ORIGINAL PROF-752

PENETRATING COLONIC INJURIES;
PRIMARY REPAIR

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ABSTRACT ... afsaralibhatti@hotmail.com **Introduction:** The management of colonic injuries continues to arouse lively debate. **Objectives:** To assess the efficacy of primary repair of penetrating colonic injuries. **Study Design:** Prospective study. **Setting:** Surgical Unit No. IV Jinnah Hospital, Lahore **Period:** one year from (Ist Jan 2002 to 31 Dec 2002). **Patients & Methods:** A study of 30 cases of penetrating colonic injuries were managed with primary repair. **Results:** Most of the patients were male (80%). Stab was the commonest mode of injury. The commonest sites were right colon & transverse colon (40% each). The leg period was 1-5 (mean 3h). The commonest associated. Injury was liver (33%). The hospital stay was 7-13 days (mean10 days). Morbidity was 26%. No patient develop faucal fistula. Mortality remains nil. **Conclusion:** Primary repair of penetrating colonic injury is recommended.
Key words: Colon & Primary repair,

INTRODUCTION

The management of colonic injuries continues to arouse lively debate. In penetrating abdominal trauma, the colon, due to its anatomical location is more vulnerable to injury as compared to other abdominal visceral. The microbiological flora of the large gut poses another threat to the patient when injury breaks the integrity of its wall. Colon is one of the most commonly injured viscera in abdominal trauma and in order of frequency[12] it comes second to small gut and number four to liver[1,2].

While the first reference to colon injuries can be found in the book of judges[3]. This past century has seen a dramatic reduction in mortality, which was nearly 100% during the time of civil war. This has fallen to less than 5% in many of the recent civilian series[4]. Before the World War-I, the management of colonic injuries was essentially non-operative and the patients were treated with opium only[5]. During the World War I these injuries were managed by exteriorizing the injured colon resulting in fall of mortality to 60%[6].

Ogilvie[7] recounting the experience of British Surgical team in the North African Desert campaign of World War-II, reported significant reduction in mortality attributed to the performance of colostomies in the treatment of

colon injuries. Upon learning of this experience, in 1943, The Surgeon General Of United States[8] issued an order stating that all colon injures sustained in battle would be treated by performing a colostomy. Based upon this philosophy and other improvement in medical care mortality rates fell to 30% during World War-II[9].

Further reduction in mortality rates (10 to 15%) was noted during the Korean and Viet Nam conflicts[9]. This was attributed to improvement in antibiotics, resuscitation, rapid evacuation, allowing earlier operation, blood availability and better overall supportive care. In the last two decades the mortality rate has fallen to 5% or less[10] making colostomies a gold standard in the management of colonic injuries. Although colostomy provides good results for colonic injuries but carries with it some inherent problems and in our setup is not socially acceptable. It is less easy to manage and need for another surgery further makes it an unpleasant experience[11,12].

In the early 1950s, reports began to surface suggesting that some injuries could be treated with primary repair rather than colostomy, In 1951, Orchner was one of the first surgeons to advocate consideration of primary repair for civilian colon injuries[13]. His premise was that injuries repaired in a timely fashion in the presence of minimal to moderate contamination were safe, and eliminate need for a colostomy and the subsequent second surgery required for its closure. 40% of patients were repaired primarily without exteriorization or diverting colostomy. His mortality rate fell from 23% to 9% with primary repair. To say that his assertion was greeted with less than widespread enthusiasm is a significant understatement.

By and large the issue was not seriously contested until the 1980s, when a number of respected of trauma surgeons began repairing colon injuries primarily with acceptable outcomes. The fundamental issue in primary repair is whether it is safe or perhaps safer than diversion. Accepting that this premise may perhaps be true begs the secondary issue of patient selection, with injuries that can be safely repaired without increased risk for complication compared to diversion.

The surgeons all over the World have been working out different strategies to avoid colostomy and its associated problems. These include primary repairs, exteriorization of the repaired segment with early drop back[14] and more recently use of intracolonic by pass tube after repair of left colon and rectum[15]. With improved facilities in patient care and proper use of antibiotics the surgeon today are more inclined to primary repair of colon. With advancing mechanization and lawlessness in our society the incidence of blunt and penetrating trauma is on an increase[1].

PATIENTS & METHODS

This was a prospective analytic study conducted in department of surgery Jinnah Hospital Lahore from 1st Jan 2002 to 31st December 2002. Thirty patients who sustained intraperitoneal colon injuries were included in the study. Those patients who sustained injuries to more than two organs system along with colon or who had complete shattered walls of colon were not included in the study.

The injured patients were admitted to A&E department of Jinnah Hospital where airway and oxygenation was established. All the patients with penetrating abdominal injuries having signs of peritonitis underwent Laparotomy after proper resuscitation.

Metromidazole, Gentimicin and Ampicillin were given intravenously preoperatively and continued for five days. In all the cases, the abdomen was opened through a midline incision, prompt control of hemorrhage and isolation of contaminating intestinal perforation was accomplished. An assessment of degree of faecal contamination was made, and associated injuries were managed. Wounds of colon were assessed for primary repair.

Once the decision of primary repair was made colonic perforation was deberided till healthy bleeding edges. Standard double layer interrupted repair with vicryl 2/0 was performed. Colonic injuries not suitable for primary repair were excluded from the study; they were either exteriorized or repaired with proximal defunctioning colostomy.

The peritoneal cavity was routinely irrigated with normal saline before abdominal closure and tube drain placed. Mass closure of Laprotomy incision was done with continuous prolene NO. 1. The wound was thoroughly irrigated with povidere iodine normal saline solution and closed primarily with interrupted proline sutures. Wounds of entry and exist were also debrided and left open.

All the patients were kept nil by mouth till the gut sounds were audible. Antibiotics were administered for at least five days. Stress was given for early mobilization of patient. Steam inhalation and chest physiotherapy was advised to every patient. Drain output was recorded. When the patient had established normal bowel activity oral fluid were allowed.

In case the wound got infected the stitches were removed, daily dressings were done and wound allowed to heal secondarily. Intra abdominal abscesses were diagnosed clinically or on ultrasound examination followed by percutaneous drainage under ultrasound guidance. The patients were discharged from hospital when their condition was satisfactory and they had started taking orally with full restoration of bowel activity. The stitches were removed on 7th day. Secondary wound closure if required was done on outpatient basis.

RESULTS

Thirty patients were included in the study.24 (80%) were male and 6(20%) were female. Age range was 18–38 yrs (mean 28).

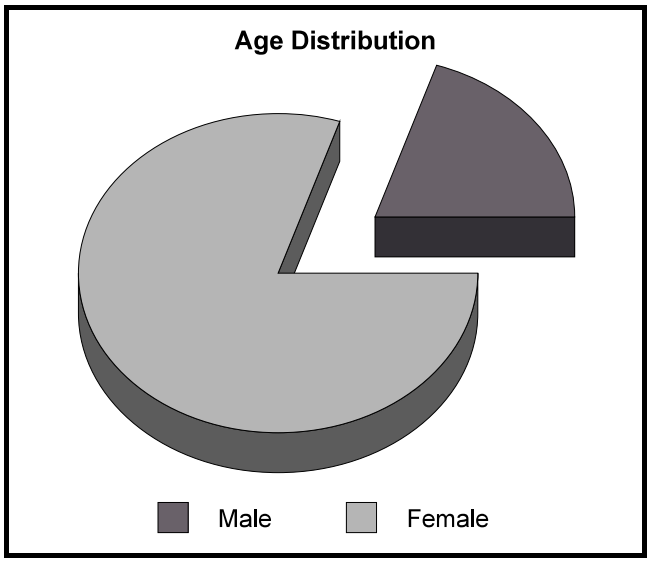

Table-I.		
Sex	Total	Percentage
Male	24	80%
Female	6	20%

Table-II. Type of Injuries		
Type of Injuries	Total	Percentage
Stab	14	46%
Firearm	12	40%
Iatrogenic	04	13%

Fourteen (46%) had stab, twelve (40%) sustained firearm injury and four (13%) had estrogenic colonic injury. The commonest sites were right and transverse colon 12 each (40%). Left colon sustained injury in 2(6%) patients and sigmoid in 4 (13%). The interval between injury and treatment was 1 – 5h (mean 3) 10 patients (33%) were in shock on presentation. Ten patients had associated injuries.

The length of hospital stay was 7 – 13 days (mean 10). Wound infection and atelectasis were commonest complications occurring in 4 patients

(13%) each. Intra abdominal (subhepatic) abscess developed in two (6%) No patient developed Leak from repair. Overall morbidity was 26% and mortality was nil.

Table-III. Associated Injuries		
Associated Injuries	Total	Percentage
Liver	10	33%
Jejunum	6	20%
Ileum	2	6%
Mesenteric Tear	2	6%
Diaphragm Tear	2	6%
Parabolic Hematoma	2	6%

Table-IV. Postoperative Complications		
Postoperative Complications	Total	Percentage
Wound Infection	4	13%
Subhepatic Abscess	2	6%
Atelectasis	4	13%

DISCUSSION

Although colostomy is still a safe, conservative and acceptable method of treating patients with colonic injuries, its morbidity remained formidable. It is an open source of contamination lying close to main wound. The hospital admission is required for closure of colostomy with risk of complication associated with it[17]. Inconvenience of having colostomy by itself makes the patient isolated from society and work place.

In Pakistan and other developing countries due to poor education, unreliable supply of collecting appliances and inadequate toilet facilities, colostomies are less easily managed[11]. Once a colostomy or ileostomy is created, the patient becomes essentially disabled until after closure. Patients with colostomy generally have an additional 8 to 16 weeks of disability in the interval from its formation until closure[18]. The burden on health facilities increases due to multiple admission, increased bed occupancy, operating theatre time, and use of manpower.

Complication of colostomy may occur at time of fashioning colostomy or after its closure. Early postoperative complications like retraction, stricture, prolapsed and paraclostomy hernia are well recognized[19]. There is wide variation in the recorded morbidity of stoma closure. Parks and Hastings found a complication rate of 36% without any mortality in a review of 83 patients subjected to colostomy closure[20].

Pachter et al found 25% morbidity rate in their study of 87 patients[21]. Other series have also shown high rates of complications in patients with colostomy compared to those treated without it[22,23,24]. Colostomy closure is not only associated with complication rate of 10 – 50%[25], but there is a significant mortality rate of 4% reported in literature[26]. At the same time low morbidity rates have been described in some series [27,28] Jordan has nicely described this issue that any operation regardless of complication is potential cause of complication for a patient[29]. Most of the series conclude that primary repair should be undertaken in selected patients and for this experience and judgment on the part of surgeon is of central importance. However, the criteria for selection of the patients for primary repair are not the same.[22,24,30]

This study favour primary repair of colon in most of patients and our results are also comparable to other series. Ten of our patients developed complications. Four patients had wound infection; four had atelectasis and two developed intra-abdominal (sub hepatic) abscess. No patient developed fecal fistula.

Although it has long been commonly accepted that left colon wound produce higher rates of infective complications than those of the right colon[13], our data did not demonstrate any significant difference.

Table-V. Morbidity and mortality rates after penetrating Colonic injuries

Author	Year	No of Pts	Primary repair (%)	Colostomy (%)	Exteriorized repair (%)	Mortality (%)	Morbidity (%)	Wound Infection
Thomson et al	1981	105	48	31	21	3	18	7
Karanfilian et al	1982	132	19	30	51	9	27	NA
Cook et al	1984	207	26	74	0	4	29	7
Adkins et al	1984	56	64	21	15	4	14	NA
Nallathambi et al	1984	136	43	40	17	5	14	NA
Demetriades et al	1985	134	56	41	2	2	8	10
Frame et al	1989	65	58	50	2	0	23	NA
George et al	1989	102	93	7	0	3	23	NA
Nelken & Lewis	1989	76	49	51	0	3	42	8
Chappins et al	1991	56	50	50	0	0	18	3
Schultz et al	1991	100	57	43	0	1	2	10
Za Choudary	1994	15	100	0	0	0	26	13
Present	2002	30	100	0	0	0	26	13

NA = Not applicable

Similarly we could not appreciate mechanism of injury as a separate risk factor in our ten patients who developed complications after primary repair of colon. Severity of colonic injury was significantly related to the complication rate[17]. But in our study we could not appreciate significant risk factors for primary repair. We had no leakage from repair site.

Patients with massive colonic destruction were not included in the study. We carried out primary repair successfully in patients who had associated injuries of one or two organ system. Although in the past, associated intra-abdominal visceral injuries were considered either a contraindication for primary colonic repair or it was associated with high postoperative morbidity.[17,23,30] N.Y. Kamwendo et al[31] strongly recommend primary clonic repairs in spite of any associated intra-abdominal visceral injuries. We closed all the Laparotomy wounds after irrigation with povidine iodine and normal saline. Our wound infection rate remains low, only four patients(13%) developed wound infection, which is lower than similar studies reporting wound infection rate (14 – 48%)[17,18], Store and febeain[32] found significantly higher (P<0.01) incidence of irtraperitional abscesses in patients where abdominal cavity was drained and colon was managed by some form of colostomy. We used closed drainage after primary repair of colonic injuries. Only two patients (6%) developed intra abdominal (sub hepatic) abscess. Shock was considered another contraindication for primary repair of colonic injuries[17,18] but Burch et all[33] in a retrospective review of 727 patients concluded that shock and fecal soilage were of less importance and did not mandate a colostomy. We also did not

consider shock and fecal soilage a contraindication for primary repair and achieved good results. Average hospital stay in our patients was 10 days, which is comparable to other studies.

We conclude that primary repair of colonic injuries is safe irrespective of shock, blood transfusion, intra-abdominal soiling and associated injuries. It is a safe alternatively of colostomy because of minimal morbidity, short hospital stay and cost effectiveness. Injuries of the right and left colon can be managed in the same way, despite the known anatomic and physiological differences between them. Primary repair should be the procedure of choice for penetrating colonic injuries.

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