Original Article

Management of Penetrating Injuries of Colon

1. Shaukat Ali 2. Muhammad Azim Khan 3. Khalid Hussain Qureshi

1. Asstt. Prof. 2. Sr. Registrar 3. Assoc. Prof., Department of Surgery, Nishtar Medical College, Multan

ABSTRACT

Objective: Types of operative measures adopted and prognosis of patients with perforating injuries to colon.

Study Design: Descriptive Study

Place and Duration of Study: This study was carried out in the Surgical Unit-I, Nishtar Medical College, Multan during the period from July 2011 to December 2011.

Material and methods: All 60 patients were admitted in emergency ward with trauma to abdomen, and routine investigations were carried out.

Results: Majority of the patients i.e. 51 (85%) were injured by gunshot. Fifty five (90%) patients were male. For more extensive contamination colostomy gave complication rate 20% in grade 2 and 25% in grade-3. Patients who were anastomosed, 15% developed leakage. Out of 60 patients, 15 (25%) patients had injury at right colon, 16 (28%) had at transverse colon, 28 (46%) patients at left colon and remaining 11 (18%) patients had injury at sigmoid colon. Out of 60 patients, 10 (16%) patients were found in injury grade–1, 44 (74%) patients in grade-2 and 6 (10%) patients in injury grade-3 were involved. Majority of the patients i.e. 44 (74%) had more complications. There was no difference between these two groups with respect to grade of colon injury according to the colon injury severity scale or location of injury.

Conclusion:- It was observed from data that selective primary repair may be used in a significant proportion of colon wounds. It was based on classification system that employs an assessment of the extent of tissue injury, degree of fecal contamination, assessment of associated injuries; estimates of the influences of delay between injury and definitive therapy and hemorrhagic shock.

Key Words:- Contamination colostomy, Anastomosis, Colon.

INTRODUCTION

Colon and rectal injuries occur upto 10% of patients that suffer penetrating or severe blunt abdominal trauma. In blunt abdominal trauma splenic injury was found to be the commonest with 56% of laparotomies. The liver was the second most organ involved (21%)[1]. The majority of colon injuries are diagnosed intra-operatively following a penetrating abdominal injury[2].

Management of penetrating colonic injuries requires urgent continuous vigilant care of patient. In the past, changes in the management policies evolved as a result of large therapeutic experience gained during the time of military conflict. Surgical care in case of traumatic injury to colon has changed significantly. During the world war-II, diversion was the dictum; current trends favour the primary repair[3].

During the World War-I, the average mortality rate reported was 60%. Surgeon General of United States issued a letter that all the injuries to the colon would be treated by performing a colostomy[4]. Based on this philosophy the rate fell to 30% during the world war-II. The mortality rate fell to 10-15% during the Korea and Viet Nam conflict. Colostomy is increasing reserved for rectal injuries and destructive colon injuries[5]. Peri-operative antibiotics and early celiotomy with intra-abdominal exploration and primary repair of the colon injury usually provide excellent results[6].

In colonic injury hypovolemia and sepsis are common causes of morbidity and mortality. These patients need extra care. Primary repair was used safely in most cases of civilian penetrating colon injuries. Colostomy was performed for selected cases of colon wounds associated with shock, multiple blood transfusions; multiple other injuries[7]. Iatrogenic abdominal colonic perforation is a rare but very dangerous complication of colonoscopy[8]. Perforation of colon and rectum during barium enema examination contributes a surgical emergency. Prompt diagnosis of the colonic injury and early management is vital in decreasing morbidity and mortality[9].

MATERIALS AND METHODS

This descriptive study was carried out in the Surgical Unit-I, Nishtar Hospital, Multan during the period from July 2011 to December 2011. All 60 patients were admitted in emergency ward with trauma to abdomen, and routine investigations were carried out.

RESULTS

Out of 100 patients 85 (85%) were injured by gunshot while stab wound was found in 15 (15%) of the patients.

Ninety (90%) patients were male and 10 (10%) were female patients. Out of 100 patients, 70 (70%) had mild contamination, 15 (15%) had moderate and 15 (15%) hade severe contamination. Majority of the patients i.e. 74% had grade-2 according to Flint injury scale.

Out of 100 patients, 25 (25%) patients had injury at right colon, 28 (28%) had at transverse colon, 46 (46%)

patients at left colon and remaining 18 (18%) patients had injury at sigmoid colon (Table-1).

Majority of the patients i.e. 74 (74%) had more complications. Rate of complications increased with the increase in the grades of injury (Table-2)..

Small bowl injuries were found in 60 patients, duodenum in 18 patients, stomach in 12 patients and liver was found injured in 10 patients (Table-3).

There was no difference between these two groups with respect to grade of colon injury according to the colon injury severity scale or location of injury. The majority of injury was grade-3 and 4. There was no grade1 colon injury in either group as shown in table-4.

Table No.1: Location of injury

Site	Number of organs	Percentage
Right colon	25	25.0
Transverse colon	28	28.0
Left colon	46	46.0
Sigmoid colon	18	18.0

Table No.2: Grades of injury versus complications (n=100)

Grades	No. of patients	%age	Complications
1	16	16.0	0
2	74	74.0	20
3	10	10.0	30

Table No.3: Associated intra-abdominal injuries (n=100)

Injury	Primary repair	Diversion
Small bowel	30	30
Duodenum	10	08
Stomach	06	06
Liver	04	06

Table No.4: Colon injuries severity scale (n=100)

Grades on injury	Primary repair	Diversion.
1	0	0
2	08	04
3	24	30
4	10	10
5	08	06

DISCUSSION

During one year period 60 patients with penetrating injury to the colon were observed under prospective study. Most of these patients were male. Primary repair gave better results while colostomy was considered for severe cases. Primary repair of the colon perforation due to penetrating injury is most frequently possible following a low velocity injuries (penetrating stab wounds) where associated organ systems are injured and contaminated minimally.

Patients with gunshot wounds were 90% (54) and stab wounds were 10% (6). 50% were incised (laparotomy) while within 8 hours and 50% patients were incised after 8 hours but within 12 hours. In the unstable patients by doing the minimum necessary to control exsanguinations and prevent the spillage of intestinal contents and urine into peritoneal cavity. Re-operation for definitive surgery, undertaken after optimum stabilization of physiological parameters in an intensive care ward. Of the injury severity indices estimated, the PATI most reliably produced complications and specifically identified patients whose outcome would be good for primary repair. These results suggest that the use of primary closure should be expanded in civilian penetrating colon trauma that even with moderate degree of colon injury. Primary closure provides an outcome equal to that provided by colostomy. In addition to the predictive value of PATI suggests that it should be included along with other injury severity indices in trauma databases.

Ninety percent of patients were brought to surgery within hours of injury. The time from pick up ambulance to incision was 7 hours.

Because higher degree of trauma was seen in the colostomy patients, comparisons were stratified according to index of injury to reduce this bias. Factors contributing to lower morbidity and mortality for improvement are:-.

a. Evacuation time from accidental point to stable tactical situation or hospital.

b. Anesthesia and antibiotics regimens.

c. Resuscitation.

Mortality rate rose progressively with the severity of injury (4% in grade 1, 31% for grade 3). While septic complications were similar for grade-2 and 3. Isolated colonic injuries, with minimum blood loss, operated upon within 08 hours were associated with less than 10% mortality.

Colon wounds of gunshot = 91%
Stab wounds = 09%
Delay of laparotomy > 8 h = 50%

Major morbidity was defined as septic or non septic complications that resulted in significant change in treatment, outcome or hospital stay. One of these is abdominal wound disruption[10].

Colon related morbidity, including intra abdominal abscesses, systemic sepsis, colonic fistula, major wound infection, dehiscence or major osteomty infection, but excluding pneumonia and urinary tract infection, because these were not considered to be colon injury related complications.

All abdominal organ injured were evaluated accordingly. The small intestine was the other organ injured most commonly. Mortality otherwise for the randomized colostomy was tenfold greater than if the primary closure has been performed. Average postoperative stay was six days longer ($p< 0.01$) if the colostomy has been created, exclusive of subsequent hospitalization for colostomy closure.

Primary repair was used safely in most cases of penetrating colon injuries. Colostomy was performed in selected cases on wound associated with shock, multiple blood transfusion, multiple other injuries, extensive contamination and high velocity weapons in the absence of these associated factors, primary repair approved justified. Patients were divided according to grades of injury.

It was observed from data that selective primary repair may be used in a significant proportion of colon wounds. It was based on classification systems that employ an assessment of the extent of tissue injury, degree of fecal contamination, assessment of associated injuries; and estimates of the influences of delay between injury and definitive therapy and hemorrhage shock. There was no difference is outcome between patients who had primary repair and those undergoing diverting colostomy. Results obtained in 60 patients eligible for randomization revealed that primary closure in 30 patients had a lower infection rate of incision (46% vs. 56% p > 0-05) and is still lower infection rate for the abdomen proper (15% vs. 30% , p <0.05) in comparison to 30 patients with randomized colostomy. Morbidity otherwise for the randomized colostomy was tenfold greater than in a primary closure had been performed. Average postoperative stay was 6 days longer ($p < 0.01$) if the colostomy has been created, exclusive of subsequent hospitalization. for colostomy closure.

Repair was safer with low associated risk factors. Resection and anastomosis carried out with low leak risk in these patients.

CONCLUSION

Diverting colostomy is the standard of care when mucosal penetration is present, but primary closure in civilian practice has generally had excellent results, Al though it has been restricted to less severely injured patients. Because the degree of injury may influence choice of treatment in modern practice. Various indices of injury severity have been purposed for assessment of petitions with penetrating colon trauma. Primary suture repair of colon perforation due to penetrating injury is most frequently possible following low velocity injury (particularly stab wound).

REFERENCES

1. Ghazanfar A, Choudhry ZA, Zubair M, Nasir SM, Khan SA, Ahmed Q. Abdominal solid visceral injuries in blunt trauma. An experience in busy surgical unit of Mayo Hospital, Lahore. Ann K E Med Coll 2001; 7: 85-7.
2. Fealk M, Osipow R, Foster K, Cearuso D, Kassir A. The conundrum of traumatic colon injury. Am J Surg 2004; 188; 663-70.
3. Gonzalez RP, Turk B. Surgical options in colorectal injuries. Scand J Surg 2002; 191: 87-91.
4. Maccabes DL, Dominitz JA, Lee SW, Bilingsley KG. Acute presentation of transverse colon injury following percutaneous endoscopic gastrotomy tube placement: case report and review of current management. Surg Endosco 2000; 14: 296.
5. Barden BE, Maulli KI. Perforation of the colon after blunt trauma. South Med J 2000; 93: 33-5.
6. Adesanya AA, Ekanem EE. A ten year study of penetrating injuries of the colon. Dis Colon Rectum 2004; 47: 169-77.
7. Khan A. Stab wounds abdomen: an experience with 105 laparotomies. J Ayub Med Coll Abbottabad 1999; 11: 6-8.
8. Hunt ER, Nance ML, Keller MS, Groner JI, Ford HR, Kuhn A et al. Management of penetrating colon and rectal injuries in the pediatiric patients. Dis Colon Rectum 2004; 47: 1526-32.
9. Freitag M, Albert W, Petersen S, Ludwig K. Iatrogenic colon perforation from the view point of the surgeon. Experiences with 11 patients. Chirurg 2000; 71: 568-71.
10. Cuschieri SA, Steele RJC, Abdool Rahim Moosa. Essential surgical practice. In: Steele RJC, editor. Disorders of the colon and rectum. 2002; 260.

Address for Corresponding Author:
Dr. **Shaukat Ali,**
Assistant Professor,
Department of Surgery,
Nishtar Medical Medical, Multan