Case Report

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Complex Antegrade Percutaneous Transhepatic and Retrograde Endoscopic Lithotripsy and Extraction

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ABSTRACT We report a clinical case of elimination of megacholedocholithiasis using complex antegrade percutaneous transhepatic and retrograde endoscopic contact electropulse lithotripsy and extraction. Since an attempt of antegrade extraction failed due to megacholedocholithiasis, the patient underwent complex contact electropulse lithotripsy followed by lithotripsy through antegrade and retrograde access, which made it possible to eliminate megacholedocholithiasis without the development of postoperative complications, restore the lumen of the bile ducts and ensure the possibility of subsequent planned surgical treatment of chronic calculous cholecystitis.

Keywords: megacholedocholithiasis, contact electropulse lithotripsy, antegrade and retrograde lithotripsy

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GSD – gallstone disease PTCS – percutaneous transhepatic cholangiostomy

Gallstone disease (GSD) is one of the most common diseases of the digestive system worldwide. Among diseases of the digestive system, cholelithiasis is the most common cause of hospitalization in developed countries, affecting one in five people among the adult population [1–3]. Choledocholithiasis is one of the most common complications of cholelithiasis with an incidence of up to 5–30% in various countries [1–4]. At the present stage of the treatment of choledocholithiasis, the operations of the first choice are minimally invasive videolaparoscopic, antegrade or retrograde endoscopic methods of treatment, including endoscopic papillosphincterotomy, antegrade and retrograde lithotripsy, lithoextraction, videolaparoscopic choledochotomy and choledocholioextraction. However, modern methods of lithotripsy cannot be used in the case when the gallstone has dimensions equal to or greater than the diameter of the lumen of the choledochus, especially if the stone has a diameter of 20 mm or more,

the so-called "megacholedocholithiasis" [5-7]. In such cases, open laparotomic interventions are still the method of choice for the most part, accompanied by a significant number of early and postoperative complications against the background of an increase in the number of patients with multimorbidity [5–7]. The limitations of the use of antegrade and retrograde methods of lithotripsy and lithoextraction are associated with the technical impossibility of capturing and crushing a stone with a lithotripter due to its size, structural features of the extrahepatic bile ducts, inconvenient location and deformation of the lumen of the choledochus. Given the relevance of the problem of megacholedocholithiasis, we considered it possible to present a clinical example of the treatment of megacholedocholithiasis according to the method proposed in the surgery clinic of the City Hospital No.5 of Barnaul: contact lithotripsy with Urolit-107 device with subsequent balloon dilation of common bile duct.

Clinical example

An 85-year-old patient was hospitalized in the Department of Surgery of the City Hospital No. 5, Barnaul, with complaints of periodic darkening of urine, skin itching, yellowness of the sclera of the eyes, and pain in the right hypochondrium.

In the anamnesis about 40 years suffers from cholelithiasis. Chronic calculous cholecystitis. Over the past few years, she began to notice periodic bouts of pain in the right hypochondrium up to 2-4 times a year. She considers herself ill for 3 days before admission, when she noticed the above symptoms.

The patient's condition upon admission is regarded as moderate. Skin and visible mucous membranes are icteric. Blood pressure 130/80 mm Hg, heart rate 72 beats per minute. The size of the liver according to Kurlov is 9×8×6 cm. Peritoneal symptoms are negative. Acholic stools. Dark urine.

The general and biochemical blood tests of the patient on the evening before the operation are presented in Table 1.

Table 1

General and biochemical blood tests of the patient on the evening before the operation

Index	Units	Value
WBC	10^9/l	20.20
Neutrophils	10^9/l	18.00
Eosinophils	10^9/l	0.49
RBC	10^{12}/l	3.62
Hemoglobin	g/l	116
Hematocrit	%	32.6
Platelets	10^9/l	242.00
ESR	mm/h	28
Total bilirubin	μmol/l	58.23
Bilirubin indirect	μmol/l	10.78
Direct bilirubin	μmol/l	47.45
Aspartate aminotransferase	u/l	90.21
Alanine aminotransferase	u/l	105.71
Alkaline phosphatase	u/l	2,923.49
Alpha amylase	u/l	127.16
Total protein	g/l	75.98
Urea	mmol/l	7.71
Creatinine	μmol/l	90.96
Glucose	mmol/l	5.60
Sodium	mmol/l	130.62
Potassium	mmol/l	4.30

An ultrasound examination of the pancreatobiliary area revealed the following pathology: a hypoechoic matter and hyperechoic inclusions, 12.4 mm in diameter, with acoustics, are located in the gallbladder cavity . The intrahepatic ducts are dilated: the segmental ducts are dilated up to 3 mm, the lobar ducts are dilated up to 8 mm, confluence is preserved. Hepaticocholedochus is unevenly expanded up to 17 mm, hyperechoic inclusions with a diameter of 11 mm and 11.5 mm are located in its lumen, up to 14 mm in the proximal section, and 11.5 mm in the distal section. The Wirsung duct is unevenly dilated up to 2.5 mm. Conclusion: “Syndrome of biliary hypertension, low protein. Choledocholithiasis. Suspension in the cavity of the gallbladder. Gallbladder stones".

The patient was given a clinical diagnosis: “GSD: Choledocholithiasis. Chronic calculous cholecystitis, mechanical jaundice”.

Upon admission, the patient was urgently performed percutaneous transhepatic external drainage of the bile ducts (percutaneous transhepatic cholangiostomy, PTCS) on the right in order to decompress the bile ducts and arrest the obstructive jaundice clinic. After managing the clinic of obstructive jaundice, 5 days after admission, the patient during antegrade lithoextraction was diagnosed with multiple choledocholithiasis with a large stone up to 20 mm in size in the intrapancreatic part of the choledochus, non-displaceable, obstructing the entire lumen of the choledochus, so the attempt at antegrade lithoextraction was unsuccessful (Fig. 1).

The patient underwent endoscopic papillosphincterotomy With retrocholangiopancreatography . Due to the large size of the stone, it was technically impossible to capture the stone with a Dormia basket and perform mechanical lithotripsy. Balloon dilatation of the choledochus distal to the calculus was performed. Introducer No. 7 was inserted along the conductor, then a lithotripsy probe with a diameter of 2 mm of the Urolit-107 for electric pulse lithotripsy was inserted retrogradely endoscopically along it, and then the stone was crushed at a frequency of 3 Hz and a power of 3 W (Fig. 2).

The next step was to perform antegrade contact electropulse lithotripsy through the PTCS drainage using a lithotripsy probe with a diameter of 2 mm of the apparatus for electropulse lithotripsy "Urolit-107" (Fig. 3).

After lithotripsy, revision of the choledochus with a Dormia basket was performed with simultaneous antegrade hydraulic lithoextraction, followed by control antegrade cholangiography (Fig. 4). The outflow of bile is restored. The postoperative period was uneventful.

Two days after the operation, the patient was discharged for outpatient observation with recommendations for planned surgical treatment of chronic calculous cholecystitis 2 months after the inflammatory phenomena subsided.

General and biochemical blood tests of the patient at discharge are presented in Table 2. Subsequently, the patient underwent planned surgical treatment, video-laparoscopic cholecystectomy and removal of the drainage in the surgery clinic of the Regional Clinical Hospital. The postoperative period was uneventful.

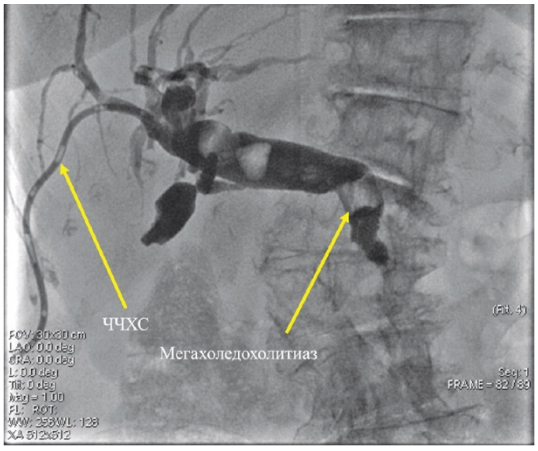

Fig. 1. Antegrade cholangiography of the patient before contact electropulse lithotripsy and extraction
Note: PTCS - transcutaneous transhepatic cholangiostomy

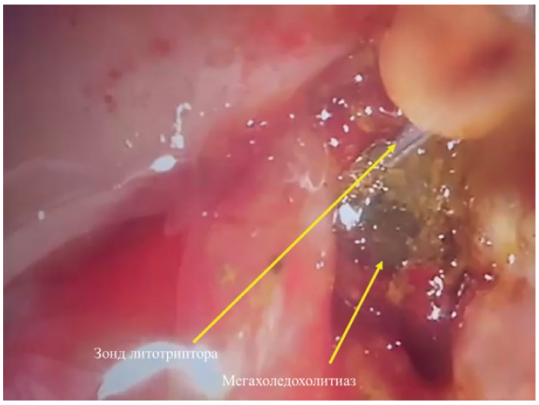

Fig. 2. Retrograde endoscopic contact electropulse lithotripsy

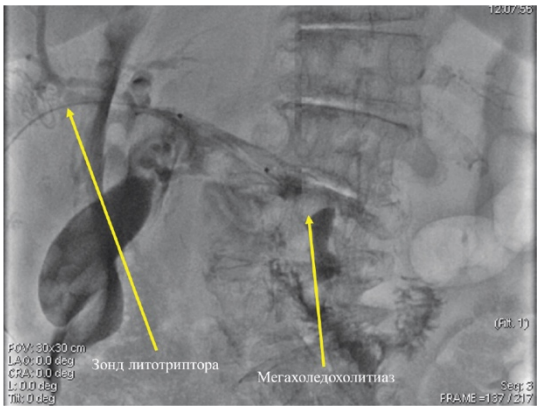

Fig. 3. Antegrade contact electropulse lithotripsy

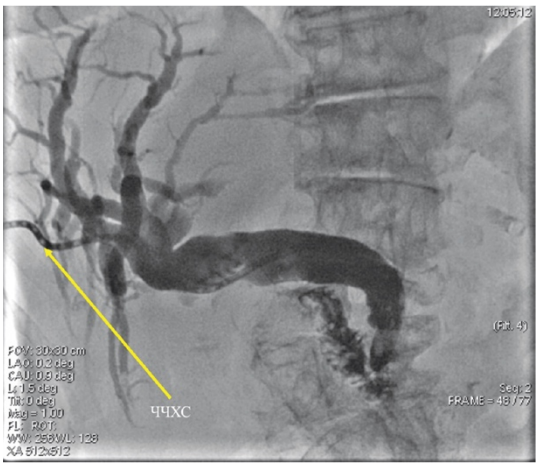

Fig. 4. Antegrade cholangiography of the patient after contact lithotripsy
Note: PTCS - transcutaneous transhepatic cholangiostomy

Table 2

Complete blood count and biochemical blood tests of the patient upon discharge

Index	Units	Value
WBC	10^9/l	15.70
Neutrophils	10^9/l	13.93
Eosinophils	10^9/l	0.08
RBC	10^{12}/l	3.11
Hemoglobin	g/l	102
Hematocrit	%	29.2
Platelets	10^9/l	252
ESR	mm/h	59
Total bilirubin	μmol/l	21.47
Bilirubin indirect	μmol/l	14.48
Direct bilirubin	μmol/l	6.99
Aspartate aminotransferase	units/l	13.31
Alanine aminotransferase	units/l	15.99
Alkaline phosphatase	units/l	311.07
Alpha amylase	u/l	39.02
Total protein	g/l	72.48
Urea	mmol/l	8.66
Creatinine	μmol/l	113.90
Glucose	mmol/l	5.00
Sodium	mmol/l	130.00
Potassium	mmol/l	5.29

CONCLUSION

Thus, antegrade percutaneous transhepatic and retrograde endoscopic contact electrical pulse lithotripsy is the method of choice in the treatment of multiple choledocholithiasis and megacholedocholithiasis in the case when it is impossible to perform minimally invasive endoscopic and video-laparoscopic interventions, which make it possible to avoid laparotomic surgery and the associated risks of postoperative complications.

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