

Management Of Penetrating Colonic Injuries

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A study of 75 patients sustaining penetrating injuries of colon from September 1994 to September 1996 is presented. The patients were managed in one of the surgical units of Mayo Hospital Lahore. Eighty nine percent were male and 11% female. Sixty nine percent belonged to 2nd and 3rd decade of life. Eighty four percent sustained gunshot wound and 16% had stab wound. Seventy six percent reached hospital within three hours and 80% were operated within three hours after reaching the hospital. Eighty four percent were stable at the time of admission and 87% had other associated injuries. In 13% primary repair was done. In 24% injured colon was exteriorized and 44% had colostomy. Transverse and pelvic colon were mostly injured. Twenty seven percent had respiratory complications and 20% had wound infection. The mortality was 14%.

Keywords: Penetrating colonic injuries, management.

The management of colonic injuries, majority of which are penetrating in nature, continue to lively debate. In the past, changes in the management policies evolved as a result of large therapeutic experience gained during military conflicts.

The first reference to colonic injuries can be found in the Book of Judges¹. This century has seen a dramatic reduction in mortality, which was nearly 100% during the time of civil war. It has now fallen to less than 5% in recent series. Ogilvie² (1944), recounting the experience of the British Surgical team in the North African Desert Campaign of World War-II reported significant reduction in mortality attributed to the construction of colostomy in the treatment of colonic injuries. Based on this experience the Surgeon General of United States, in 1943, issued an order that all colonic injuries sustained in the battle, would be treated by performing a colostomy. Due to this procedure and improvement in the medical care, mortality rate fell to 30% during World War II.

Further reduction in the mortality rate (10—15%) was noted during Korean and Vietnam conflict. This was attributed to improvement in antibiotics, resuscitation, rapid evacuation, earlier operation, blood availability and better overall supportive care.

Later on Woodhall & Ochner³ (1951) published their experience in which 40% of the patients were repaired primarily without exteriorization or diverting colostomy. Their mortality rate fell from 23 to 9% with primary repair. The purpose of the study was to evaluate penetrating colonic injuries for primary repair and patients in whom colostomy was necessary. Moreover the risk factors affecting the outcome and complication rate were also studied.

Patients And Method

During two years from September 94 to September 96, 75 patients with penetrating colonic trauma were managed at one of the surgical units of Mayo Hospital Lahore. Patients under the age of 12 years were not included in the study as they are managed at paediatric surgical floor. All patients were assessed clinically, particularly looking for haemodynamic impairment, peritoneal signs and associated non colonic visceral injuries. After initial evaluation and resuscitation,

appropriate base line investigations like blood complete, blood grouping and cross matching, urinalysis, chest and abdominal radiographs were done. Haemodynamically unstable patients were directly shifted to the operation theatre for immediate exploration. All patients were given triple regimen of antibiotics. The abdomen was opened through midline incision. The source of continuing haemorrhage looked for and dealt with. Then a systematic search for visceral injuries was made. The colonic injuries were assessed and depending upon the mechanism of injury, site of injury, haemodynamic status and time between the injury and hospital admission, one of the following methods was done.

1. Stab injury - Primary repair, if safety criteria were present.
2. Grade 2-3 injury to caecum or ascending colon - Right hemicolectomy.
3. Left colon - Either exteriorization as colostomy or primary repair with proximal diversion/colostomy with mucous fistula.

A thorough peritoneal toilet was done with isotonic saline. Per-operative colonic lavage was not done. Drains were used selectively. Mass closure of abdomen was done with No.1 Prolene. Skin was closed selectively.

The data collected included Total number of patients, Age, Sex, Mechanism of injury, Time interval between assault and hospital admission and between hospital and operation, Haemodynamic status, Site of injury, Method of repair, Morbidity and Mortality. The colon was repaired with 3/0 Vicryl in two layers, the first continuous and second with interrupted stitches.

Results

Seventy five patients with penetrating colonic injuries were managed during study period of two years. Age ranged between 12 to 67 years with mean age of 26

Table No. 1 Age and Sex distribution

Age	Male	Female	Total	%age
12-20	18	02	20	27
21-30	28	04	32	43
31-40	11	01	12	16
41-50	09	01	10	13
51-60	01	00	01	01
Total	67	08	75	100

years. 67 were male and 8 female as shown in Table No 1. 84% had gunshot wounds and rest (16%) had stab injuries.

Fifty seven (76%) patients were brought to emergency department within three hours of injury and 60 (80%) patients were operated within three hours of admission as shown in Table No 2.

Table No.2 Injury - admission lag.

Hours	N=	%AGE
1-3	57	76
3-6	16	20
6-9	02	03

Admission - Operation lag.

1-3	60	80
3-4	11	15
4-6	03	04
6-12	01	01

At the time of admission 64 patients(84%) had BP more than 80 mm of Hg) in contrast to war victim who are mostly in shock (Table No.3). Sixty five patients (85%) had other associated injuries. Stomach and small intestine were commonly involved. (Table No:4).In this study transverse and pelvic colon were involved in 56 (74%) patients.

Table No. 3 Haemodynamic status at presentation.

Blood pressure	n=	%age
In mm of Hg		
Not recordable	04	5.3
<80/60	07	9.3
>80/60	64	84

Ten patients had primary repair. 8 were stabs and two firearms. The wounds were debrided and repaired with 3/0 Vicryl in two layers. These were grade 1-2 injuries involving the antimesenteric border. There was no complication. In 13 patients the injured colon was exteriorized as a colostomy. These patients had single perforation in the transverse colon or left colon and could not be repaired primarily because safety criteria was absent. This procedure is less time consuming. 33 patients had proximal colostomy after dealing the distal perforations (Table No.5).

Table No. 4 Frequency of organ injured.

Name of organ	%age	Name of organ	%age
Small bowel	39	Major Vessels	04
Stomach	20	Rectum	04
Liver	15	Ureter	04
Spleen	06	Retroperitoneal	04
		Hematoma	
Urinary Bladder	05	Biliary system	04
Kidneys	05	Pancreas	03
Mesentry and omentum	05	Duodenum	03
Diaphragm	05	Gravid Uterus	01

Perioperative antibiotic prophylaxis with 3rd generation cephalosporins and metronidazole or triple regimen was given.

Twenty patients had post operative respiratory complications and 15 had wound infection. The abdominal wound, postoperative ileus or intra abdominal sepsis lead to impair diaphragmatic movements, thus causing atelectasis. 5 patients had septicemia.

Table No.5 Types of procedures performed.

Procedure	N=	%Age
Primary Repair	10	13
Exteriorization as Colostomy	13	17
Transverse Colostomy	25	33
Sigmoid Colostomy	04	05
Hartmann's Procedure	04	04
Rt. Hemicolectomy	18	24
No Procedure Done*	01	01

*The patient died on the table

Even if there is no suture line leakage, prolonged hypotension can lead to translocation of colonic bacteria causing endotoxic shock (Table No.6). The mortality in this series was 14%, main cause being hypotension and septicaemia.

Table No.6 Morbidity

Complications	n=	%age
Respiratory	20	27
Wound infection	15	20
Intra abdominal sepsis	07	09
Faecal fistula	04	03
Septicemia	05	07

Discussion

The trauma has reached epidemic proportions. It frequently causes prolonged morbidity and high mortality. In a recent report, trauma ranked fourth as a killer, the first three being the heart disease, stroke and cancer. When mortality figures were tabulated for younger patients, trauma was number one⁴.

The male female distribution is 8:1 which is similar to other local series⁵. The male preponderance is rather higher than European studies. This may be due to the fact that the number of women engaged are less in this part of the world³.

The patients are mostly young males which is similar to the study of others⁶. The nature of injury is firearm in most of the cases which is similar other national and international studies. The firearms are a global problem^{6,7,8}.

Most of the injured persons were brought to the emergency within three hours by the people themselves. The role of the government and non-government organizations is very limited. The delay in operations was limited. The delay in operation can be avoided if blood bank services are further improved and people are educated to donate blood voluntarily.

Changing trends in the management of colonic injuries in this century have been summarized by Nance⁹. Primary repair was favoured early in the century until World War II when Ogilvie's² classic paper describing the British experience in the African desert advocating colostomy proximal to or at the site of colonic injury for better results. Woodhall and Oschner³

suggested the safety of the primary repair in selected patients with civilian colon injuries. Diversion remained the standard during the period from 1950 to 1980. However in the last

10 years, primary repair has assumed an increasing role. Stone and Fabian¹⁰, in a prospective randomized study of the perforating colonic injuries, clearly demonstrated that in selected patients, primary repair was effective.

George and Colleagues¹¹ prospectively performed primary repair in 95 of 102 patients with colonic injuries. The incidence of wound infection was 14.8% and intra abdominal abscess/peritonitis was 13.6%. V.Narayn Singh¹² performed primary repair in 57 patients out of 61. There was one death due to multiple associated injuries and one suture line leak leading to faecal fistula. Some authors⁶ have recommended primary repair for all the colonic injuries as the risk factors are relative. In my study ten patients underwent primary repair with excellent results. In two cases who had firearm injury to the caecum, primary repair was done and in spite of criticism from others remained well.

Per operative colonic lavage is not necessary as experienced by Narayan Singh¹². Some surgeons recommend anal stretch in primary repair cases.

The reduced severity of civilian injuries, advances in resuscitation and antibiotic therapy can tip the balance towards primary repair.

Exteriorized repair may be a good option in some patients as experienced by some of our colleagues⁸. Colostomy is still gold standard. Where there is doubt

about the outcome, colostomy should be resorted to.

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