Management of Blunt Duodenal Injuries

Suvit Sriussadaporn MD*, Rattaplee Pak-art MD*,
Sukanya Sriussadaporn MD*, Kritaya Kritayakirana MD*

** Department of Surgery, Faculty of Medicine, Chulalongkorn University*

Background/Aims : *Blunt duodenal injuries are relatively rare. Diagnosis is usually delayed resulting in significant morbidity and mortality. Treatment of the injured duodenum varies according to severity of injury and duration before diagnosis. Duodenal fistulas are serious complications with potential mortality. The purpose of this study was to examine results of treatment of patients with blunt duodenal injuries at our institution.*

Patients and Method : *This is a retrospective study of patients who sustained blunt duodenal injuries and were admitted to King Chulalongkorn Memorial Hospital, Bangkok, Thailand from January 1990 to December 2003. During the study period, management of duodenal injuries at our institution depended largely on severity of injuries, timing of diagnosis and the presence of retroperitoneal infections. Intramural hematoma of the duodenum was treated conservatively. Uncomplicated wounds of the duodenum (grade II and grade III injury) with no obvious retroperitoneal infections were treated by simple duodenal repair. Pyloric exclusion was performed in cases of difficult duodenal repair and/or delayed diagnosis (> 24 hours after injury) with obvious evidence of retroperitoneal infections.*

Results : *Twenty six patients were entered into the study. Five patients (19.2%) had intramural hematoma of the duodenum, all were successfully treated by conservative treatment. Twenty one patients (80.8%) had transmural tear of the duodenal wall. Ten of them (47.6%) underwent simple repair, 10 (47.6%) underwent simple repair of the duodenal wounds combined with pyloric exclusion (2 of them underwent the operations elsewhere), and 1 (4.8%) underwent pancreaticoduodenectomy. Seven patients who had transmural tear of the duodenum developed complications (33.3%). Two patients had duodenal fistulas (9.5%); 1 in the simple repair group and 1 in the pyloric exclusion group. One patient who underwent pyloric exclusion had leakage of the gastrojejunostomy anastomosis with intact duodenal repair resulting in a complicated and prolonged hospital course. There was no mortality in this study.*

Conclusions : *The outcome in management of blunt duodenal injuries at our institution was acceptable with low morbidity and no mortality. Intramural hematomas were safely treated conservatively. Uncomplicated duodenal wounds were treated by simple suture repair. Pyloric exclusion was a useful additional procedure in patients with complicated duodenal injuries. Retroperitoneal infections was a strong indication to perform this procedure in addition to simple repair of the duodenal wounds. Pancreaticoduodenectomy should be reserved for only severed combined duodenal and pancreatic head injuries.*

Keywords : *Blunt duodenal injury, Duodenal fistula, Pyloric exclusion, Pancreaticoduodenectomy*

J Med Assoc Thai 2004; 87(11): 1336-42
Full text. e-Journal: *http://www.medassocthai.org/journal*

Diagnosis of duodenal injuries from blunt trauma is usually delayed owing to its retroperitoneal location and trivial clinical signs at the early stage of injuries. Furthermore, associated injuries such as head and chest injuries which are frequently present in major abdominal trauma patients may also contribute to the delayed diagnosis by making patients evaluation more difficult. Although recent reports revealed a significant improvement in morbidity and mortality of blunt duodenal injuries compared to those reported in the past, the incidence is still relatively high with an overall morbidity rate of 50-60% and mortality rate of 0-7%[1-5].

Correspondence to : Sriussadaporn S, Department of Surgery, Faculty of Medicine, Chulalongkorn University, Rama 4 Road, Bangkok 10330, Thailand. Phone: 0-2256-4117, Fax: 0-2256-4194

Management of ruptured duodenum has long been a surgical challenge to all trauma surgeons. The main purpose of treatment is to prevent duodenal fistulas which are serious complications with potential mortality. Although most duodenal wounds from blunt trauma can be successfully treated by simple suture repair, a certain number of patients require some additional procedures either to protect the repaired duodenal suture line or to make the leakage, if it occurs, easier to manage. Several additional procedures have been advocated since the beginning of the twentieth century and, among them, pyloric exclusion is currently one of the most widely used methods[3-11].

The purpose of this study was to examine the results of treatment of patients with blunt duodenal injuries at our institution, where during the last decade, pyloric exclusion was employed for patients with complicated duodenal wounds.

Patients and Method

This is a retrospective study of patients with duodenal injuries from blunt trauma who were admitted to King Chulalongkorn Memorial Hospital during the 14 year period ending December 2003. All patients who had perforation of the duodenal wall were diagnosed during exploratory laparotomy. Patients who had intramural hematoma of the duodenum were diagnosed from upper GI barium study, computed tomography or during laparotomy. During the study period, the indications for exploratory laparotomy of blunt abdominal trauma patients at our institution were: 1. shock 2. peritonitis 3. positive x-ray signs such as perinephric air at right upper quadrant of the abdomen which was strongly suggestive of ruptured duodenum 4. positive diagnostic peritoneal lavage (DPL) and 5. computed tomography findings indicated the need for exploratory laparotomy.

Severity of the injured duodenum was classified according to the American Association for the Surgery of Trauma-Organ Injury Scale (AAST-OIS)[12]. Surgical management of duodenal injuries depended largely on severity of injuries, timing of diagnosis (interval from injury to operative repair), and the presence of retroperitoneal infections found during exploratory laparotomy. Intramural hematoma (grade I and grade II injury) was treated conservatively. Uncomplicated wounds of the duodenum (grade II and grade III injury) with early diagnosis (< 24 hours after injury) and without severe retroperitoneal infections were treated by simple suture repair. Simple suture repair was also employed in cases with delayed diagnosis (> 24 hours after injury) if there was no or minimal retroperitoneal soft tissue infections. Pyloric exclusion was added after simple suture repair in cases of difficult suture lines and/or delayed diagnosis (> 24 hours after injury) with obvious evidence of retroperitoneal infections. When retroperitoneal infections were encountered during exploratory laparotomy, aggressive debridement of the infected retroperitoneal soft tissue was performed in addition to suture repair of the injured duodenum and pyloric exclusion. Pyloric exclusion was performed by opening the posterior wall of the gastric antrum about 3 cm. proximal to the pyloric sphinctor and suturing the pyloric sphinctor with polypropylene suture No. 2-0 from inside the stomach. After that, a gastrojejunostomy anastomosis was performed at the previous gastrotomy site. One or two penrose drains were routinely placed at the retroperitoneal area. All patients who underwent pyloric exclusion were followed up by upper GI barium study to evaluate patency of the sutured pylorus at 3 to 6 weeks interval. No retrograde decompressive jejunostomy or feeding jejunostomy was performed in the patients. When severe duodenal and pancreatic head injuries were encountered, pancreaticoduodenectomy was considered a treatment of choice.

Shock in this study was defined as a systolic blood pressure of ≤ 90 mm Hg when the patients first arrived at the emergency room. Statistical analysis was performed by using Student t-test. A P value of < 0.05 was considered significant.

Results

Twenty six patients were enrolled into the study. Twenty three patients (88.5%) were male and 3 (11.5%) were female. The age ranged from 15 to 51 years, mean 27.9 ± 10.97 years. Motorcycle accidents were the most common cause of injuries (Table 1). Eight patients (30.8%) were in shock on arrival at the emergency room. Fifteen patients (57.7%) had

Table 1. Causes of duodenal injuries

Causes	Number of Patients
Motorcycle accidents	9 (34.6%)
Assault	5 (19.2%)
Sudden accidental impact to the abdomen	5 (19.2%)
Fall from height	3 (11.5%)
Car accident	3 (11.5%)
Pedestrian accident	1 (4.0%)
	26 (100.0%)

associated intra and extraabdominal injuries (Table 2). Site and severity of duodenal injuries are shown in Table 3. Of the 5 patients who had intramural hematoma of the duodenum; 4 were diagnosed from upper GI barium study and computed tomography without exploratory laparotomy, 1 was diagnosed during exploratory laparotomy for other associated intraabdominal injuries. All patients with intramural hematoma of the duodenum had uneventful expectant treatment. Of the 21 patients who had transmural tear of the duodenum; 10 (47.6%) underwent simple suture repair, 10 (47.6%) underwent simple suture repair of the duodenal wounds combined with pyloric exclusion (2 of them underwent the operations elsewhere), and

Table 2. Associated injuries in 15 patients*

Intraabdominal Injuries	No. of Patients	Extraabdominal Injuries	No. of Patients
Liver	6	Long bone fractures	5
Spleen	3	Rib fractures	2
Pancreas	3	Maxillofacial injuries	2
Gall bladder	2	Soft tissue injuries	2
Inferior vena cava	1	Epidural hematoma	1
Kidney	1		
Small bowel	2		
Colon	1		

* Some patients had more than 1 associated injury

Table 3. Site and severity of duodenal injuries

Site of duodenal injuries*		Number of Patients
First part of duodenum		3 (10%)
Second part of duodenum		10 (33.3%)
Third part of duodenum		13 (43.3%)
Fourth part of duodenum		4 (13.3%)
Severity of duodenal injuries**	**Injury Description**	**Number of Patients**
Grade I	Hematoma involving single portion	3 (11.5%)
Grade II	Hematoma involving more than one portion or Disruption < 50% of circumference	10 (38.5%)
Grade III	Disruption 50 to 75% circumference of D2 or Disruption 50 to 100% circumference of D1, D3, D4	12 (46.2%)
Grade IV	Disruption > 75% circumference of D2 or Disruption involing ampulla or distal common bile duct	0 (0%)
Grade V	Massive disruption of duodenopancreatic complex	1 (3.8%)
		26 (100.0%)

* Some patients had intramural hematoma or transmural tear of more than 1 part of the duodenum
** Classification according to the American Association for the Surgery of Trauma-Organ Injury Scale (AAST-OIS)[12]

1(4.8%) who had combined pancreatic head and duodenal injuries underwent pancreaticoduodenectomy. Details of patients who underwent additional pyloric exclusion procedure are shown in Table 4. Delayed diagnosis with obvious soft tissue infections of the retroperitoneal area were principal factors determining the need for pyloric exclusion. The time interval from injury to time of operative repair in all patients ranged from 2 to 72 hours, mean $\pm$ SD 19.5 $\pm$ 21.61 hours. The time interval in the simple repair group ranged from 2 to 48 hours, mean 15.0 $\pm$ 19.0 hours. The time interval in the pyloric exclusion group ranged from 2 to 72 hours, mean 23.5 $\pm$ 23.98 hours. There was no statistical significance of the time interval in both groups of patients.

No complication ralated to the duodenal injuries in patients who had intramural hematoma was observed in the present study. In patients who had transmural tear of the duodenal wall; 7 (33.3%) developed complications, 2 of them were in the simple repair group and 5 were in the pyloric exclusion group (Table 5). Duodenal fistulas occurred in 2 patients or 9.5% of patients who had transmural tear, 1 was in the simple suture repair group and 1 was in the pyloric exclusion group. The fistulas closed spontaneously after conservative treatment in both patients. Of interest was another patient in the pyloric exclusion group who had leakage of the constructed gastrojejunostomy anastomosis while the duodenal repair was intact. This patient underwent multiple operations

Table 4. Details of patients who underwent pyloric exclusion

Case Number	Injury Grading	Preoperative Time (hours)	Shock (Yes/No)	Associated Injuries	Retroperitoneal Infections (Yes/No)	Complications
1	II	72	No	none	Yes	dodenal fistula
2*	III	2	Yes	ruptured liver ruptured spleen	No	gastrojejunostomy anastomotic leakage
3	II	20	Yes	maxillofacial injury	Yes	none
4*	III	3	Yes	ruptured spleen colon injury	No	colonic fistula
5	III	14	No	fractured femur	Yes	wound infection
6	II	48	No	none	Yes	none
7	II	8	Yes	ruptured liver ruptured gall bladder abdominal wall injury colonic contusion	Yes	none
8	III	14	No	none	Yes	small bowel obstruction
9	III	48	No	none	Yes	none
10	III	6	No	none	Yes	none

* pyloric exclusion was performed elsewhere

Table 5. Complications following duodenal repair

Simple suture repair of the duodenal wounds (n = 10)	
Complications	Number of Patients
Doudenal fistula	1
Pancreatic fistula	1
Suture repair of the duodenum with pyloric exclusion (n = 10)	
Complications	Number of Patients
Duodenal fistula	1
Leakage of gastrojejunostomy anastomosis	1
Colonic fistula	1
Small bowel obstruction	1
Wound infection	1

and prolonged hospital stay (254 days) owing to multiple gastrointestinal fistulas resulting in severe intraabdominal and abdominal wall infections. He was eventually discharged home with a large ventral hernia which was subsequently repaired one year later.

Nine of the 10 patients who underwent pyloric exclusion were proved by upper GI barium study to have patency of the pylorus at 3 to 6 weeks after the operations. The remaining 1 patient whose pylorus was still closed when upper GI barium study was performed at 6 weeks after the operation was lost to follow up.

The hospital stay in patients who had intramural hematoma of the duodenum ranged from 5 to 90 days, mean 26.6 $\pm$ 35.67 days. The hospital stay in patients who had transmural tear of the duodenal wall ranged from 7 to 254 days, mean 41.4 $\pm$ 59.65 days. The hospital stay in patients who had complications related to the injured duodenum ranged from 26 to 254 days, mean 79.5 $\pm$ 78.91 days.

There was no mortality in the present study.

Discussion

Blunt trauma to the duodenum has long been recognized by trauma surgeons for its dreadful complications if improperly treated. Very high morbidity and mortality were reported in the early studies[1,2]. There are many explanations for high incidence of leakage of the repaired duodenum. Firstly, the diagnosis is usually delayed causing inflammatory reaction of the duodenal wall which is less ideal for a safe suture repair. Furthermore, severe soft tissue infections in the retroperitoneal area around the injured duodenum cause a hostile environment to the proper healing of the duodenal suture line. Secondly, the average volume of saliva, gastric juice, bile, duodenal and pancreatic juices passing through the duodenum is approximately 10 litres per day[10]. Such a massive flow of saliva and digestive enzymes make the duodenal suture line vulnerable to leakage. Thirdly, when present, associated pancreatic injury and pancreatic enzymes leakage add a significant risk for suture line disruption.

Intramural hematoma of the duodenum is found more frequently in children than in adults and conservative treatment should be initiated after the diagnosis is obtained[13]. All patients with intramural hematoma of the duodenum in the current study were successfully managed by conservative treatment which included 1 to 2 weeks of nasogastic tube suction and total parenteral nutrition.

Uncomplicated duodenal wound can be safely treated by simple suture repair. This may account for approximately 80% of all duodenal wounds[13,14]. For more complicated duodenal injuries, more complex procedures may be required to protect the suture line. Several adjunctive procedures have been described to decrease the incidence of suture line leakage. Berne et al in 1968 recommended duodenal diverticulization which included repairing of the injured duodenum, distal gastrectomy with Billroth II reconstruction and tube duodenostomy[15]. Although physiologic changes following this procedure obviously protect the duodenal suture line, its versatility is in doubt owing to the complexity of the procedure. In 1977, Vaughan et al advocated pyloric exclusion which included repairing the injured duodenum, opening the gastric antrum and suturing the pyloric sphinctor from inside the stomach and completing the procedure by performing gastrojejunostomy anastomosis[8]. This method has been widely accepted and currently recommended in the management of complex duodenal and pancreatic injuries[3-11,13,14,16]. However, the appropriate indications to add this procedure after repairing the duodenal wound have not been clarified and most of the time is operator dependent. Kashuk et al in 1982, recommended the following indications for pyloric exclusion: 1) delay in operation of more than 24 hours, 2) injury involving 75% or more of the duodenal wall in first or second portion or high energy missile perforation or compromised blood supply, and 3) associated injuries at head of the pancreas or distal common bile duct[7]. The basic physiologic changes favouring protective action of pyloric exclusion to the duodenal suture line are: 1) decreasing volume load of saliva and gastric juice through the duodenum, 2) decreasing activation of bile flow and pancreatic juices by divertion of gastric juice from contacting duodenal mucosa[8]. In the current study, pyloric exclusion was performed in 47.6% of patients who had transmural tear of the duodenum. The main reason for the relatively high rate of performing pyloric exclusion is that the majority of patients came to us late leading to delayed operations (mean duration before operative repair in pyloric exclusion group was 23.5 $\pm$ 23.98 hours). However, delay in operation is not the sole indication for pyloric exclusion. Obvious evidence of retroperitoneal infections is also a major determinant for performing pyloric exclusion in these patients. Two patients in the present study who were operated on 48 hours after injuries underwent simple repair without adjunctive pyloric exclusion because the retroperitoneal area was not obviously infected.

Only 2 patients (9.5%) in the present study had duodenal fistulas which closed spontaneously by conservative management. One of them was in the pyloric exclusion group. This low rate of uncomplicated duodenal fistulas supports the authors' policy of performing pyloric exclusion in complicated duodenal injuries. However; this procedure is not without risk as 1 of the presented patients had leakage of the constructed gastrojejunostomy anastomosis with intact duodenal repair resulting in a prolonged and complicated postoperative course. Leakage of the gastrojejunostomy anastomosis following pyloric exclusion with intact duodenal repair has also been experienced by some investigators[13]. This potentially fatal complication should be kept in mind when pyloric exclusion is considered a necessary additional procedure.

Nine of the 10 patients who underwent pyloric exclusion were demonstrated by upper GI barium study to have a patent pylorus in 3-6 weeks after the operation. This finding is in accordance with previous reports[6,8]. Since the sutured pylorus will open and the gastrojejunostomy anastomosis will spontaneously close, so the risk of stomal ulcer will decrease with time and truncal vagotomy is not required[13]. Nevertheless, acid reducing medication should be administered during the early postoperative period until the sutured pylorus is open.

Some investigators advocated placement of a retrograde jejunostomy tube to decompress the injured duodenum and placement of a feeding jejunostomy tube for enteric feeding[17,18], Neither of which were done in the presented patients. The authors, as well as other investigators, were in doubt about the efficacy of the retrograde jejunostomy tube to decompress the duodenum and prevent duodenal suture line leakage[10]. Tube decompression has not been shown to decrease the incidence of duodenal fistulas by some investigators[19,20]. For feeding jejunostomy, the authors think that it should be reserved only for high risk or complicated patients in whom oral feeding would be delayed for an extended

period of time. All patients except 1 in the current study had grade I to grade III duodenal injuries and could be simply managed without a feeding jejunostomy tube. In the authors' opinion, unnecessary insertion of a feeding jejunostomy tube may be associated with unexpected complications.

Only 1 patient in the present study underwent pancreaticoduodenectomy. This patient had severe injuries to the first and third part of the duodenum with pancreatic head disruption (grade V injury). He had an uneventful recovery. Pancreaticoduodenectomy should be reserved for only severe pancreaticoduodenal injury patients who are not candidates for other less aggressive procedures[13,14,21].

Conclusions

Management of blunt duodenal injuries depends largely on the severity of injuries, promptness of diagnosis, and evidence of retroperitoneal infections at the time of operation. The low incidence of duodenal fistulas (9.5%) and the absence of mortality in the current study supports the authors' policy in management of duodenal injuries. Intramural hematomas should be treated conservatively. Simple repair is the treatment of choice in most uncomplicated cases. Pyloric exclusion should be considered as an adjunct to protect the repaired duodenal suture line in delayed cases with obvious evidence of retroperitoneal soft tissue infections. The pyloric exclusion, if indicated, should be meticulously performed since it may be complicated by gastrojejunostomy anastomotic leakage. Retrograde jejunostomy and feeding jejunostomy were not performed in the presented patients. Pancreaticoduodenectomy should be reserved only for severe injuries to the duodenum and pancreatic head.

References

1. Miller RT. Retroperitoneal rupture of the duodenum by blunt force. Ann Surg 1916; 64: 550-78.
2. Cohn I Jr, Hawthorne HR, Frobese AS. Retroperitoneal rupture of the duodenum in non-penetrating abdominal trauma. Am J Surg 1952; 84: 293-301.
3. Cone JB, Eidt JF. Delayed diagnosis of duodenal rupture. Am J Surg 1994; 168: 676-9.
4. Ballard RB, Badellino MM, Eynon CA, Spott MA, Staz CF, Buckman RF, Jr. Blunt duodenal rupture: a 6-year statewide experience. J Trauma 1997; 43: 229-32.
5. Fang JF, Chen RJ, Lin BC. Surgical treatment and outcome after delayed diagnosis of blunt duodenal injury. Eur J Surg 1999; 165: 133-9.
6. Martin TD, Feliciano DV, Mattox KL, Jordan GL Jr. Severe duodenal injuries: treatment with pyloric exclusion and gastrojejunostomy. Arch Surg 1983; 118: 631-5.
7. Kashuk JL, Moore EE, Cogbill TH. Management of the intermediate severity duodenal injury. Surgery 1982; 92: 758-64.
8. Vaughan GD 3 d, Frazier OH, Graham DY, Mattox KL, Petmecky FF, Jordan GL Jr. The use of pyloric exclusion in the management of severe duodenal injuries. Am J Surg 1977; 134: 785-90.
9. Weigelt JA. Duodenal injuries. Surg Clin North Am 1990; 70: 529-39.
10. Carrillo EH, Richardson JD, Miller FB. Evolution in the management of duodenal injuries. J Trauma 1996; 40: 1037-46.
11. Ivatury RR, Nassoura ZE, Simon RJ, Rodriguez A. Complex duodenal injuries. Surg Clin North Am 1996; 76: 797-812.
12. Moore EE, Cogbill TH, Malangoni MA, Jurkovich CJ, Champion HR, Gennarelli TA, et al. Organ injury scaling, II. Pancreas, duodenum, small bowel, colon and rectum. J Trauma 1990; 30: 1427-9.
13. Jurkovich GJ. The duodenum and pancreas. In: Mattox KL, Feliciano DV, Moore EE, editors. Trauma. 4th ed. New York: McGraw-Hill, 2000: 735-62.
14. Asensio JA, Petrone P, Roldan G, Pak-art R, Salim A. Pancreatic and duodenal injuries. complex and lethal. Scand J Surg 2002; 91: 81-6.
15. Berne CJ, Donovan AJ, Hagen WE. Combined duodenal pancreatic trauma. The role of end-to-side gastrojejunostomy. Arch Surg 1968; 76: 712-22.
16. Degiannis E, Krawczykowski D, Velmahos GC, Levy RD, Souter I, Saadia R. Pyloric exclusion in severe penetrating injuries of the duodenum. World J Surg 1993; 17: 751-4.
17. Stone HH, Fabian TC. Management of duodenal wounds. J Trauma 1979; 19: 334-9.
18. Flint LM Jr, McCoy M, Richardson JD, Polk HC Jr. Duodenal injury: analysis of common misconceptions in diagnosis and treatment. Ann Surg 1980; 191: 697-702.
19. Snyder WH 3rd, Weigelt JA, Watkins WL, Bietz DS. The surgical management of duodenal trauma. Precepts based on a review of 247 cases. Arch Surg 1980; 115: 422-9.
20. Ivatury RR, Gaudino J, Ascer E, Nallathambi M, Ramirez-Schon G, Stahl WM. Treatment of penetrating duodenal injuries: primary repair vs. repair with decompressive enterostomy/serosal patch. J Trauma 1985; 25; 337-41.
21. Asensio JA, Petrone P, Roldan G, Kuncir E, Demetriades D. Pancreaticoduodenectomy: a rare procedure for the management of complex pancreaticoduodenal injuries. J Am Coll Surg 2003; 197: 937-42.

การรักษาการบาดเจ็บต่อดูโอเดนั่มที่เกิดจากแรงกระแทกภายนอก

สุวิทย์ ศรีอัษฎาพร, รัฐพลี ภาคอรรถ, สุกัญญา ศรีอัษฎาพร, กฤตยา กฤตยากีรณ

ความเป็นมาและวัตถุประสงค์ *: การบาดเจ็บต่อดูโอเดนั่มจากแรงกระแทกภายนอกพบได้ไม่บ่อย การวินิจฉัยทำได้ยาก เนื่องจากหลังบาดเจ็บใหม่ ๆ ผู้ป่วยอาจมีอาการไม่มากนักเพราะดูโอเดนั่มเป็นอวัยวะที่อยู่บริเวณเรทโทรเพอริโตเนียม การรั่วของดูโดเดนั่มเป็นภาวะแทรกซ้อนที่อันตราย รักษายากและอาจทำให้ผู้ป่วยเสียชีวิตได้ วัตถุประสงค์ของการศึกษานี้เพื่อวิเคราะห์ผลการรักษาการบาดเจ็บต่อดูโอเดนั่มจากแรงกระแทกภายนอกด้วยวิธีต่าง ๆ ในผู้ป่วยที่มารับการรักษาที่ โรงพยาบาลจุฬาลงกรณ์*

ผู้ป่วยและวิธีการ *: เป็นการศึกษาย้อนหลังในผู้ป่วยที่ได้รับบาดเจ็บต่อดูโอเดนั่มจากแรงกระแทกภายนอกที่มารับการรักษาที่โรงพยาบาลจุฬาลงกรณ์ในช่วงเวลา 14 ปี ตั้งแต่เดือนมกราคม พ.ศ. 2533 ถึงเดือนธันวาคม พ.ศ. 2546 ในช่วงเวลาดังกล่าวแนวทางในการรักษาการบาดเจ็บต่อดูโอเดนั่มจากแรงกระแทกภายนอกที่โรงพยาบาลจุฬาลงกรณ์ เป็นดังต่อไปนี้ คือ เลือดออกในผนังของดูโอเดนั่ม รักษาด้วยวิธีประคับประคอง บาดแผลดูโอเดนั่มแตกไม่รุนแรง (เกรด II หรือ เกรด III) ที่ได้รับการวินิจฉัยรวดเร็วและไม่มีการติดเชื้อรุนแรงในบริเวณเรทโทรเพอริโตเนียม รักษาโดยการเย็บซ่อมแซมเพียงอย่างเดียว แต่ถ้าได้รับการวินิจฉัยล่าช้าและหรือระหว่างผ่าตัดพบว่ามีการติดเชื้อรุนแรงบริเวณเรทโทรเพอริโตเนียม การรักษานอกจากจะเย็บซ่อมแซมแล้วยังเพิ่มเติมการทำพายลอริกเอกซคลูชั่นเพื่อป้องกันการรั่วของดูโดเดนั่มที่เย็บซ่อมแซมร่วมกับตัดเนื้อเยื่อที่มีการติดเชื้อบริเวณ เรทโทรเพอริโตเนียมออกด้วย*

ผลการรักษา *: มีผู้ป่วยในรายงานนี้ 26 ราย จำแนกการบาดเจ็บต่อดูโอเดนั่มออกเป็น มีเลือดออกในผนังดูโอเดนั่ม 5 ราย (ร้อยละ 19.2) และมีการแตกของดูโอเดนั่ม 21 ราย (ร้อยละ 80.8) ผู้ป่วยที่มีเลือดออกในผนังดูโอเดนั่มได้รับการรักษาด้วยวิธีประคับประคองเป็นผลสำเร็จทุกราย สำหรับผู้ป่วยที่มีการแตกของดูโอเดนั่ม 10 ราย (ร้อยละ 47.6) ได้รับการรักษาโดยเย็บซ่อมแซมเพียงอย่างเดียว, 10 ราย (ร้อยละ 47.6) ได้รับการรักษาโดยการเย็บซ่อมแซมรอยแตกและทำพายลอริกเอกซคลูชั่นเพิ่มเติม (2 ราย ทำผ่าตัดจากโรงพยาบาลอื่นแล้วส่งตัวมารักษาต่อที่โรงพยาบาลจุฬาลงกรณ์) และ ผู้ป่วย 1 ราย (ร้อยละ 4.8) ซึ่งมีการบาดเจ็บรุนแรงต่อดูโอเดนั่มและส่วนหัวของตับอ่อนได้รับการทำแพนครีเอติโคดูโอเดเนกโตมี่ ผู้ป่วยที่มีการแตกของดูโอเดนั่ม 7 ราย (ร้อยละ 33.3) มีภาวะแทรกซ้อน ในจำนวนนี้เป็นการรั่วของดูโอเดนั่ม 2 ราย (ร้อยละ 9.5) โดยผู้ป่วย 1 ราย อยู่ในกลุ่มที่ได้รับการเย็บซ่อมแซมเพียงอย่างเดียวและ 1 ราย อยู่ในกลุ่มที่มีการทำพายลอริกเอกซคลูชั่น เพิ่มเติม ไม่มีผู้ป่วยในรายงานนี้เสียชีวิต*

สรุป *: ผลการรักษาการบาดเจ็บต่อดูโอเดนั่มจากแรงกระแทกภายนอกที่โรงพยาบาลจุฬาลงกรณ์ อยู่ในเกณฑ์น่าพอใจ ทำให้สามารถสรุปแนวทางรักษาได้ว่า เลือดออกในผนังดูโอเดนั่มควรได้รับการรักษาแบบประคับประคอง บาดแผลดูโอเดนั่มแตกไม่รุนแรงและวินิจฉัยได้เร็ว ไม่มีภาวะติดเชื้อรุนแรงในบริเวณเรทโทรเพอริโตเนียมควรรักษาโดยการเย็บซ่อมแซมเพียงอย่างเดียว บาดแผลดูโอเดนั่มแตกที่ได้รับการวินิจฉัยล่าช้าและหรือมีการติดเชื้อรุนแรงในบริเวณเรทโทรเพอริโตเนียมควรได้รับการรักษาโดยเย็บซ่อมแซมบาดแผลที่แตกร่วมกับทำพายลอริกเอกซคลูชั่น และการบาดเจ็บรุนแรงต่อดูโอเดนั่มและส่วนหัวของตับอ่อนอาจจำเป็นต้องรักษาโดยการทำแพนครีเอติโคดูโอเดเนกโตมี่*