

# TO QUESTION THE TREATMENT ACUTE DESTRUCTIVE PANCREATITIS

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The aim of this study was to improve the principles of the pathogenetic therapy of acute pancreatitis and assess the effectiveness of local hypothermia of pancreas, as well as peritoneal lavage-dialysis in the treatment of acute destructive pancreatitis. A total of 5889 patients with acute pancreatitis (AP) were examined. The leading role played by the lesions of the pancreatic lymphatic system in the development of destructive processes was noted. In experiments done on eight dogs, the first day of experimental acute pancreatitis showed necrosis of the lumbar retroperitoneal lymph nodes with a violation of lymph drainage from the pancreas before the retroperitoneal fat necrosis was initiated. The effectiveness of local hypothermia of the pancreas was experimentally demonstrated. In 32 patients with AP, the perioperative local hypothermia of the pancreas for 20-25 minutes was followed by the reduction of the alpha-amylase activity in the peripheral blood and in the portal system, as well as a significant reduction in the edema of the pancreas, that delayed the progression of the destructive lesions. An effective method of performing lavage-dialysis of the omental bursa, by using a transversely perforated tube with a pollution control device in the lumen, was developed.

Key wordy: acute pancreatitis, hypothermia, lavage-dialysis, intra-abdominal pressure.

## **Introduction**

According to many studies, the percentage of acute pancreatitis (AP) in the structure of surgical diseases reaches up to 10%/ The growth rate of this disease is far ahead that of several other surgical processes of the abdominal cavity. The destructive type of AP reaches to 15-20%. An infection in the foci of the tissue decay reaches to 70% and this complication in 80% of destructive pancreatitis (DP) is the major cause of death [2, 3 , 4, 7].

It is extremely difficult to achieve effective solutions in the treatment of DP. Moreover, without suppressing the enzyme “storm” in the pancreas, the effectiveness of any treatment is not possible. Unfortunately, discovering an effective drug to reach this goal is still proving elusive, while achieving local hypothermia (LH) by using cooling machines is too inconvenient for clinical use [1,4, 6,7,8].

Found that all patients with peritonitis pancreatogenic has increased intra-abdominal pressure greater than 15 mm. hg. art. and increased intra-abdominal pressure correlates with the severity of the pathological process, the higher the rates of intra-abdominal pressure, the more severe the

disease process. Determination of intra-abdominal pressure is of great prognostic value indicating whether the tactics of patients with pancreatogenic peritonitis [8].

In light of this optimization of the treatment of AP remains a clinical problem.

**The aim** of this study was to improve the principles of the pathogenetic therapy of acute pancreatitis and assess the effectiveness of local hypothermia of the pancreas, as well as peritoneal lavage-dialysis in the treatment of acute destructive pancreatitis. We propose a reliable method of direct measurement of intra-abdominal pressure in forecast the syndrome of abdominal hypertension to pancreatogenic peritonitis.

### **Material and Methods**

To solve this problem, the technique of the local contact cooling of the pancreas developed earlier, "Method of hypothermia of the pancreas" (Patent of RF # 2110219 priority of Mae 10. 1998), "Method of study of the intra-abdominal pressure" ((Patent of RF # 2488346 priority of 13.2.2012), has been used. The essence of the invention involves perioperative and postoperative visual 18-20 minute irrigations of the front and side surfaces of the pancreas with an intermittent stream of ethyl chloride allowing free evaporation into the atmosphere. This is accompanied by the formation of a layer of ice crystals on the entire surface of the irrigated tissue. This method allows the surface of the pancreas gland to cool to 0° - 4°, to a temperature at which there is a reduction in the destruction of the exocrine apparatus of the gland while maintaining the function of the islets of Langerhans [9]. All portions of the pancreas from head to tail can be easily irrigated : this method does not require a wide opening of the omental bursa and thus reduces the trauma of surgery. Later on, this technique of local hypothermia of the pancreas was modified. Instead of using ethyl chloride during the operation, a sealed container with small pieces of melting ice weighing 1-2 kg with the ability to easily lie prone across the free surface of the pancreas in the omental bursa for 20-25 minutes.

A median laparotomy was performed to apply the LH. The omental bursa was revealed by dissection of the gastrocolic ligament. The pancreas was isolated from the surrounding tissues with tampons. The peritoneum covering the gland surface was dissected, and then LH was performed. As described earlier, after cooling the pancreas, the omental bursa through the counter punctures in both the lumbar-hypochondriac areas, was drained in the transverse direction. This was done in the lumen using a perforated tube (diameter of 0,8-1,0 cm) carrying the pollution control device ("Device for draining purulent cavities". Patent of RF #2066207, priority of 09.10.1996), which was a string of beads threaded on a fishing line.

Depending on severity of the necrobiotic process, the operation was finished by suturing the median wound or by creating a broad omentoburso-pancreatic stoma in patients with contaminated DP to eliminate intra-abdominal hypertension and provide free abruption of necrotic tissue with purulent detritus. In the presence of widespread peritonitis, the drainage of the pelvic cavity, including the right and left areas of the abdominal cavity were performed. For postoperative peritoneal lavage-dialysis, perforated tubes (of diameter 0, 8 - 1, 0 cm) were applied. To determine the efficacy and safety of both the methods of LH, experiments were conducted on 8 mongrel dogs weighing  $20 \pm 2$  kg. One day prior to the application of LH, under general anesthesia, the canalicular-hypertensive model of DP.

The clinical study included 5889 patients with between 2005 and 2015. Table I presents the data the clinical forms of AP and the mortality in each of them. Among the 940 patients with DP, 681 (72, 5%) were males. Patients varied in age from 25 to 86 years (mean age  $46, 9 \pm 2,2$  years). In all, 802 (85, 3%) patients had a history of I to 6 episodes in AP. During the initial chest x-ray an effusion in the left side of the pleural cavity was observed in only 25 (2, 6%) patients, and later it was seen to develop in 284 (30, 2%) cases. During examination, the alpha-amylase activity in the systemic circulation and in the abdominal cavity effusion was determined. All patients had a laparoscopy performed.

## **Results and Discussion**

Experimental studies have shown that both the local hypothermia methods reduced the temperature in the center of the affected pancreas up to  $+ 19^{\circ} - + 22^{\circ}$ ; however, on the surface of the pancreas the temperature was  $0^{\circ} - +4^{\circ}$ . At this temperature, a significant inhibition of the exocrine apparatus was noted, without any structural collapse and without affecting the function of the islets of Langerhans. This was confirmed by biochemical study.

Analysis of the clinical data suggests that edematous form of acute pancreatitis is accompanied by the release of the pancreatic enzyme into retroperitoneal space and free abdominal cavity only in 10%, and into the blood and lymphatic systems in 90%. In destructive pancreatitis, 90% the pancreatic enzymes are released into the retroperitoneal space and free abdominal cavity. These enzyme levels gradually reduce in the peritoneal exudates during convalescence. A sharp fall was observed in patients 2-4 days before death. The enzymatic activity of the exudates in patients with destructive pancreatitis reached up to 16.000 U/L and higher, while the activity of alpha-amylase in the blood was normal. The enzymatic activity of the exudates in patients with the edematous form of acute pancreatitis was 00.00-270U/L, although the level of this enzyme in the blood reached up to 960.00U/L and more.

The treatment of destructive pancreatitis was usually begun with a minimally invasive drainage of the omental bursa and the pelvic cavity under laparoscopic control or using the ultrasound.

The increase in the intoxication and growth of the phlegmon were revealed in 442 (47%) patients after 12-38 days. This necessitated a laparotomy with removal of the decaying pancreatic tissue and retroperitoneal fat; it should be noted that the necrotic zone reached up to pelvic cavity in some patients. The tissue thus removed weighed 1 kg or more. It is quite obvious that the decay of the adipose tissue occurred by the uncontrolled steady flow of the enzymes from the residual pancreatic parenchyma into the surrounding tissue. Given the area damaged and the progression of the purulent-destructive processes. In the retroperitoneal fat the decision to apply peritoneal lavage-dialysis. The method was used in 52 patients, of whom 12(23, 1%) patients died.

Intraoperative local hypothermia was performed in 32 patients aged 19 to 67 years. During surgery, the edematous form of the acute pancreatitis was seen in 4 (12,5%) patients, the hemorrhagic form in 8 (25%), and DP in 20 (62,5%). Local hypothermia was performed only once in 26 (81,2%) patients (including 6 patients with the remnants of the pancreas after nctrosectomy), repeatedly in 6 (18,8%) patients (initially 7-10 days after surgery , at 12-14 and 16-18 days after surgery). Tissue edema was significantly reduced in all the patients post local hypothermia.

The drainage of the omental bursa with the cross-perforated drainage tube carrying the pollution control device was performed in all the 32 patients during the postoperative period (4-14 days).

All the patients also received comprehensive medical therapy. All patients with the edematous and hemorrhagic forms of acute pancreatitis, where local hypothermia had been applied, showed no complications, the mean length of the hospital stay was 24-34 days. Mean length of hospital stay was 35-79 days in 20 patients with destructive pancreatitis; 3 of whom (15%) died: 1 patient within 7 hours after the operation, of toxemia and 2 patients 56 and 64 days after multiple surgeries because of septic complications.

Active usage of the perforated drainage tube the pollution control device and peritoneal lavage-dialysis allowed complete clean up of the omental bursa from the enzymes, fibrin and tissue detritus.

Also, local hypothermia was found to reduce the risk of developing of destructive pancreatitis and the other purulent-necrotic complications of acute pancreatitis.

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