ORIGINAL ARTICLE

Surgical Experience Regarding Management of Traumatic Duodenal Injuries

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ABSTRACT

Objective: To share our surgical experience of duodenal injuries in past 6 years and to evaluate different surgical approaches regarding management of duodenal injuries, and to establish relationship between grades of injury and surgical treatment employed and outcome of each.

Patients and methods: 32 consecutive patients diagnosed with traumatic duodenal injuries admitted to CMCTH during 6 years period from March 2002 to April 2008 were retrospectively analyzed. The data collected on study specific Performa included demographic data, cause of injury, number and size of injury, anatomic location of duodenal injury, grade of duodenal injury, injuries to surrounding structures, surgical procedures performed, postoperative complications, morbidity and mortality.

Results: During the period under study a total of 32 consecutive patients with duodenal injuries were included in the study. There were 29 (90.6%) male and 3 (9.4%) female with male to female ratio of 9:1 and mean age of 27.8 years. 78.12% cases were due to penetrating injuries predominantly firearm injuries and 22.98% were due to blunt trauma. second part of duodenum was found to be the most commonly injured site in 53% case and grade III injuries accounted for 53% of total injuries. The most common operative procedure performed was Primary Repair with and without Tube Duodenostomy. Postoperatively 6.25% cases developed duodenal fistula, and the overall morbidity was found to be 34.37% and mortality 28%.

Conclusion: It is concluded that the most commonly duodenal injury were grade III injury manage with successfully primary repair with or without tube Duodenostomy. Therefore it is recommended that primary repair with or without tube duodenostomy can be safely performed upto grade 3 traumatic duodenal injuries, while complex procedure should be reserved for grade IV and V injuries.

Key words: Duodenal injury, Traumatic or penetrating Injury.

INTRODUCTION

Duodenal injuries are rare injuries found in only 3-5% laparatomies for blunt or penetrating abdominal trauma[1,2]. Delays in diagnosis due to late clinical presentation, subtle diagnostic findings, incorrect classification of the injury, and intra operative dilemmas due to retroperitoneal location of the duodenum, its proximity to important abdominal structures, its marginal blood supply, lead to difficulties in management and considerably increase morbidity and mortality in these patients [3,4]. The management of duodenal injuries has long been debated.

PATIENTS AND METHODS

Thirty two consecutive patients diagnosed with traumatic duodenal injuries admitted to CMCTH during 6 years period from March 2002 to April 2008 were retrospectively analyzed. The data collected on study specific Performa included demographic data, age sex, cause of injury, preoperative investigations performed, preoperative findings like number and size of injury, anatomic location of duodenal injury, grade of duodenal injury, injuries to pancreas and surrounding structures, surgical procedures performed, postoperative complications, morbidity and mortality.

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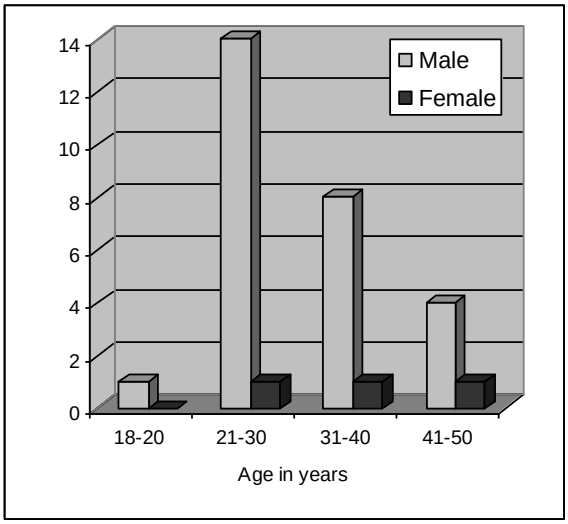
Grade		Injury Description
1	Hematoma	Involving single portion of duodenum
	Laceration	Partial thickness, no perforation
2	Hematoma	Involving more than one portion of duodenum
	Laceration	Disruption of < 50% of circumference
3	Laceration	Disruption of 50-75 % of circumference of D2
		Disruption of 50-100% of circumference of D1, D3, D4
4	Laceration	Disruption of less then >75% of circumference of D2
		Involving ampulla or CBD
5	Laceration	Massive disruption of pancreatico duodenal complex
	vascular	Devascularization of duodenum

After aggressive resuscitative measures, emergency explorative laparatomy was performed in all patients with suspected duodenal injuries. Per operatively duodenal injuries were classified into grade I to V duodenal organ injury scale (DIS) according to AAST (American Association for the Surgery of Trauma. Primary repair, primary repair with tube duodenostomy, and complex repair that included pyloric resection, triple ostomies with duodenal repair or tube duodenostomy whipple's, procedure were the surgical repair methods performed.

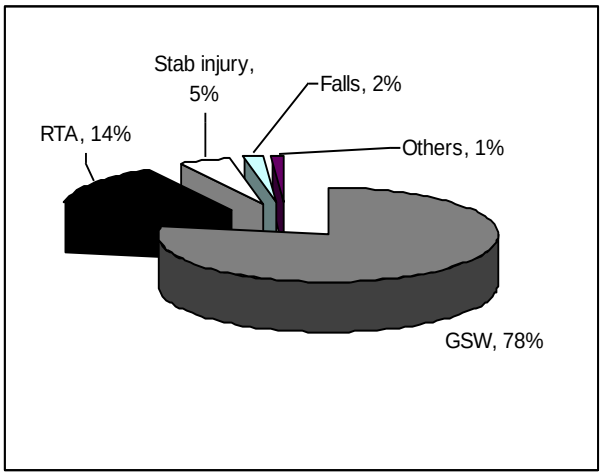
RESULTS

During the 6 years period under study 32 consecutive patients with duodenal injuries diagnosed preoperatively were included in the study. There were 29 (90.6%) male and 3 (9.4%) female with male to female ratio of 9:1. the age and sex distribution is given in Diagram1. predictably the patients were young with mean age of 27.8 years.

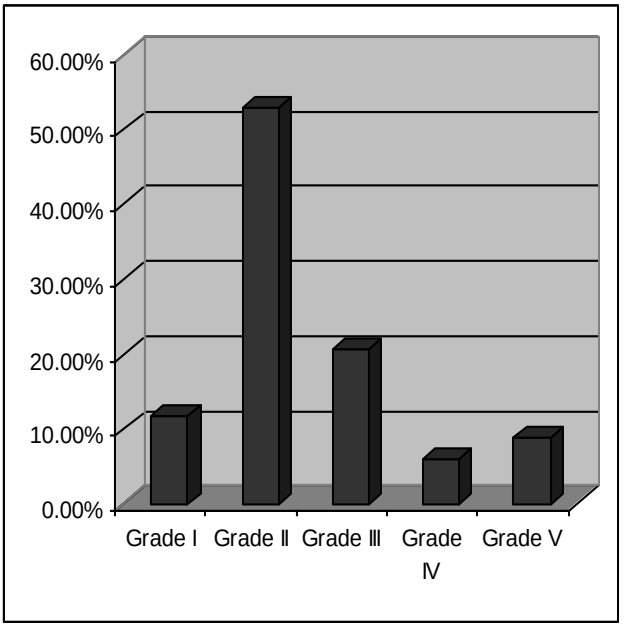


In the period under review, 25% (n=08) patients presented with shock, of these five had sustained gunshot injuries to abdomen, 2 had blunt trauma, while one patient had stab injury. The cause of injury in all cases is depicted in pie chart.

All patients in our study suspected of intra-abdominal organ injuries, after aggressive resuscitation underwent laparatomy without delay. Per operativly second part of duodenum was found to be the most commonly injured site, i.e. in 17 (53.12%) cases, followed by third part in 7 patients, fourth in 5 patients, and first part in 3 patients. Two patients of gunshot wound, and one of stab wound had through and through perforation of duodenum. Isolated duodenal injuries were found in 05 patients only while the most commonly injured surrounding structures were found to be liver in 10 cases, stomach in 07 cases, gut in 05 and pancreas in only 2 cases. There was no injury to major vessels.



Penetrating injuries accounted for 85% injuries



Grades of injury

Table IV: Associate injuries

Characteristics	=n	%age
Isolated duodenal injuries	05	15.63
Duodenal + liver	10	31.25
Duodenum + stomach	07	21.87
Duodenum + intestine (small, large)	05	15.63
Duodenum + pancreas	02	6.25
Duodenum + others	03	9.37

Table V: operative procedure performed

Procedure	Grade I	Grade II	Grade III	Grade IV	Grade V	Total
No duodenal procedure	04(100%)		--	--	--	**04**
Primary repair	--	06(18.75%)	3 (42.86%)	--	--	**09**
Primary repair with tube duodenostomy	--	12(66.67%)	3 (42.86%)	--	--	**15**
Complex repair	--	---	1 (14.28%)	01(100%)	02(100%)	**04**
Total	04	18	07	01	02	32

Only 04 patients had grade I injury i.e hematoma and no duodenal procedure was performed in them. While 18 patients had grade II injuries, 07, grade III, and only 01 of grade IV, and 02 of grade V injuries.

The most common operative procedure performed was primary repair with tube duodenostomy. All penetrating injuries to duodenum were treated by debridement of wound margins, and primary closure of the defect, with or without tube duodenostomy. Primary repair alone was done in 09 patients, 06 of grade II, and 03 of Grade III injury, while 12 cases of grade II and 03 of grade III injury required tube duodenostomy in addition. Complex repair was done in01, 01, 02 cases of grade III, IV, and V injuries respectively.

Postoperatively the most common complication encountered was wound infection 12.5% in respiratory tract infections 9.37% as in other surgeries, intra-abdominal abscess 6.25% cases, in but the most common procedure related complication was duodenal fistula in o1, o1, cases of grade II and grade III injuries respectively. The average post operative hospital stay was noticed to be 11.2 days. The mortality in this study was noted to 28%, 9 out of thirty two patients expired postoperatively.

Table VI: Post operative complications, morbidity and mortality

Compli-cations	**Duodenal fistula**	**Other complications**	**Total**
Grade I	-	-	2(6.25%)
Grade II	01	07(21.88%)	
Grade III	01		
Grade IV	-		
Grade V	-		
Total	34.37%		

DISCUSSION

Management of duodenal injuries is quite challenging even at the hands of a skilled surgeon, due to relative low frequency of duodenal trauma to injuries of other abdominal organs, late presentation, difficult diagnosis, delayed surgical intervention, and high probability of development of postoperative morbidity and subsequent mortality.

Duodenal injuries are rare, and collection of data regarding incidence and management is time consuming, in this study we share our surgical experience of 32 consecutive cases in last 7 years. Most of patients in our study were young males with mean age of 27.8 years, as in other studies on trauma[5,6,7].

The leading cause of duodenal trauma in our study was penetrating injuries predominantly due to firearm injury, and stab injuries in some cases. This is consistent with other studies carried out previously[4,8].

The duodenal injuries following non penetrating trauma present diagnostic dilemma, as they are usually inapparent in the early post traumatic period, as large portion of duodenum is retroperitonaeal, and most injuries occur in those segments, sign and symptoms are often subtle and manifested only when severe pathophysiological derangements take place, this often lead to difficulty in diagnosis and delay in surgical repair, thereby increasing morbidity and mortality in cases of blunt trauma compared to penetrating trauma[9,10,11]. Furthermore in some patients particularly of grade I or II duodenal hematoma without perforation may not require surgery and surgical intervention may inadvertently increase postoperative morbidity[9,11.12.].

In this study, second part of duodenum was the most commonly injured and most injuries were of grade II. This is in accordance to previous reports[4,15].

The surgical treatment of traumatic duodenal injuries is controversial from decades, some Authors support simple repair, while still others suggest complex duodenal procedures including extensive resections[13,14,15]. In our study primary repair was the most common surgical procedure performed. It has been reported to be successful in 75-85% cases[16,17,18,19], in our study it PR was performed in 09 patients and PR with tube duodenostomy was done in 15 patients, and only 2 of 24 patients developed duodenal fistula, giving a success rate of 91%.This is in contrast to a multicentre trial study of Cogbill et al [20], which claims tube duodenostomy to be unnecessary and ineffective in preventing postoperative procedure related complications.

Furthermore injuries to surrounding organs are almost always present in cases of trauma, particularly gut. In our study we encountered only 05 islolated to duodenal injuries while 27 patients had associated injuries, of which liver and stomach were the most commonly injured organs followed by intestine. Patients with associated injuries are likely to develop

postoperative extra duodenal complications, and thus the postoperative morbidity is not always duodenal or duodenal procedure related. In our study the overall morbidity was found to be 34.37%, of which duodenal-procedure related morbidity was 6.25% only. This is within the range of duodenal fistulas rates reported in literature ranging between 0-16. 2%. The overall morbidity in our study was 34.37, consistent to reports by cogbill et al[20], levison et al [10] and ansensio[16] and others [4,] ranging between 12-50%.

The mortality rate in our study was 28%. This is in upper limit of the range reported in literature by cogbill et al[20], and others[4,21], ranging from 10-30% and can be attributed to severe duodenal or associated injuries, delayed hospitalization due to inapparent clinical features particularly in cases of blunt trauma, or presentation in shock, pre operative sepsis and organ failure, and not particularly procedure related.

CONCLUSION

It is concluded that the most commonly duodenal injury were grade III injury manage with successfully primary repair with or without tube Duodenostomy. Therefore it is recommended that primary repair with or without tube duodenostomy can be safely performed upto grade 3 traumatic duodenal injuries, while complex procedure should be reserved for grade IV and V injuries.

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