Original Article

Penetrating Colonic Injuries: Primary Repair Versus Colostomy

1. Sher-uz-Zaman Bhatti 2. Muhammad Saif ul Malook 3. Muhammad Ali Zulqarnain 4. M. Saleem Shaeikh

1. Asst. Prof. of Surgery 2 & 3 PG Residents of Surgery 4. Assoc. Prof. of ENT, QAMC/BVH. Bahawalpur

ABSTRACT

Objectives: To compare the primary repair with colostomy in colonic injuries at tertiary care hospital in terms of morbidity and hospital stay.

Study Design: Quasi experimental study

Place and Duration of Study: This study was conducted in the Department of Surgery, Unit II BVH Bahawalpur from 27-01-2010 to 31-8-2010.

Patients and Methods: A total of sixty patients fulfilling the inclusion criteria were selected for this study. Patients were randomly allocated in two groups. Group A (Primary Repair) and Group B (Colostomy), 30 patients in each group. Follow up in group A patients was done twice after 2 weeks and after one month. The follow up in group B was done for multiple times. Initially the visit was advised after every two weeks until the patient was called back for colostomy closure.

Results: The mean age in group A was 28.9±8.1 years and in group B was 30.1±14.0 years. The mean hospital stay in group A was 8.9±3.65 days and in group B was 11.0±4.7 days. At two weeks follow up, in group A, there was one (3.3%) patient of abscess, one(3.3%) of suture repair leak, one (3.3%)patient of sepsis and 2 (6.7%)patients of wound infection. In group B, there were 2(6.7%) patients of abscess, one (3.3%) patient of suture repair leak, 3(10%) patients of sepsis and 4(13.3%) patients of wound infection.

Conclusion: This is concluded from our study that primary repair was safe and effective treatment modality in the management of colonic injuries as compared to colostomy.

Key Words: Colonic injuries, primary repair, colostomy.

INTRODUCTION

The management of colon injuries has been one of the most controversial issues in trauma and has undergone many radical changes in the last few decades. The traditional management of penetrating colonic injuries is by exteriorization or proximal colostomy[1], however, in recent times, the idea of primary repair of colonic injury is gaining more acceptance. It was influenced by the experience that the primary repair has been a safe and effective treatment for colonic injuries during war times[2]. The primary repair or resection and anastomosis can be performed with acceptable morbidity for the perforations of the colon and rectum[3]. Repair is with a single-layer, continuous, extra-mucosal, monofilament suture.

Primary repair of colonic injuries has less morbidity and is less expensive as compared to colostomy and is ideal method of management for colonic injuries.[4] Primary repair is debatable, however, in the present antibiotic era, it is safe and less costly than the two-stage procedure of proximal colostomy followed by repair.[5]

The management of colonic injury has changed in recent years. The study by Bowley et al strengthens the validity of direct repair or resection and primary anastomosis for colonic injury.[6] Surgical care in the case of traumatic injury to the colon has changed significantly. Current trends favor primary repair. Questions remain as to whether primary repair is the safest option for all colon injuries.[7]

Primary repair is a safe method of managing penetrating colon injuries in carefully selected patients. [8] Penetrating colon injury carries a high rate of infectious morbidity. The developments of infectious complications is related to the injury severity and haemodynamic status of the patient, not the type of operation performed.[9]

Colon injury is still widely recognized as one of the most serious intra-abdominal injuries in civilian practice because of lethal consequences of peritoneal contamination.[10] Colon is one of the most commonly injured viscera in the abdominal trauma.[11] Colonic injuries may occur in several ways:

1. Open injuries from penetrating wounds as in shotgun or stab injuries.
2. Closed lesions resulting from external violence as in crushing injuries or injuries due to blast in air or water without external wound.
3. Due to trauma applied from within the lumen of the bowel as in sigmoidoscopic, colonoscopic or pneumatic injuries to the upper rectum or lower

sigmoid. 5% colonic injuries are caused by blunt abdominal trauma and 95% colonic injuries are caused by gunshot and stab abdomen injuries.[12]

In order of frequency, colon comes to number four next to liver, small intestine and stomach.[13] Colon is second to small bowel to get injured in gunshot abdominal wounds and third most common organ involved in stab injuries of abdomen.[14]

The incidence of trauma or injuries is on the increase and is a clinical problem of paramount importance. The geopolitical situations resulting in military conflicts continue to contribute to a wide variety of trauma even today.[15] Since 1947, citizens of Pakistan traditionally have a large number of victims of firearms due to its specific cultural heritage.[16]

Before the time of First World War, the colonic injuries were treated by non-operative methods, for example, management like that of fecal fistula.[17] In the World War 1, this method of treatment of colonic injuries was replaced by operative method of treatment. The operative method consisted of primary repair of colonic injury. The primary repair of colonic injury led mortality up to 60%.[18]

The survival rate in colonic injuries dramatically increased by exteriorization of injury as a colostomy during the Second World War. This led to strong support for its extensive use in civilian practice.[19] With the passage of time, colostomy was accepted as a standard method of management for colonic injuries and in selected cases, primary repair with proximal colostomy was adopted as the chosen treatment.[20] The colostomy method of treatment has dual purpose. In exteriorization of the colonic injury, possible intra-abdominal sepsis is avoided followed by safe closure later on. In case of primary repair with colostomy, proximal decompression is achieved and chances of failure of anastomosis are eliminated.

In this study, the comparison of the primary repair versus colostomy in the colonic injury was evaluated to provide a better method of management of the patients with colonic injury.

PATIENTS AND METHODS

The objective of this study was to compare the primary repair with colostomy in colonic injuries at tertiary care hospital in terms of morbidity and hospital stay. This study was conducted at Department of surgery unit II, Bahawal Victoria Hospital, Bahawalpur. The study lasted from 27th Janurary 2010 to 31st August 2010. A total of sixty patients were included in the study which were divided into two groups of 30 patients. They were randomly allocated in the two groups. Group A (primary repair), Group B (colostomy). Patients who presented within 10 hours after history of penetrating injury (i.e stab wound or fire arm injury) were included in the study. Patients were fully resuscitated and stable at the time of operation. Those patients who sustained injury of more than two abdominal viscera were excluded from the study. Patients were asked to sign the informed consent. Detail history of presenting complaints if any were asked and physical examination were recorded. At the end of operation, operative variables were noted on a predesigned proforma. Follow up in group A was done twice after discharge. The first visit was after two weeks and the second visit was after one month. The follow up in group B was done for multiple times. Initially the visit was advised after every two weeks until the patient was called back for colostomy closure. After colostomy closure, the patient was advised follow up twice a month for one month. Confounding variables were controlled through matching. The study data was analysed with the help of SPSS ver 12. The variables included age, sex, hospital stay, type of injury, time interval between injury and operation, site of injury, anemia, jaundice, morbidities (abscess, suture repair leak, sepsis and wound infection). Student T test test was applied for hospital stay and time interval between injury and operation to find out the significance between the two groups. Chi square test was applied for the morbidities. P value less than 0.05 was considered as significant.

RESULTS

A total of 60 patients fulfilling the inclusion criteria were included in the study. Patients were randomly allocated two groups. Group A(primary repair), Group B (colostomy), with 30 patients in each group. The mean age in group A was 28.9$\pm$8.1 years while in group B, it was 30.1$\pm$14.0. There were 27(90%) male patients and 3 (10%) females in Group A, while Group B consisted of 28 (93.3%) male and 2 (6.7%) female patients.

The mean hospital stay in Group A was 8.9$\pm$3.65 days and in Group B, it was 11.0$\pm$4.7 days. P value for the mean hospital stay was 0.04. In the distribution of type of injury, in group A, there were 25 (83.3%) patients of firearm injury and 5 (16.7%) patients of stab wound injury. In group B, there were 22 (73.3%) patients of firearm injury and 8 (26.7%) patients of stab wound injury.

The mean time interval between injury and operation in group A was 3.4$\pm$2.7 hours while in group B, it was 4.5$\pm$5.1 hours. P value was non significant, being 0.26. In the distribution of site of injury, in group A, there were 24 (80 %) patients of abdomen injury and six patients (20%) of buttock injury. In group B, there were 23 (76.7%) patients of abdomen injury, 5 (16.7%) patients of buttock injury and 2 (6.7%) patients of lower chest injury.

In the distribution of anemia, in group A, there were 18 (60%) patients who had anemia and in group B, there were 20 (66.7%) patients of anemia. In group A, there were 5 (16.7%) patients having jaundice while in group B, there were 3 patients (10%) having jaundice.

At two weeks follow up, in group A, there was one (3.3%) patient of abscess, one (3.3%) patient of suture repair leak, one (3.3%) patient of sepsis and 2 (6.7%) patients of wound infection. In group B, there were 2 (6.7%) patients of abscess, 1(3.3%) patient of suture repair leak, 3 (10%) patients of sepsis and 4 (13.3%) patients of wound infection.

At four weeks follow up, in group A, there was one (3.3%) patient of abscess and one (3.3%) patient of wound infection. In group B, there were 2 (6.7%) patients of abscess, 1(3.3%) patient of suture repair leak, 1 (3.3%) patients of sepsis and 2 (6.7%) patients of wound infection.

At six weeks follow up, in group B, there was one (3.3%) patient of abscess, one (3.3%) patient of sepsis and one patient (3.3%) of wound infection. At follow up of eight weeks, there was one (3.3%) patient of abscess and one (3.3%) patient of wound infection.

DISCUSSION

Colon injury has been associated with a high risk of septic complications and mortality. This study assessed the pattern, management, outcome and prognostic factors in patients. There is strong evidence that the vast majority of colonic injuries can be safely managed by primary repair. It seems, however, that there is a limited role for colostomy, particularly in high risk patients with destructive injuries of the left colon. Primary repair of colonic injuries has less morbidity and is less expensive as compared to colostomy and is ideal method of management for the colonic injury. [4] Primary repair is debatable, however, in the present antibiotic era, it is safe and less costly than the two stage procedure of proximal colostomy with repair.[5] Questions remain as to whether primary repair is the safest option for all colon injuries.

In our study, the mean age in group A patients was 28.9±8.1 years and mean age in group B was 30.1±14.0 years. As compared with the study of Kahya *et al* [21], the mean age of patients of 30.1 years, which is same and comparable with our study.

In our study, in group a, there 90% male and 10% female patients. While in group B, there 93.3% male and 6.7% female patients. As compared eith the study of Kahya *et al* [21] which included 88% male and 12% female patients.

In our study, in group A, there were 83.3% patients of firearm injury and 16.7% patients of stab wound injury. In group B, there were 73.3% patients of firearm injury and 26.7% of stab wound injury. As compared with the study of Adesanya and Ekanem[22], the firearm injury were caused in 91.7% patients and stab wound injury were caused in 8.3% patients, which is comparable with our study. In another local study conducted at Lahore General Hospital, Lahore by Hussain *et al* [8], there were 72% patients caused by firearm injury.

In our study, the mean time interval between injury and operation in group A was 3.4±2.7 hours and in group B was 4.5±5.1 hours. As compared with the local study conducted at Lahore General Hospital, Lahore by Hussain *et al* [8], the mean time interval between injury and operation was seven hours, which is comparable with our study. Likewise, the mean hospital stay is also similar in both of above studies.

In group A of our study patients, there was 3.3% patient of intra abdominal abscess and in group B, there were 6.7% patients of intra abdominal abscess. As compared with the study of Bedirli *et al* [23], there were 6% patients of intra abdominal abscess complication, which is comparable with our study. In our study group A, there were 6.7% patients of wound infection and in group B, there 13.3% patients of wound infection. As compared with the study of Bedirli *et al* [23], there were 14% patients of wound infection, which is same and comparable with our study. In another study conducted by Busic *et al*[24], there were 14.3% patients of wound infection, which is also comparable with our study.

In this study, in group A, the complication of sepsis was found to be 3.3% in group B, 13.3% of patients. As compared with the study of Stagnitti *et al* [25], the complication of sepsis was found to be 14%, which is similar to our results. In our study, the complication of suture repair leak in group A was found in 3.3% patients and in group B, there also similar percentage of patients. As compared with the study of Miller *et al* [26], the complication of suture repair leak was found to be 7%, which is comparable with our study.

CONCLUSION

Primary repair group had significantly shorter hospital stay as compared to colostomy (p=0.04). Primary repair group had significantly lesser morbidities (abscess, suture repair leak, sepsis and wound infection) as compared to colostomy. Therefore, it is concluded from our study that primary repair was safe and effective treatment modality in the management of colonic injuries as compared to colostomy.

REFERRENCES

1. Tzovaras G, Hatzitheofilou C. New trends in the management of colonic trauma. Injury 2005;36:1011-5.
2. Hudolin T, Hudolin I. The role of primary repair for colonic injuries in wartime. Br J Surg 2005;92:643-7.

3. Koksal H, Yildirim S, Celayir F, Cipe G, Baykan A, Mihmanli M, et al. A critical overview of surgical treatment methods of colorectal injuries. Ulus Travma Derg 2005;11:121-7.
4. Nadeem M, Bashir MM, Iqbal J, Rasheed A. Primary repair versus colostomy for colonic injuries. Ann KE Med Coll 2004;10:462-5.
5. Tripathi MD, Mishra B. Colonic injuries (primary repair and proximal colostomy). Int Surg 2005;90:297-304.
6. Bowley DM, Boffard KD, Goosen J, Bebington BD, Plani F. Evolving concepts in the management of colonic injuries. Injury 2001;32:435-9.
7. Fealk M, Osipov R, Foster K, Caruso D, Kassir A. The conundrum of traumatic colon injury. Am j Surg 2004;188:663-70.
8. Hussain MI, Zahid M, Askri H, Hussain T, Khan AF. Outcome of primary repair in penetrating colonic injures. J Coll Phys Surg Pak 2003;13: 412-5.
9. Bulger EM, McMahon K, Jurkovich GJ. The morbidity of penetrating colon injury. Injury 2003;34:41-6.
10. Lou SM, Jhonson AP, Atik M, MNadal AK, Alexander TL, Schlater TL. Exteriorized repair in the management of colon injuries. Arch Surg 1981;116:926-9.
11. Dawes LG, Aprahamian C, Codon RE, Malangoni MA. The risk of infection after colon injury. Surgery 1986;100:796-803.
12. Hoty DB, Mossa AR. Essential surgical practice. 3rd ed. London: Butterwoth; 1995:540.
13. Hoyut DB, Mackersie RC. Abdominal injuries In: Cusheiri A, Gile GR, Moosa A (editors). Essential surgical practice. London: Butterworth; 1988. p.291-304.
14. Jurkovich GJ. Trauma: Management of acute injuries. In: David C, Sabiston Jr, Duke JB (editors). The textbook of surgery: The biological basis of modern surgical practice. Philadelphia: WB Saunders; 1991. P-258-98.
15. Nance FC, Wenner MH, Hjonson LW, Ingram JC , Cohn I Jr. Surgical judgement in the management of abdomen: Experience with 2212 patients. Ann Surg 1974;179:639-46.
16. Ahmed I. Abdominal trauma: A prospective study. Pak J Surg 1992;8:37-42.
17. Nichols RL. Surgical infections: Prevention and treatment. Am J Surgery 1996;172:68-72.
18. Nance FC. Abdominal trauma at the Soughern Surgical Association 1888-1987. Ann Surg 1993;207:742-53.
19. Moore DD, Moore JB, Van Duzer, Moore S, Thompson JS. Mandatory laparotomy for gunshot wounds penetrating the abdomen. Am J Surg 1980;140:847-51.
20. Dunphy JE. The cut gut (presidential address). Am J Surg 1970;119:1-8.
21. Kahya MC, Derici H, Cin N, Tatar F, Peker Y, Genc H, et al. Our experience in the cases with penetrating colonic injuries. Ulus Travma Acil Cerrahi Derg 2006;12:223-9.
22. Adesanya AA, Ekanem EE. A ten year study of penetrating injuries of the colon. Dis Colon Rectum 2004;47:2169-77.
23. Bedirli A, Mentes BB, Onan A, Kerem M, Pala MI, Sakrak O, et al. Colorectal intervention as part of surgery for patients with gynaecological malignancy. Colorectal Dis 2005;7:228-31.
24. Busic Z, Rudman F, Stipancic I, Amic E, Busic D. War injuries of colon and rectum—results after 10 years. Coll Antropol 2002;26:441-6.
25. Stagnitti F, Salvi P, Corelli S, Gammardella P, Priore F, Stagnitti A, et al. Colon lesion for blunt trauma in the abdomen. Ann Ital Chir 2005;76: 543-8.
26. Miller PR, Fabian TC, Croce MA, Magnotti LJ, Elizabeth-Pritchard F, Minard G, et al. Improving outcomes following penetrating colon wounds: application of a clinical pathway. Ann Surg 2002;235:775-81.

Address for Corresponding Author:
Dr. Muhammad Saleem Sheikh
Associate Prof. of ENT,
Residence: 19-C Medical Colony BVH,
QAMC/BVH, Bahawalpur
Cell No.0333-6109010