

Diagnosis and Surgical Treatment of Patients with Closed Pancreatic Injuries

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Abstract

Diagnosis and choice of therapeutic rational tactics in patients with closed pancreatic injuries still remain and actual problem of urgent abdominal surgery. The results of treatment of 70 patients with pancreatic injuries being treated in a surgical department of RSCUMA of Uzbekistan Public Health and its branches during 2009-20021 with analyzed. Intraoperative inspection of omental bursa is still a single reliable method to reveal injuries to the pancreas. Depending on the character and localization the differ following kinds of surgical treatment of pancreatic injuries were used: based on adequate drainage of the impaired zone; removal of lifeless pancreatic tissues; restoration of passage or rational derivation of pancreatic juice. It is necessary to underline that in all cases of pancreatic injuries antisecretory, antianzymatic, antibacterial and desintoxicating therapy must be carried out.

Keywords: Pancreatic Injuries; Diagnosis; Surgical Treatment

Introduction

Diagnosis and choice of therapeutic rational tactics in patients with closed pancreatic injuries still remain and actual problem of urgent abdominal surgery. Traumatic damages to pancreas due to its deep localization and good defense occur comparatively seldom. In peace time they make 1-8%, gunshot wounds make 0,7-1% of all injuries [1-5].

Pancreatic injury more often occurs in closed trauma, it seldom occurs as isolated and four times more often in men than in women. In closed traumas the body and the head of the pancreas are more often impaired and the tail is not so often [6]. The mechanism of its damage occurs as the following: severe mechanic pressure into the area of the upper half of abdomen causes displacement of mobile organs of abdominal cavity while pancreas is attached to a spinal column, is pressed to it and gets trauma. It more often occurs in direct blow into the upper half of abdomen (Figure 1), steering injury (Figure 2), fall from a height or strong compression from outside.



Figure 1: Blow into the upper half of abdomen



Figure 2: Steering injury upper half of abdomen

Pancreatic injuries symptoms are not specific and are often considered as traumas of the other organs, so clinical diagnosis of this condition is difficult [7,8]. If a person undergoes urgent laparotomy pancreatic injuries diagnosis includes complete inspection of abdominal organs and retroperitoneal area [9].

Typical errors are made when incisions of gastrocolic ligament and inspection of omental bursa are avoided and refusal from pancreas mobilization (Figure 3) according to Koher result in absence of pancreatic injuries diagnosis even during laparotomy. Most of surgeons consider that indication to surgical treatment and choices of operation depend on the degree of pancreatic injury [10-12].

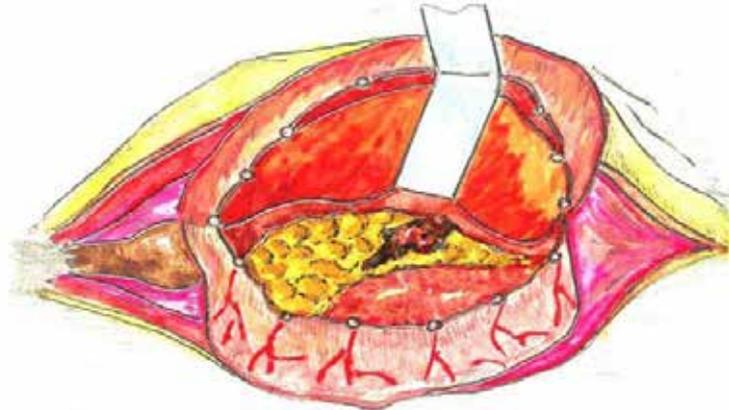


Figure 3: Typical errors when incisions of gastrocolic ligament and inspection of omental bursa are avoided and refusal from pancreas mobilization

In clinical picture of patients with pancreatic injury such symptoms as shock, hemoperitoneum, peritonitis can be evident in various degree depending on the damage severity. Destruction of pancreas is accompanied by damage to vessels, impairment of intact pancreatic ducts and enzymes penetration into parenchyma with their further activation by cytokines. It contributes to the development of edema and aseptic pancreatonecrosis. Of it is often difficult to make diagnosis of isolated pancreatic injuries it only becomes possible in combined damages during the operation. Such patients are mostly operated with diagnosis of peritonitis and internal bleeding, having suspicion on rupture of parenchymatous organs. The most frequent complications due to pancreatic trauma are: pancreatitis, retroperitoneal phlegmon, abscess of omental bursa, sepsis, pancreatic fistula, pseudocysts. Lethal outcome in isolated pancreatic injuries is high: 17,5 - 32,3%, and in combined damages it achieves 40-80% [13-16].

The aim of the research: to summarize the experience of surgical treatment of closed pancreatic traumas.

Material and Methods

A retrospective evaluation of patients with pancreatic injuries underwent treatment between 2009 and 2021 at the Emergency Department of our teaching hospital. This study received approval from surgical department of Samarkand Centre of Emergency Medical Care (RCSUMA), Uzbekistan. This surgical department admits patient from Samarkand region, with the population of at least 2 million.

There were 64 (91.4%) men and 6 women aged 18-57 years. The mechanism of trauma is shown in (Table 1).

The causes of injury	The number of patients	%
Traffic accident	25	35,7%
Fall from a height	23	32,8%
Civilian of trauma	11	15,7%
Stirring injury	8	11,4%
Sport injury	2	2,8%
Occupational injury	1	1,4%
Total	70	100%

Table 1: Mechanism of Injury to the Pancreas

Isolated injuries of pancreas were observed in 20 (29%), multiple in 32 (45%), combined in 18 (26%) patients. In all patients' pancreatic injury was combined with damage to the other organs and systems (liver, spleen, stomach, small and large intestines, retroperitoneal hematoma, trauma of the brain and spinal cord, chest). Most of the patients – 35 (51.4%) were delivered by emergency team and 34 (48,5%) patients look care of themselves. 58 patients hospitalized in till 6 hours 27 (23,5%) patients had damage to pancreatic head, 59 (51,3%) to pancreatic body and 29 (25,2%) to the tail.

All patients underwent emergency complex clinical, laboratory and instrumental examination. Standard study of general and biochemical blood analysis, general urine analysis, summarizing X-ray examination of the thoracic and abdominal cavities, ultrasonic examination of abdominal cavity and retroperitoneal area. Computerized tomography, MRT, laparoscopy was performed taking into account severity of patients' condition. According to us data free fluid in the abdominal cavity was revealed in 80,5% observations of closed injuries of the pancreas. Multispiral computerized tomography (MSCT) was only performed 7 patients. There were only revealed indirect changes on the side of pancreas in 4 patients with CTS of unknown prescription with posttraumatic pancreatic cysts.

Indications to laparoscopy in 27 (38,5%) patients with closed pancreatic trauma appeared to be: hemorrhagic shock, disparity between clinical picture and the date of the laboratory and invasive instrumental methods, impairment of consciousness, signs of extensive injuries to anterior abdominal wall, severe combined trauma. In diagnostic laparoscopy there were revealed either direct injuries of the abdominal organs or their indirect signs like hemoperitoneum. In most cases the decision about conversion of approach was made.

Results

All patients developed acute posttraumatic pancreatitis due to general (traumatic and posttraumatic) and local changes. In mechanic impairment local changes in pancreas occur due to traumatic necrosis of parenchyma, secondary destruction as a result of vascular and dust impairments with discharge of active pancreatic secretion. In order to estimate severity of pancreatic injury we used classification of pancreatic injury severity in our research (Table 2).

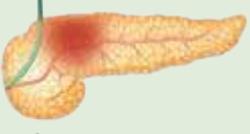
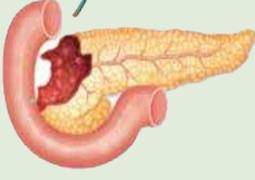
Degree of damage severity		The character of damage	Description of damage	Number of patients	%
I		Hematoma	Severe bruise without damages to pancreatic duct or loss of tissue	10	18,2%
		Rupture	Severe rupture without damage to the duct or loss of tissue		
II		Hematoma	Includes more than 1 part	34	48,5%
		Rupture	Rupture of <50% of circumference		
III		Rupture	Distal rupture or damage to parenchyma with damage to the duct	20	28,5%
					
IV		Rupture	Proximal (to the right from superior mesenteric vein) rupture or damage to parenchyma	6	10,9%
					
V		Rupture	Massive crushing and rupture of pancreatic head	-	-
Total				70	100%

Table 2: Classification of the severity of damage to the pancreas

Clinical picture of pancreatic injury was characterized by the phenomena of traumatic shock in 27 patients, internal bleeding in 18 and peritonitis in 10. Increase of amylase activity in blood and urine in 3 and more hours was observed in 49 (61,4%) patients.

Depending on the character and localization the following kinds of operative treatment of pancreatic injuries were used: based on adequate drainage of the impaired zone; removal of lifeless pancreatic tissues; restoration of passage or rational derivation of pancreatic juice.

- ✓ Laparoscopic inspection, pancreatoscopy, sanation and drainage of omental bursa and abdominal cavity - 6 (8, 5%) patients.
- ✓ Hemostasis, rational drainage of the impaired zone - 39 (55, 7%) patients.
- ✓ Opening and emptying of retroperitoneal hematomas -22 (31, 4%) patients.
- ✓ Left side resection of pancreas and defunctionalizing of duodenum -3 (4, 2%) patients.

The biggest frequency of posttraumatic pancreatitis was noted in patients with III-IV degree of pancreatic injury (90, 5% and 89, 6% accordinally).

In 2017 Krieg J. et. al. [17] proposed a prognosis scale of unfavorable outcome due to pancreatic injury (PIMS) as a quality of component assessment of the results based on 5 variable quantities and revealed a good prognosis in the whole (AUC 0,84) in the series from 473 patients' pancreatic injuries (Table 3).

According to our scale data concerning unfavorable outcome due to pancreatic traumas all patients were distributed like the following (Table 4).

№	Criteria	Scores	
1.	Age of more than 55 years	5	
2.	Shock	5	
3.	Injury of large pancreatic vessels	2	
4.	The number of combined abdominal traumas:		
	No	0	
	1	1	
	2	2	
5	Score of AAST	3	
		4	
	OIS	4	
		5	
Lethal outcome depending on degree of severity			
№	Degree of severity	Оценка PIMS, в баллах	Lethality %
1.	Mild	0-4	Low, less than 1%
2.	Average	5-9	Average, 15-17%
3.	Severe	10-20	High, 50%

Table 3: Classification of the severity of damage to the pancreas

Degree of severity	Assement PIMS	Lethality, %	The number of patients	%
mild	0-4	Low less than 1%	20	28,5%
Average	5-9	Average 15-17%	30	43%
Severe	10-20	High 50%	20	28,5%
General number of patients			70	100%

Table 4: Distribution of patients according to the Poor Outcome Scale from Pancreatic Injury PIMS

Of 70 patients with dominant pancreatic injury 12 patients (17, 1%) died. According to our data on PIMS scale there were no lethal outcomes in a mild degree of severity. 4 patients (13, 3%) died in the group of average degree of severity and 8 patients (40%). The main cause of lethal outcomes in 6 patients with severe destructive posttraumatic shock, 1 patient had pancreatitis and peritonitis, multiple complications of combined injuries of the chest and brain.

Conclusions

1. Rare pancreatic injuries, peculiarity of anatomic localization of the organ, absence of pathological signs, frequent combination with damages to the other organs makes it considerably difficult to diagnose pancreatic injuries.
2. Endovisual technologies in most cases make it possible to reveal only indirect signs of injuries of the inner organs but their use is certainly important as they make it possible to shorten the terms of examination and verify the indications to laparoscopic or open surgical intervention.
3. Intraoperative inspection of omental bursa is still a single reliable method to reveal injuries to the pancreas.
4. It is necessary to underline that in all cases of pancreatic injuries antisecretory, antianzymatic, antibacterial and desintoxicating therapy must be carried out.

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