ORIGINAL ARTICLE

Penetrating Colonic Injuries: Primary Evolving as the Standard of Care

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ABSTRACT

Design and duration: Retrospective study from March 2001 to February 2006.
Setting: Surgical Unit-I, Chandka Medical College Hospital Larkana.
Patients: All patients with penetrating colonic injuries either by gunshot or stab injury were included in the study those patients were included who were hemodynamically stable, did no have life threatening co-existing injury and on operation were found to have mild to moderate peritoneal fecal contamination.
Methodology: All patients were operated after initial resuscitation and colonic injuries found were repaired primarily without fecal diversion. During the immediate and early postoperative period, these patients were observed for any complications like peritonitis, wound infection, peri-anastomotic abscess, pelvic, sub-diaphragmatic or inter loop abscesses and colocutaneous fistulae. Patients were discharged home after they passed stools and their postoperative period remained uneventful for few days.
Results: Out of the 82 patients, majority were young males (66%). The commonest mode of injury was fire arm. The time interval between injury and repair was 4-12 hours (mean 6 hours). Simple repair with interrupted suture was the commonest procedure performed by right Hemicolectomy. Twelve 34% patients developed complications in the form of wound infection, intra abdominal abscesses and fecal fistulae. The total hospital stay was 7-21 days.
Conclusion: Primary anastomosis is safe and has excellent results in penetrating colonic injuries
Key words: Colon, Injury, Primary, Repair, Stay, Wound, Firearm Injury

INTRODUCTION

In the US, penetrating injuries comprise approximately 6% hospitalization and account for the second most common mechanism of fatal injury after motor vehicle related injuries, and 20% of all injury-related deaths[1]. The incidence is approximately same worldwide. Penetrating injuries of abdomen are rife in Pakistan due to increasing violence, and colon because of its size and anatomical fixity is prone to injuries in these cases. Traditionally penetrating injuries of colon are being managed by exteriorization of the wound or proximal colostomy, but primary repair is being advocated in the last 20 years 2-7 due to its advantages over primary colostomy. The aim of this study was to demonstrate safety and efficacy of primary repair in patients with colonic injuries with delay in surgery of less than 24 hours.

MATERIAL AND METHODS

This five year retrospective observational study was carried out at surgical department of CMCTH, from March 2001 to February 2006. All patients aged between 18 to 60, ASA type I and II, with single or multiple injuries to colon with minimal or moderate peritoneal contamination, and no or minor injury to adjacent structures were included in the study. While patients above 60 or under 18 years of age, or ASA type III, and IV, or hemodynamically with grossly contaminated peritoneal cavity and severe injuries to surrounding structures were excluded from the study. The data was collected from hospital records, to records on a study specific proforma, and included demographic data (age and sex), preoperative evaluation, and resuscitative measures, injury to hospitalization interval, preoperative findings, and postoperative hospital stay, morbidity and mortality.

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RESULTS

Only 82 patients met the inclusion criteria and were included in the study in the period under review. There were 66 male and 16 female with male to female ratio of 3:1, with mean age of 29.5 years (Table 1).

The time of arrival at emergency department of Chandka medical college teaching Hospital Larkana depended on whether the patient was brought to the accident and emergency department directly after

sustaining injury or was referred from peripheral centers as district or basic health units in the areas surrounding Larkana.

Table I: age and sex distribution of patients

Age range	Male	Female	Total
18-20	02	00	02 (2.43%)
21-30	23	08	31 (37.80%)
31-40	20	05	25 (30.50%)
41-50	17	02	19 (23.18%)
51-60	04	01	05 (6.09%)
Total	66	16	82 (100%)

45% of patients brought to AE dept presented 12 hours after sustaining injury to abdomen, and 32% within 6 hours of injury, as depicted in table 2.

Table II: injury hospitalization interval

Duration	No of patients
0-6 hours	32.92 % (n=27)
6-12 hours	45.13% (n=37)
12-24 hours	21.95% (n=18)
Total	100% (n=82)

All patients having injury to abdomen underwent laparatomy with midline incision, after aggressive resuscitation. Preoperatively, the most common site of colonic injury was Cecum, accounting for 56% (n=46) of total injuries to colon, followed by ascending colon, 13% (n=11), and right transverse colon 11% (n=9) colon. Thus the right colon was found to be injured i.e. approximately 80%, more commonly as compared to left in 20% patients, further elaborated in table 3. Primary repair was done in all patients included in the study.

Table III: site of colonic injury

Site	No of patients
Cecum	46 56.09%
Ascending colon	11 13.41%
Right Transverse colon	09 10.98%
Left transverse colon	08 9.76%
Descending colon	04 4.88%
Sigmoid colon	04 4.88%
Total	82 100%

The most common postoperative complication encountered by these patients was found to be bullet/ pallet tract infection in 11% patients, followed by wound infection in 10% cases, and abdominal abscess in 6% patients. Leakage from site of anastomosis as evident from formation of a fecal fistula was identified in 6% patients only and was managed operatively by exteriorization. The mortality was 1.21% (n=1) in one of the patient with fecal fistula.

Postoperative complications	No of cases
Bullet tract infection	10.97% (n= 09)
Wound infection	9.75% (n= 08)
Wound dehiscence	4.87% (n= 04)
Abdominal abscess	6.09% (n=04)
Anostomosis failure	6.09%(n=05)
Duration of hospital stay	
7-10 days	67.07%(n= 55)
11-18 days	23.17%(n=19)
>18 days	9.75%(n=08)

DISCUSSION

Penetrating injuries account for approximately 6% presentations in A&E dept worldwide. Penetrating injuries in our country are at rise due to increasing violence, interpersonal and communal clashes, robberies and increasing domestic violence[2] since young males are more prone to firearm injuries, a similar trend was noticed in our study too[3,4,5].

The most commonly injured abdominal organ is reported to be colon worldwide[6,7].

The management of penetrating injuries to colon has long been debated. Traditionally they have been managed by primary colostomy, but management by primary repair has gained popularity in last 10-15 decades, it was although initially recommended for selected patients only[1].

It was not recommended in cases with major blood loss, soiling, left sided colonic injuries, and injuries to more than two visceras in addition to colonic injuries[5,9,11].

But research carried out lately across the globe, have concluded that primary repair of traumatic colonic injuries can be performed safely in almost all cases[5], even warfare injuries 6. it has been favoured over colostomy as it carries advantage of avoidance of colostomy, postoperative colostomy care and rehospitalization and reoperation in terms of cost and morbidity-. Furthermore it has been reported that right sided colonic injuries which require resections do very well after iliocolostomy[3,7,10.]. But the management of left sided injuries is still debated 8, 10, 13, as most of injuries in our study are right sided and the outcome following primary repair is favourable. Single perforations in colon are routinely managed with primary closure, however multiple perforations requiring resection are recommended to be primarily anastomosed by many authors[5,7,13]. The only lesion requiring colostomy are rectal injuries or injuries involving pancreatico duodenal complex or major vessels with compromised blood supply or delay in surgery for more than 72 hours, or selected destructive injuries.

The most common and questionable complication following primary repair is anostomotic leakage and subsequent mortality. In our study only 6% patients developed leakage, which are slightly lower then other studies, while postoperative wound infections are comparable with other studies[2,3,5,9,10]. Thus we recommend primary repair in management of penetrating colonic injuries, except in cases of rectal injuries, major vessel injuries or injury to pancreaticoduodenal complex, or injury hospitalization interval of greater then 72 hours[2,3,6,10,12].

REFERENCES

1. http://www.cdc.gov/ncipc/wisqars.
2. Memon AA, Bhutto AA, Sheikh GS, Jokhio A, Soomro Q. Pattern of Firearm Injury and Outcome; LUMHS 2009; Vol: 08 No. 02.pg: 143-6.
3. Bashir Z, Rana PA, Malik SA, Shaheen A. Pattern of deaths due to firearm in Lahore – a twelve year study. Pakistan Postgrad Med J 2000; 11:109-14.
4. Chaudhry TH, Tajammul N, Bhatti MA, Hanif S. Firearm injuries - a study of 110 cases. Ann King Edward Med J 2005; 11(4):499-502.
5. Kohli A, Agarwal NK. Firearm fatalities Kandil AA. Gunshot wounds of the abdomen. Sci Med ESCME 2005; 17(4) [Online] Available at h t t p: / /www.ems.org.eg/elmgala_elalmia/ SMJ_oct_05/DATA/6.pdf17.
6. Kandil AA. Gunshot wounds of the abdomen. Sci Med ESCME 2005; 17(4) [Online] Available at h t t p : / /www.ems.org.eg/elmgala_elalmia/SMJ_oct_05/DATA/ 6.pdf
7. Adesanya AA, Afolabi IR, Da Rocha-afodu TJ. Civilian abdominal gunshot wounds in Lagos. J R Coll Surg Edinb 1998; 43:230-4.
8. Marc A, Singer MD, Rechard L: Primary repair of penetrating colon injuries. Dis colon Rectum Dec 2000; 45 (12): 1579-1587.
9. Cleary RK, Ponerantz RA, Lampman RM: Colon and rectal injuries. Dis colon rectum 2006 Aug: 49 (8): 1203.
10. Kayha MC, Derici H, Cin N, Tatar F, Et al:our experience in the cases with penetrating colon injuries. Ulus Travma Acil Cerrahj Derg. 3006 Jul: 12 (3): 223-9.
11. Hudolin T. Hudolin l: The role of primary repair for colonic kinjuries in wartime. Br J Surg. 2005 May; 92 (5): 643-7.
12. Nelson R, Singer M: Primary repair of penetrating colonic injuries cochranne database syst rev 2003: (3): CD 002247. Review.
13. Michivecius A, Klizaite J, Tamelis A et at. Penetrating colorectal trauma: index of severity and results of treatment. Medicina (kuanas). 2003jan: 39(6): 562-9.
14. Steel M, Danne P, Jones I; colon trauma: Royal Melbourne Hospital Experience ANZ J Surg. 2002 May; 72(5):357.