 4:1. The mean age was 45 ± 12.5 years; range (22-74) years Most of the patients 38 (79.2%) were in the age group 31-60 years (**Table 1**).

Table 1: Age group of patients with colostomy reversal in the study population

Age group (years)	Frequency	Percent
21- 30	07	14.6
31-40	13	27.1
41-50	12	25.0
51-60	13	27.1
>60	03	06.2
Total	48	100

The risk factors in this series were; diabetes mellitus, hypertension, smoking and anaemia in 11 (22.9%), seven (14.6%), six (12.5%) and one (2.1%) of the patients respectively

Type of colostomy reversed

Hartmann procedure accounted for more than half the colostomies reversed done in 26 patients (54.2%). Transverse loop and Double barrel represent 20.8% and 16.7% respectively and the least was sigmoid loop colostomy in four (8.3%) (**Table 2**).

Table 2: Type of colostomy reversed in the study

Type of colostomy	Frequency	Percent
Hartmann procedure	26	54.2%
Transverse loop	10	20.8%
Double barrel	08	16.7%
Sigmoid loop	04	08.3%
Total	48	100%

Indication of colostomy

Different indications for colostomy were seen in the study. Recto-sigmoid cancer was the commonest in 22 (45.8%). Non-viable sigmoid volvulus was 17 (35.4%), distal large bowel injury was five (10.4%) and

diverticular disease was four (8.3%) (**Table 3**). Recto-sigmoid cancer was the commonest (72%) in patients above 40 years and non-viable sigmoid volvulus (60%) in patients below years, however this difference was statistically significant (p value 0.08).

Table 3: Indication of colostomy in patients for reversal in the study population

Indication	Frequency	Percent
Recto sigmoid cancer	22	45.8
Non-viable sigmoid volvulus	17	35.4
Distal large bowel injury	05	10.4
Diverticular disease	04	08.3
Total	48	100

Time lapse for reversal

The time taken from construction to reversal of colostomy ranged from 1-12 months. The mean time was

(3.2 ± 1.9) months. Thirty four patients (70.8%) were operated between one to three months, 12 patients

between four to six months, one patient between seven to nine months and one between 10-12 months.

The operator of colostomy reversal were consultant 18 (37.5%), registrar under supervision 18 (37.5%) and registrar independently 12 (25%). Hand sewing in 47 (97.9%) operations and one stapled (2.1%). Vicryl suture was used in 46 (97.8%) and silk in one (2.2%). The method of suturing was continuous in 32 (68.1%) and interrupted in 15 (31.9%).

Outcome of reversal

The great majority of our patients 34 (70.8%) were discharged uneventfully. Morbidity developed in 12 (25%) and mortality in only two (4.2%) patients. Surgical site infection is the commonest complication accounted for (16.7%), while seroma in four (8.3%).

Iatrogenic bowel injury and anastomotic leak were less common, in three (6.3%) each.

The morbidity and mortality increased with age. The mortality occurred in age more than 51 years. The morbidity and mortality increased with diabetes mellitus, hypertension, smoking and anaemia.

Recto-sigmoid cancer associated with high incidence of complications, iatrogenic bowel injury in 9.1%, and surgical site infection in 18.6%. Anastomotic leak most in non-viable sigmoid volvulus 5.8%. Anastomotic leak, seroma and surgical site infection occurred in all patients reversed between seven to 12 months (P value 0.055, 0.065 and 0.76 respectively). Iatrogenic bowel injury was 8.3% between four to six months (P value 0.065) (**Table 6**).

Table 6: Duration of colostomy reversal from initial colostomy with complications of colostomy reversal in the study population

Duration (months)	IBI ¹	SSI ²	AL ³	BI ⁴	S ⁵	Total
1-3	05.9%	11.8%	12.9%	02.9%	02.9%	34
4-6	08.3%	16.7%	00.0%	00.0%	08.3%	12
7-12	00.0%	100%	100%	00.0%	100%	02
P value	0.055	0.143	0.065	0.132	0.076	
Total	03	08	04	01	04	48

IBI¹Iatrogenic bowel injury; SSI² Surgical site infection; AL³ Anastomotic leak; BI⁴ Bladder injury; S⁵ Seroma

Surgical site infection and seroma were common in sigmoid loop colostomy in 75% and 50% respectively. Iatrogenic bowel injury and anastomotic leak were common in Hartmann procedure seen in 11.5% each. Hartmann procedure had high rate of adhesion in 96.2% (P value 0.001). Intra-abdominal adhesion associated with increased rate of iatrogenic bowel injury 85% (P value 0.270).

The mean duration of hospital stay was 7.8±3.2 days (range 2-16 days). Thirty one patients (64.5%) stayed between one to seven days, 13 patients (27%) between eight to 14 days and four (8.5%) stayed more than 15 days.

DISCUSSION

In this prospective descriptive hospital based study, 48 patients had colostomy reversal operation. The patients were followed up over one month. The majority of the initial colostomies were emergencies in 41(85.4 %) and electives in seven (14.6%). This findings match in other similar studies [7, 8]. In developing countries there was delaying in diagnosing diseases earlier so most of them presented as emergencies.

Indications of colostomy

There are different indications according to geographical distribution in developed and developing countries. In our study the most indication for colostomy was recto sigmoid cancer in 22 (45.8%), non-viable sigmoid volvulus in 17 (35.4%), which comparable to

similar study done locally at Khartoum [4]. However in Addis Ababa, non-viable sigmoid volvulus was the most common indication, followed by colonic cancer and colonic trauma [5]. In Western countries, diverticular disease was the first indication and cancer was the second; Roe, *et al.* found diverticular disease in 43.8% [6], Boland, *et al.* diverticular disease was 60% [14] and Bryan, *et al.* found diverticular disease in 67% [15]. However recto-sigmoid cancer was first indication in 58.6% in a study done by. Roig, *et al* [7].

Types of Colostomy

The most common type of colostomies were Hartmann procedures 26 (54.2%) and transverse loop colostomies ten (20.8%). Hartmann and loop colostomies were 83.3%, which was comparable to findings in other similar study; A Bekele, *et al.* found Hartmann and loop colostomy were the most common types of colostomies performed in 94 (60.6%) and 39 (25.2%) of the patients respectively [5], Keck, *et al.* found Hartmann procedure was most type of colostomy [16]. In our study and in literatures most operations were emergencies. The suitable and safest method of intervention in large bowel diseases was a Hartmann procedure.

Interval of colostomy reversal

There is considerable variation in the duration for reversal from initial colostomy. In our study the mean was 3.2 ± 1.9 months (range 1-12 months). The majority of reversals (95.8%) between one to six months and this

comparable to findings in other similar studies; Khan, *et al.* found the majority of reversals between one to six months (68%) [10].

However the duration is short when compared with findings in other similar studies; A Bekele, *et al.*, found interval from (2-18 months), mean interval of 6.6 months [9], Salem, *et al.* found the mean was five months [17], Boland, *et al.* interval was 8.9 months [14], Takahshi, *et al.* interval was eight months [18], Roig, *et al.* found a median of ten months from initial colostomy [8]. In our study the optimal timing of closure varies from patient to patient, but report by A Bekele *et al.* found closure within six weeks of the initial operation significantly increased the morbidity [9].

Technique of colostomy reversal

In our study the most frequent method to anastomose the layers of bowel was two layered continuous hand sewn with vicryl suture. This was comparable with other studies; A Bekele, *et al.* Were used hand sewn, two layered in 82.8% [9], Roe, *et al.* were used hand sewn in 50.7% [6]. In our study the stapled closed was used once, it was not used frequently in our local practise of surgery.

Risk factors affect the outcome

In agreement with some authors, the most risk factors that affect the outcome of colostomy reversal were diabetes mellitus, hypertension, smoking and anaemia. This finding agree with Roig *et al.*, found diabetes mellitus, atherosclerosis and smoking affect the outcome [7].

Outcome of colostomy reversal

Operative mortality rate as high as 10% and morbidity rate of 50% have been reported by Schmelzer, *et al* [11]. In our study, the overall incidence of morbidity was 25% and mortality was 4.2%. Morbidity was lower than in other author's reports; Roe, *et al.* Found morbidity in 30% [6], Keck, *et al.* found complication rate 26% [16], but it was agreed to Antolovic, *et al.* who found 25% postoperative complications after Hartmannreversal [13].

In our study the mortality rate was higher in compared with the findings in other studies; Keck, *et al.* found mortality for Hartmann reversal in two percent [16], Roe, *et al.* Found mortality rate in three percent [6], A Bekele, *et al.* found mortality rate 1.1% [9] and mortality was 3.5% reported by Roig, *et al* [7]. However mortality was lower than other results; Takahshi, *et al.* found mortality in eight percent [18], Leong, *et al.* a seven percent mortality rate [19].

In our study anastomotic leak was 6.3% which was occurred higher than other author's reports, Antalovi, *c et al.* found anastomotic leak in 3.8% [12], Roe, *et al.* found leak in four percent [6], Keck, *et al.*

found leak in four percent [16], Kyung, *et al.* found leak in one percent [20].

In comparison, in our study surgical site infection in 16.7% was lower than findings in other similar studies, Murtaza *et al.* found surgical site infection in 16.9% [21]. Antolovic *et al*; found surgical site infections occurred in 18% [12].

Viscous injuries were occurred in particular cases in which adhesion density was more severe as reported by Keck, *et al* [16]. In our study iatrogenic bowel injury was occurred in three (6.3%) patients and bladder injury in one (2.1%) patient. In our study adhesions were associated with iatrogenic viscous injuries which is statistically significant (P value 0.001) due to difficult dissection anatomy and mostly with Hartmann procedure.

The higher rates of morbidity of Hartmann colostomy reversal than for sigmoid loop colostomy and for colostomy on left side than colostomy on right side was in agreement to other similar studies A Bekele, *et al* [9], Aydin, *et al* [22] and Manson, *et al* [11].

There was no statistically significant difference in the outcomes or complications rates of colostomy reversal whether the surgery was done by a consultant surgeon or registrar alone or registrar under supervision. Although, primary closure of all colostomy site wounds was the choice of wound management in our cases, there were few authors who were advocated of delayed primary or secondary skin closure, given the significant risk of wound infection with primary closure as reported by Murtaza, *et al* [22].

Duration of hospital stay

The mean duration of hospital stay after colostomy reversal in our patients was 7.8 ± 3.2 days (range 2-16 days). This comparable to findings in other similar studies, Boland, *et al.* found the mean length of hospital stay was 7.7 days [14], Antalovic, *et al.* Found the mean was nine days [12], Schmelzer, *et al.* found the mean was 6.8% [13]. However it's slower than days in other studies; Dixon, *et al.* found the median hospital stay 17 days [8] and Liang, *et al.* found the hospital stay was 20 days [23]. In our study the least hospital stay was two days accounting one patient, he died in the second post-operative day due to suspected myocardial infarction.

CONCLUSION

Colostomy reversal is a low morbidity procedure in our setting and the optimal timing of closure varies from patient to patient. Since it is a relatively common procedure, all surgeons including surgeons' under-training should be well versed with it. However, it appears that delayed reversal seems more advantageous and safer as compared to early reversal procedures.

REFERENCES

1. Erwin-Toth P, Doughty D. Principles and procedures of stomal management. In: Ostomies and continent diversions: Nursing Management, Hampton, B, Bryant, R (Eds), Mosby, St. Louis 1992; 29.
2. Desai DC, Brennan EJ JR, Reilly JF, Smink RD Jr. The utility of Hartmann procedure. *Am J Surg* 1998; 175(4): 152-54.
3. Schein M, Decker G. The Hartmann procedure. Extended indications in severe intra-abdominal infection. *Dis Colon rectum* 1988; 31(6):12-29.
4. Moh El-Amin, Yahia E Al-Arabi. Study on colostomy and its complication in Sudanese patients. 2003: MD thesis, Sudan Medical Specialization Board.
5. Bekele A, Kottiso B, Tesfaye M. Patterns and indications of colostomies in Addis Ababa, Ethiopia. *Ethiopian Medical Journal* 2007; 47 (4): 282-290.
6. Roe AMI, Parbhu S, Ali A, Brown C, Brodribb AL. Reversal of Hartmann procedure: Time and operative technique. *Br J Surg* 1991; 78 (10): 167-70.
7. Roig JV, Cantos M, Balciscueta Z, Uribe N, Espinosa J, Rossello V, Garcia Calvo, Hernandez J, Landete F. Hartmann operation: How often is it reversed and what cost? *Colorectal Dis* Dec 2011; 13 (12): 396-402.
8. Dixon ARI, Holmes JT. Hartmann procedure for rectal and distal sigmoid colon. *J R Coll Surg Edinb* Jun 1990; 35 (3): 166-76.
9. Bekele A, Kottiso B, Biluts H. Outcomes of colostomy reversal procedure in two teaching hospitals in Addis Ababa, Ethiopia. *East and Central African Journal of Surgery* Sep 2008; 13 (2): 119-124.
10. Khan AL, Ah-See AK, Crofts TJ, Heys SD, Ermin OJ. Reversal of Hartmann colostomy. *J R Coll Surg Edinb* Aug 1994; 39 (4): 239-42.
11. Manson JR, Fleming FJ. Association between operative complications in patients undergoing Hartmann reversal. *Br J Surg* Jul 2013; 100(8): 1094-9.
12. Antolovic DI, Reissfeilder C, Ozkan T, Galindo L, Buchler MW. Restoration of intestinal continuity after Hartmann procedure. *Langenbeck Arch Surg* Oct 2011; 396 (7): 989-96.
13. Schmelzer TMI, Mustafa G, Norton HJ, Newcomb WL, Hope W, Lincourt AE, Kercher KW, Kuwada TS, Gersin KS, Heniford BT. Reversal of Hartmann procedure: A high risk operation. *JR Surg* Oct 2007; 142 (4): 598-606.
14. Boland E, Hsu A, Brand MI, Saclarides TJ. Hartmann colostomy reversal: Outcome of patients undergoing surgery with intention of eliminating faecal diversion. *Am Surg* Jul 2007; 73 (7): 664-7.
15. Bryan Joost Marinus van de Wall, Werner A. Draaisma. Esther. Schouten. Ivo A.M.J. Conventional and Laparoscopic Reversal of Hartmann procedure. A review of literature *J Gastrointest Surg* 2010; 14 (74): 743-752.
16. Keck JO1, Collopy BT, Ryan PJ, Fink R, Mackay JR, Woods RJ. Reversal of Hartmann procedure: effect of timing and technique on ease and safety. *Dis Colon rectum* Mar 1994; 37(3):243-8.
17. Salem L, Anaya DA, Roberts KE, Flum DR. Hartmann colostomy and reversal in diverticulitis: A population-level assessment. *Dis Colon Rectum*. May 2005; 48(5):988-95.
18. Takahashi-Monory T1, Velasco L, Morales-Olivera JM. Morbidity-mortality of Hartmann reversal procedure. *Cir Cir*. Oct 2006; 74(5): 329-33.
19. Leong QM1, Koh DC, Ho CK. Emergency Hartmann procedure: Morbidity, mortality and reversal rates among Asian. *Tech Coloproctol*. Mar 2008; 12(1): 21-25.
20. Kyung Ha Kim, Hyun Tae Kim, Tae Geun Ha, Jin Yong Shin, Woon Won Kim, K Wan Hee Hong. Loop Colostomy with not Everted Fashion for rectal cancer. *J Korean Soc Coloproctol* 2007; 23 (5): 127-28.
21. Murtaza Ghulam, Nuruddin Rozina, Memon Ayaz Ahmad, Chawla Tabish, Azam Iqbal, Mukhtar Yasir. Surgical infections. Feb. 2014, 15(1): 58-63.
22. Aydin HN1, Remzi FH, Tekkis PP, Fazio VW. Hartmann reversal is associated with high postoperative adverse events. *Dis Colon rectum*. Nov 2005; 48(11):2117-26.
23. Liang MK, Li LT, Avellaneda A, Moffett JM, Hicks SC, Awad SS. Outcomes and predictors of incisional surgical site infection in stoma reversal. *JAMA Surg*. Feb 2013; 148(2):183-9.