

CRYODESTRUCTION IN LOCAL ADVANCED PANCREATIC CANCER: INDICATIONS, PERFORMANCE AND EFFECTIVENESS EVALUATION



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Objective: to determine the indications and evaluate the cryodestruction (CD) of locally advanced pancreatic cancer (LAPC) results.

Materials and methods. Since January 2012 CD was performed in 69 LAPC patients (mean age 54 ± 7.2 years). Preoperative examination: US, MSCT and/or MRI. Pancreatic lesions size: 2.5-7.0 cm. Local destruction was supplemented by the bypass anastomoses in 14 (20.3%) cases, bile duct stenting - in 18 (26.1%).

Russian devices "KRIO-MT" and "KRIO-01" and porous-spongy applicators made of titanium nickelide were used. Cryoapplicators diameter: 2-5 cm. The target temperature: -186°C . Exposure time: 3-5 min. Sessions number: depended on the tumor size (1-5, average 2.4).

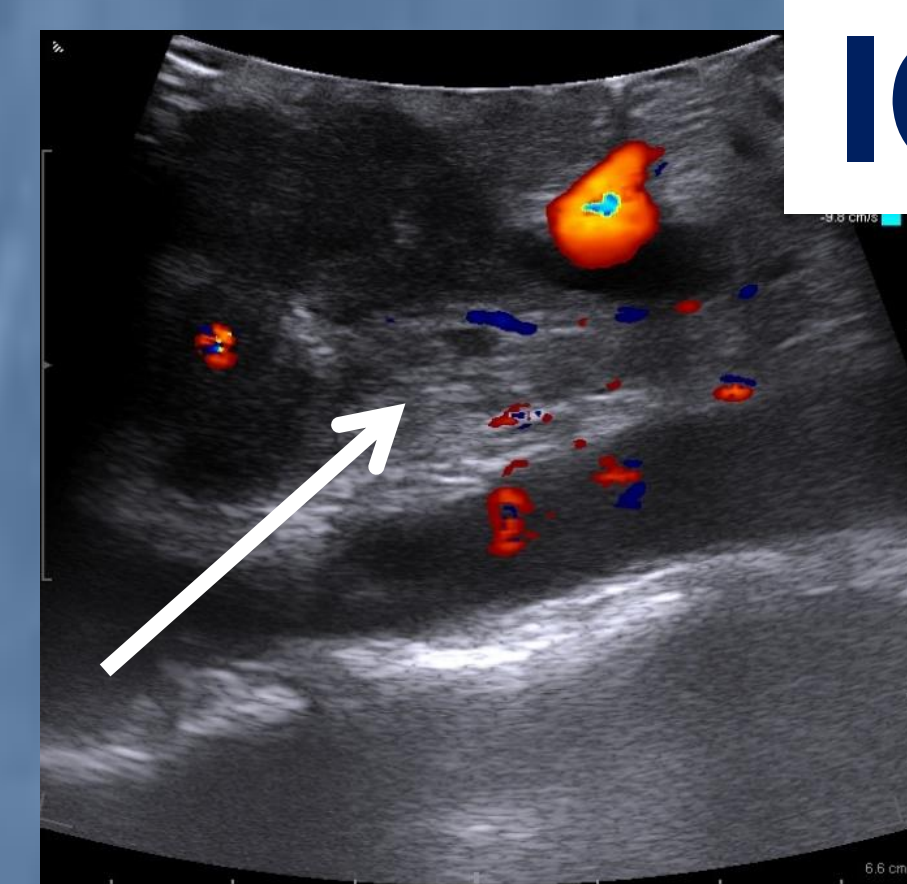
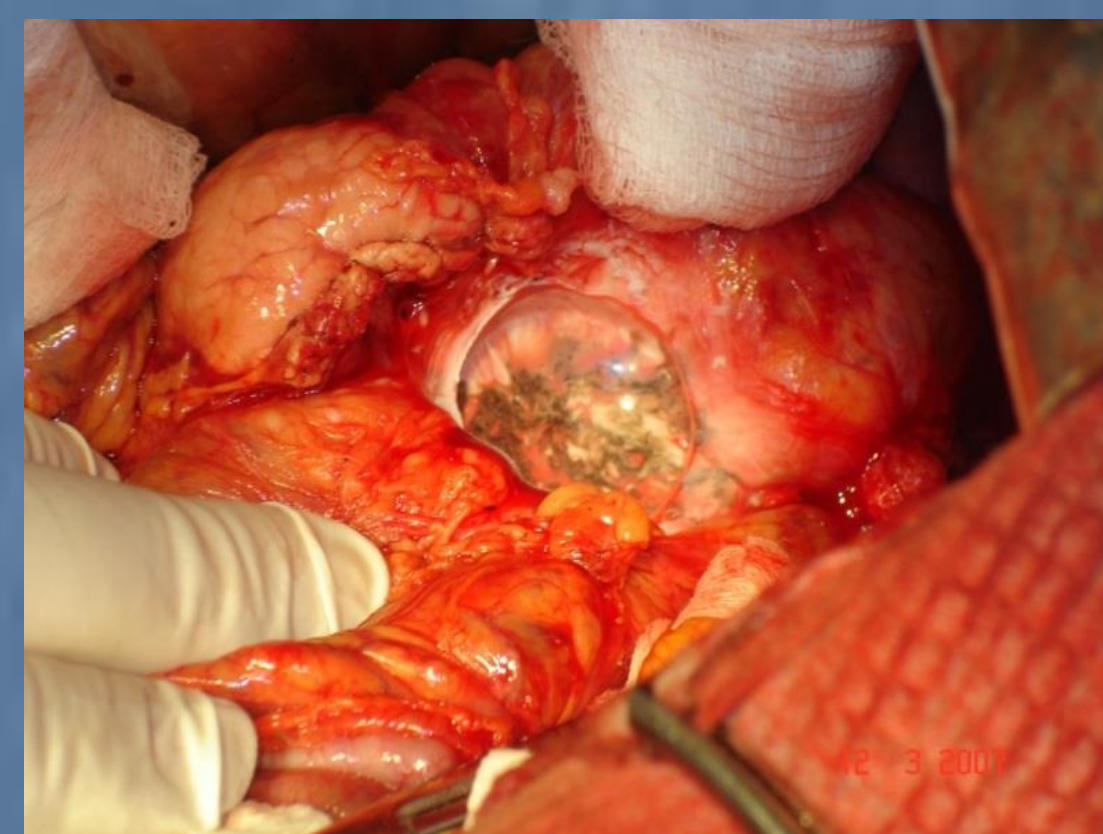
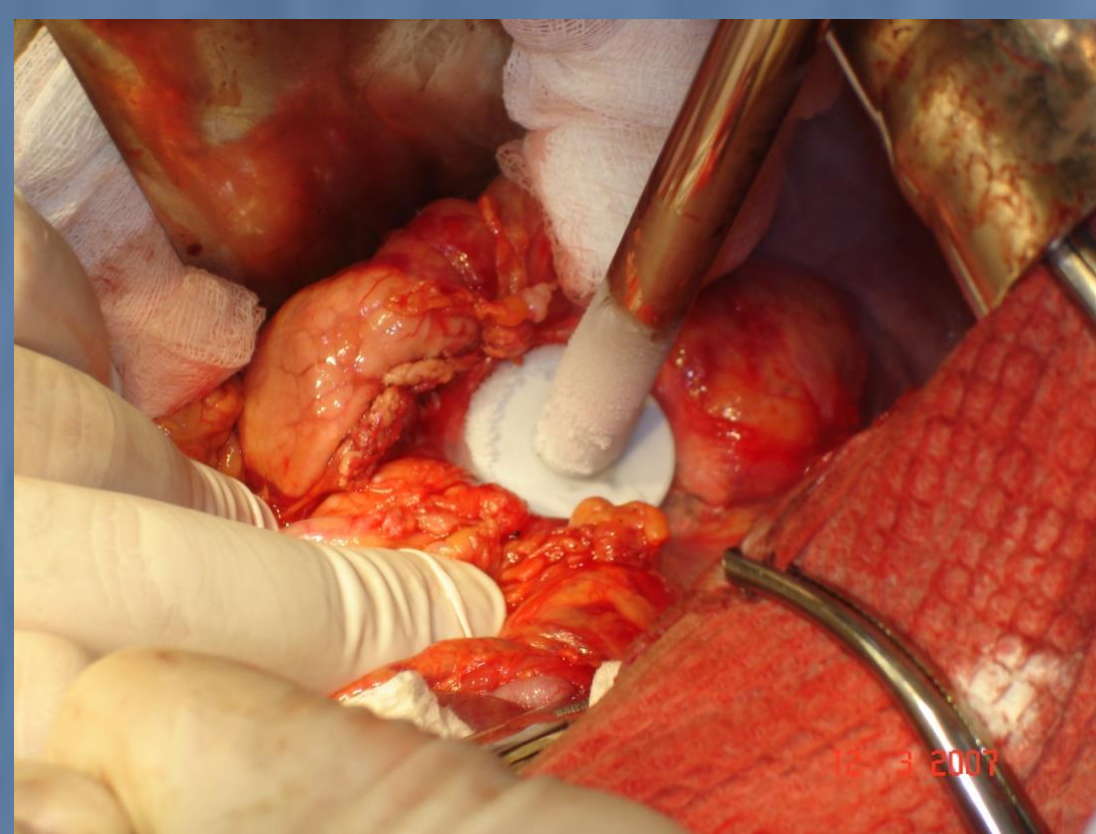
Postoperative examination: US (1, 3, 5 days or on demand), MSCT and/or MRI.

Results. Preoperative examination made it possible to determine the possibility of CD performing.

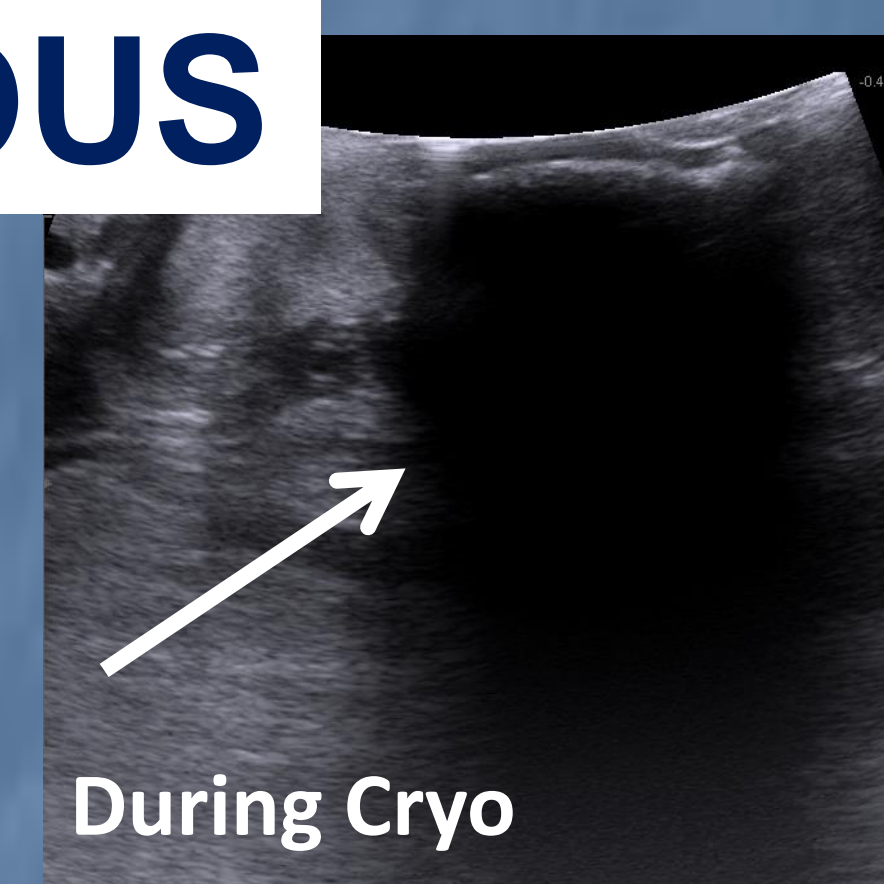
➤ **CD indications:** unresectable pancreatic tumor, involvement of unpaired main visceral arteries in the tumor, severe pain syndrome, general contraindications for open operation.

➤ **CD contraindications:** germination of a hollow organ over a considerable extent; distant metastases. The NCCN Guidelines Ver. 1.2016 Pancreatic Adenocarcinoma was used in determining of LAPC.

We consider it mandatory to use intraoperative US (IOUS) during CD. The tumor center was determined at IOUS and a cryogenic applicator was placed directly in its projection. Before pancreatic neoplasms CD, a mandatory study of the liver was performed to detect metastases. IOUS made it possible to avoid possible injuries to healthy organs and vessels and to correctly assess the completeness of the destruction of pathologically altered tissues. IOUS performed from different points makes it possible to immediately determine whether the zone of the iceball overlaps the tumor. Thus, IOUS, with a certain researcher experience, makes it possible to judge with a high probability of CD effectiveness. US-control allows intraoperative assessment of changes in bloodflow in large vessels. The cessation of bloodflow occurred mainly in vessels of small diameter (up to 3 mm), which were thrombosed as a result of freezing. The large vessels walls are resistant to low temperatures and blood flow in the vessels of large diameter after cryotherapy is completely restored.



IOUS



During Cryo

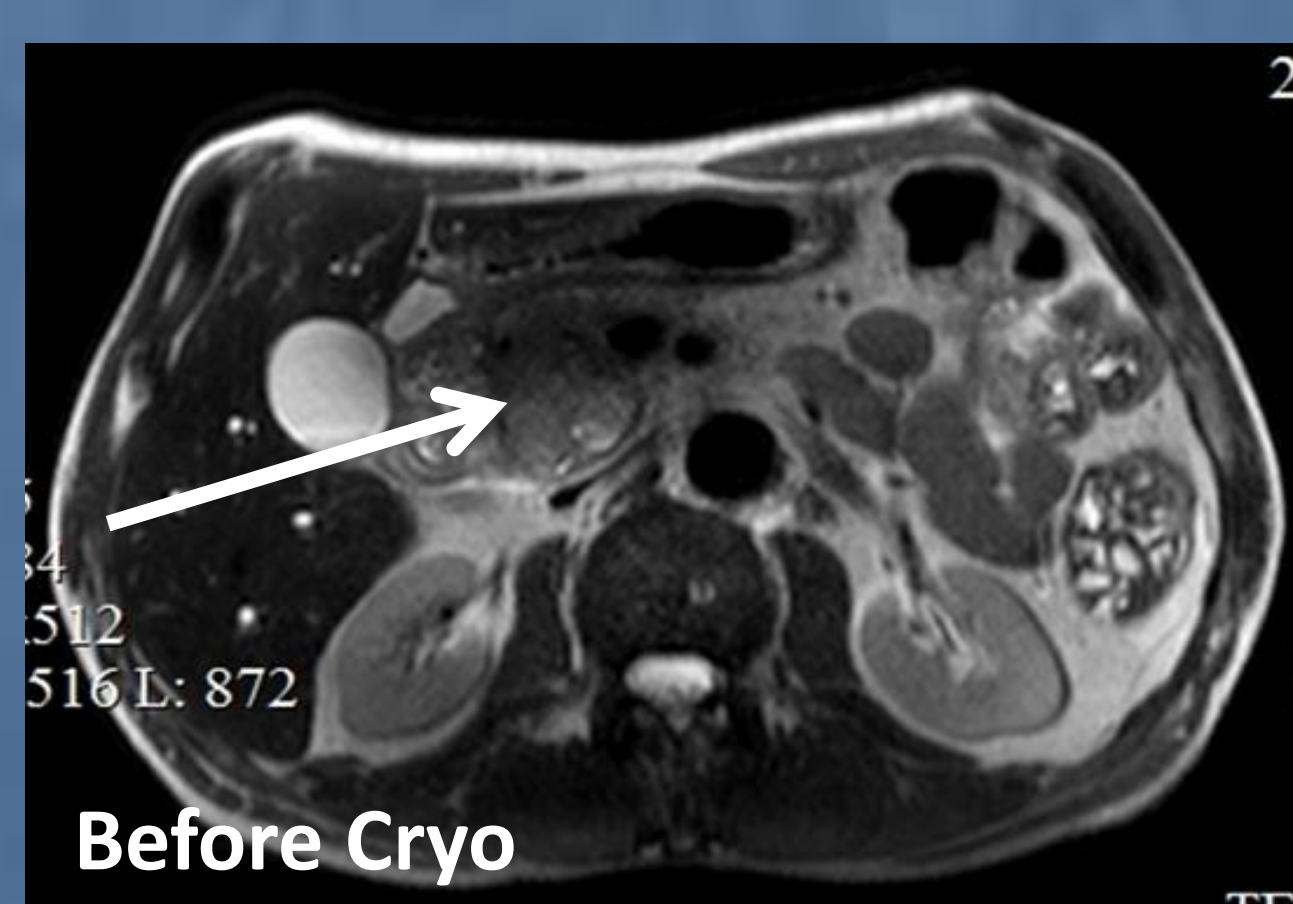


After Cryo

US-emphasis in postoperative period: examination of post-destructive changes zone to determine the completeness of the tumor treatment: free fluid in the abdominal cavity; accumulations of bile, pancreatic secretion, blood; free fluid in the pleural cavities. MSCT was performed in patients in unclear situations and/or when bleeding was suspected.

Intra-abdominal bleeding was in 3 (4.3%) cases (due to cracks on the border of pancreatic tissue and "iceball" (1); damaged of the artery during the biopsy after CD (1); from the mesenteric artery basin vessel (1), was endovascular stopped. Acute pancreatitis was in 5 (7.2%) cases; suppuration in the manipulation area - 2 (2.9%), eventration - 1 (1.5%). Ascites was detected in 10 (14.5%) cases (stopped conservatively within 5–8 days).

MSCT and MRI are much more informative and effective. MRI makes it possible to differentiate viable pancreatic tissue from devitalized areas. The early criteria of CD effectiveness were the complete overlap of tumor tissue necrosis zone, the absence of residual fragments along the periphery. If they are detected on MRI and adequate US, it is possible to perform an additional CD session in a few days.



Before Cryo



After 6 months



After 1 year



After 1.5 year

MRT-monitoring

There were no lethal outcomes during CD and in immediate postoperative period. The complete disappearance of the pain syndrome after CD was in 39.6%, a significant decrease in its intensity - in 41.8%.

Conclusion. Cryodestruction of LAPC in unresectable patients is an intervention that significantly improves the quality of life of cancer patients, primarily by reducing pain. US, MSCT and/or MRI allow to determine the indications, conduct a CD and evaluate the results at the stages of implementation.