Evaluation of the Results of Primary Closure/Resection and Primary Anastomosis with Colostomy in Acute Colonic Injured Patients.

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ABSTRACT

Background: The management of acute colonic injury has been improved since several decades, treating low risk patients with primary closure and high risk patients (duration 6 hours or more, shock, contamination, transfusions 6 unit or more and multiple organs injury) with colostomy.

Objective: To assess the outcomes of primary closure and exteriorization in acute colonic injuries.

Material and Methods: This Comparative study was carried out in the Casualty Department DHQ teaching Hospital Bannu, from Jan.2009 to Dec.2010. Thirty Eight patients of acute abdominal trauma, who attended the emergency department, were included. Majority of the patients were those of fire arm injured, followed by blunt abdominal trauma. Less frequent were penetrating trauma due to stab and bomb blast pieces. As part of their resuscitation, they were shifted to operation theatre for abdominal exploration and either primary Closure/ Resection and primary anastomosis was done or colostomy of injured colon performed keeping in mind the Protocol of low and high risk categories respectively. The results obtained were subjected to statistical analysis by using SPSS software version 20, and showed significant differences except wound infection when compared complications between primary closure & Colostomy procedures.

Results: Primary Closure was carried out in 18 of 38 patients (47.4%) in low risk category while Colostomy was done in 20 of 38 (52.6%) in high risk patients. (69%) of the patients were below 40 years of their age and (31%) were above 40 years. In our series fire arm was more common (78.9%) weapon for penetrating abdominal trauma. Isolated Colonic injury was rare 10.6% as colonic injury was usually associated with other organ injuries (89.4%). Morbidity was comparable in both procedures. Wound infection recorded was (22%) in Primary Closure & (20%) in Colostomy. Mortality recorded was (5.5%) in Primary Closure & (10%) in Colostomy patients. Anastomotic leakage was recorded in one patient with primary closure where re colostomy saved the patient. Mean Hospital stay was 13days.

Conclusion: Primary Closure/Resection and Primary Anastomosis is having good results, in low risk patients but Colostomy of injured Colon is valuable in high risk and in patients who develop complications after Primary Closure.

Keywords: Colonic injury, Colostomy, Primary Anastomosis.

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INTRODUCTION

Isolated colonic injury is rare and is usually associated with other organs damage^{6, 12, 20} and also having high bacterial content and hard formed fecal loading⁹, increasing morbidity and mortality, through mechanical process and infecting the suture line. The initial symptoms and signs of isolated Colonic injury are vague, and delayed, as these are usually due to sepsis because of fecal spillage^{1, 3, 21, 23} but as Colonic injury in abdominal trauma is usually associated with other abdominal organs injury^{6, 12, 20}, therefore these patients usually are in critical conditions and present with pain, tachycardia, vomiting, bleeding, hypotension, distension of abdomen and signs of peritoneal irritation²³.

The only solution for managing such patients is early laparotomy^{7, 19, 21, 23, 27}. Primary Closure/Resection and anastomosis in low risk and fit patients and otherwise colostomy is performed. Good surgical judgment and in time surgery may results in low morbidity and mortality^{23, 24, 26}. Keeping these in mind, the present study was conducted with the specific aim to compare the results of the primary anastomosis and colostomy in low and high risk categories respectively.

MATERIAL AND METHODS

A comparative study, conducted in the casualty department of DHQ Teaching Hospital Bannu, from Jan 2009 to Dec 2010.

Total number of 38 patients with acute abdominal trauma, attended the emergency department. 30 of these patients (78.9%) were those of fire arm injuries, followed by blunt abdominal trauma including 4 patients (10.5%) other penetrating types of injuries were stab

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wounds 2 patients(5.26%) and bomb blast pieces penetrating were 2 patients (5.26%). Most of these patients attended the casualty department in critical condition. So surgery was carried out as part of their resuscitation, based on the ATLS guidelines, taking brief history, detail abdominal clinical examination and performing only base line investigations, including blood grouping, cross matching, HBV, HIV, HCV, Blood urea, blood sugar and in exceptional stable cases ultrasound examination of abdominal pelvis and radiographs of cervical region, chest and pelvis were done on their way to operation theatre.

Inclusion criteria: All trauma patients with colonic injuries, irrespective of their age and sex with sero negative for HBS, HCV and HIV were included in the study, due to our surgical facility limitations.

Exclusion criteria: None of the above and non-willing persons.

Statistical Analysis: Data were analyzed statistically, by using SPSS, version 20, soft ware

application and the results are presented in the form of tables, and p-values were calculated.

RESULTS

Most common of the associated injuries in order of decreasing frequency were small gut (31.6%) , liver (15.8%),thoracic(15.8%), stomach (15.8%), Spleen (10.5%), pancreatic , renal and urinary bladder injuries were also recorded in the minority of patients as shown in table 1.

In our patients operated, the most common of these were fire arm injured patients. We do not know the exact reason, but the incidence in our region has been especially increased after 9/11 ailment of the world. Other types of penetrating injuries were those of stab wound (5.26%), bomb blast pieces penetration of the abdomen, leading to the colonic injury (5.26%). Blunt type of abdominal injury with colonic involvement was second common cause, due to road traffic accident (10.5%). As shown in table 2.

Table 1. Showing %age of associated organ injuries

Associated organ injured	Total number of patients	% age
Small Gut	n=12	(31.6%)
Liver	n=6	(15.8%)
Thoracic injury	n=6	(15.8%)
Stomach	n=6	(15.8%)
Spleen	n=4	(10.5%)
Pancreas	n=2	(5.2%)
Renal	n=2	(5.2%)
Urinary bladder	n=1	(2.6%)
Total	38	100%

Table 2. Showing %age of Mechanism of Injury

Mechanism of injury	Number of patients	% age
Penetrating Injuries (89.5 %)	n=34	89.5
1. Fire arm	n=30	78.9
2. Stab wound	n=2	5.26
3. Bomb blast pieces	n=2	5.26
Blunt Trauma	n=4	10.5
1.Road traffic accidents		
Total	N=38	100%

Table 3. Comparison of complications between primary Closure & Colostomy

Major Complication	Primary closure patients (n=18)	Colostomy patients (n=20)	p- value
Expiry	1 (5.5%)	2 (10 %)	p<0.001
Wound infection	4(22%)	4(20%)	Non-significant
Burst Abdomen	2(11 %)	1(5%)	p<0.001
Anastomotic Break down	1(5.5%)	0(0%)	p<0.001

Hepatic, thoracic and stomach injuries were recorded in (15.8%) of patients. splenic injury (10.5%), pancreatic injury (5.2%), renal and urinary bladder injuries were recorded in 2.6% of patients were infrequent ¹⁹. Wound infection was comparable in both, primary closure 22% and colostomy 20%. Two patients developed burst abdomen in primary closure and 1 patient in colostomy group. All these patients then underwent , tension sutures, and 1 of them of the primary colonic closure group, who along with burst abdomen, presented with leaked anastomosis , where besides undergoing tension sutures, exteriorization of the colon performed & then the patient life was saved .The results showed significant differences between two groups, when compared complications like expiry, abdominal burst and anastomotic break down, between primary Closure & Colostomy while non significant differences were observed in wound infection as shown in table 3.

DISCUSSION

In this modern era of huge overcrowding, poverty, lack of knowledge, with superadded terrorism and optimism, trauma is now a day's one of the most common cause of mortality and morbidity. Abdominal trauma is either penetrating or blunt, with most of the patients, having other associated injuries, including chest, skeletal and head injuries ^{23,30}

Penetrating injuries include fire arm injuries, stab wounds, bomb blast pieces penetration, causing varieties of injuries. Velocity of the penetrating agent (Bullet) is also an important consideration , while penetration to the abdomen can also occur from injury to the thorax, loins, buttocks or perineum and then the involvement of other specialties concerned may become essential in the management of such patients, while following the ATLS guidelines, which also help avoiding, missing any injury ^{1,23,30} .

Non penetrating or blunt trauma include, crushing injuries, direct blows and deceleration forces injuries, some time there is no superficial wall trauma, in spite of intra abdominal organs injury. History, clinical examination of such patients and the knowledge of mechanism of injury is important in managing such patients ^{30,31} .

Most of these patients usually attended the casualty in their critical state of life, so surgery was carried out as part of the resuscitation for these patients, based on the ATLS guidelines, taking brief history, detail abdominal examination and performing only baseline and necessary investigations,. The usual symptoms and signs in the abdominal injury were pain, increased heart rate, vomiting ,increase in the size of abdomen, low BP, shock and signs of peritonism.

Experience of the surgeon and intelligent interpretation of history, clinical findings, along with available laboratory procedures, may be of some help but laparotomy is ultimately, the definitive procedure to detect the colonic injury early and to avoid the serious complication of delay, once there is peritoneal penetration. So surgery was done as part of resuscitation with generous midline abdominal incision through which all of the abdominal organs may be easily examined and can be extended, where needed.

The aim was to save these patients with minimal morbidity and mortality. IV fluids in the form of Ringolact D infusion was started while blood transfusion arrangement was being made. During laparotomy all abdominal organs were examined and it was observed that isolated Colonic injury was rare (10.6%), as compared to injured colon along with other associated injuries (89.4%), most common of the associated injuries in order of decreasing frequency were small gut (31.6%) , liver (15.8%), thoracic (15.8%), stomach (15.8%), Spleen (10.5%), pancreatic , renal and urinary bladder injuries were also recorded in the minority of patients as shown in table 1.

Either colostomy (20 of 38 patients 52.6%) or primary closure/resection and anastomosis of injured colon were carried out (18 of 38 patients 47.41%). Colonic injuries were categorized into low and high risks, depending upon the duration of injury^{21, 23} whether more or less than 6 hours, age of the patients above or below 40 years, general condition of the patient and whether or not associated with other injuries and nature of severity and number of such associated organs injuries, the low and high risk categorization also require good surgical judgment, any associated co morbid factors and degree of fecal spillage^{21, 23} in addition to the above. Most of the patients in this series were less than 40 years of age (69% versus 31%). Male predominated over females (94.7% versus 5.2%); penetrating injury was more common than non penetrating (89.5% versus 10.5%). Fire arm injury was the commonest weapon for penetration in our series (78.9% versus 5.26% stab versus bomb blast 5.26%), small gut injury was the commonest associated organ injury. Colonic injury related morbidity & mortality were analyzed. As symptoms of isolated injury of the colon are usually delayed and usually are due to sepsis, because of peritoneal fecal contamination,^{1, 3} resulting in complications, if management is delayed²⁹.

Only early surgical intervention avoid such sequelae of fecal spillage^{21, 23, 24, 25, 27, 29} such as abscess formation, peritonitis, multi organs failure and death, but as colonic injury is usually associated with other organs injury so this along with age of the patient, general condition of the patient & any other associated co morbid factors can significantly affect the outcome²⁹.

In our series the patients with colonic injuries, primary closure was performed in (47.3%) and colostomy done in (52.7%) of patients and where 95% were male and only 5% were female, 69% of the patients were below age of 40 years and 31% were above 40years. This resembles other international literature available¹⁹. Fire arm injured patients predominated (79%) and 2 patients (5.2%) each in stab and bomb blast, were present. Total 4 patients (10.5%) were present in blunt trauma due to road traffic accident. This simulates in that, penetrating injury predominates over none penetrating²⁹ but it is dissimilar in kind of weapon used. Small gut injury was the commonest (31.6%) of the associated organ injuries which simulates the available international series¹⁹.

Hepatic, thoracic and stomach injuries were recorded in (15.8%) of patients. splenic injury (10.5%), pancreatic injury (5.2%), renal and urinary bladder injuries were recorded in 2.6% of patients were infrequent [19]. Wound infection was comparable in both, primary closure 22% and colostomy 20%. Two patients developed burst abdomen in primary closure and 1 patient in colostomy group. All these patients then under went, tension sutures, and 1 of them of the primary colonic closure group, who along with burst abdomen, presented with leaked anastomosis, where besides undergoing tension sutures, exteriorization of the colon performed & then the patient life was saved see table 3.

Matalo *et al* also revealed lesser chances of complications and decreased expiry rate in patients, undergoing initial closure in injured colon³. Shannon *et al* also has set guidelines following colonic injuries and report good results, performing primary closure in colonic injuries, if perforation is small with minor fecal soiling, having good vascularity and if the patient is hemodynamically stable¹.

CONCLUSION

Although still colostomy is a valuable procedure, in high risk group, but according to our experience, primary anastomosis may be a safe option in low risk patients.

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