Basis of The Isobaric Enteral Perfusions in Generalized Peritonitis

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Summary: *The comparative analysis of hyperbaric and isobaric intestinal lavage efficiency was made using the new method of computer electrophysiological monitoring-spectral peripheral electroenterography (SPEG). 68 procedures of intestinal lavage and autoperfusions in 20 patients with generalized terminal and toxic peritonitis were taken under consideration. Efficiency of isobaric regime of the enteral perfusions and high diagnostic possibilities of SPEG-method in abdominal surgery were shown.*

Key Words Peritonitis, paralytic ileus, electroenterography, enteral perfusion, bioelectrical activity.

Enteral perfusions (EP) are widely used in the treatment of functional disorders of the gastro-intestinal tract (GIT) and intoxications of different origins including peritonitis, paralitic ileus etc. (5,6,7). Their positive influence depends on the composition of perfusate and perfusion rate. In particular, U.M. Galperin scientific school suggests that the most effective is the solution similar to normal chimus (1,3). They elaborated several compounds of perfusates, including enteral salt solution for enteral lavage, monomer-electrolite solution and polimer-electrolite one for enteral tube feeding (1). They also used "elementary diets" containing all necessary nutrients (5,6). The perfusion rate depends on perfusate compounds and patients' state, and ranges from 3-4 to 10-12 ml/min. Actually, there is no background to determine efficiency of EP, that's why in practice they set up the perfusion rate every time in every case.

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We noticed, that the absorption and paralytic ileus pathogenesis correlated with introintestinal pressure (IIP). We supposed that the enteral perfusion under rate which reachies IIP, was expected to be the most physiological and effective. Special investigations were carried out to check-up this working hypothesis.

MATERIAL-METHOD

Experience in treating 20 patients with generalized terminal and toxic peritonitis (by classification of B. D. Savtshuk, 1979) was analised. All patients were operated. Liquidification on peritonitis source and peritoneal exudate, peritoneal lavage and placing abdominal drainage, nasointestinal intubation and small intestinal decompression using two-lumen silicon tube 80-100cm below Treitz were performed. In all cases paralytic ileus developed. Throughout the postoperative period a long-term peritoneal dialysis and enteral perfusions were made.

Perfusions were performed for 1 hour period, with solt-enteral solution, 400-500 ml, and with 6-8,5 ml/min of rate. The main idea was that the pressure was the regulating factor of

perfusion, and the intestinal perfusion rate was regulating itself by means of IIP (autoperfusion, Galperin U. M., 1986). We gave hyperbaric and isobaric perfusions in equal rates in order to compare the results. Besides, enteral tube feeding with oxygenated monomer-electrolitic solution in isobaric regime (autoperfusion) was done. The IIP of 14 cm H_2O or lower values were considered as indications for ETF.

We made 23 hyperbaric perfusions, 24 isobaric, 21 autoperfusions, in 68. Cases, solutions were introduced via the small tube lumen into the middle part of small intestine and extracted via the big tube lumen of the upper part of the small intestine. Hyperbaric perfusions were performed under the 50 cm H_2O of pressure, using the same system for intravenous infusions. Rate regulating clamp of the system was set up on the corresponding height.

Isobaric perfusions were done using original special equipment, permitting perfusions with fixed rates and pressure. Exaggerated pressure on the end of the tube stopped perfusion. Perfusion pressure was fixed 1,5-2cm H_2O above IIP. For the autoprefusion the same equipment was used to perfuse into the upper part of the small intestine via big tube lumen. The functional GIT state was non-invasively controlled by the new method of the spectrum peripheral electroenterography (SPEG), elaborated in the Moscow N. V. Skliphosofsky Research Institute (4). The method is based on the extremities GIT bioelectrical signals registration in the range of 0,015-0,4 Hz. The fundamentals of the method are that every gastro-intestinal tract section has a proper frequency of basic electrical wave (BEW), which is enough stable in different functional states of GIT. In that manner every electrical spectrum corresponds to its tract section bioelectrical activity. The apparatus-programming complex was worked out. It made possible the enregistration of patients data, digital computer spectral analysis based on the quick Furie transformer algorithme, calculation of spectrum parameters and statistic analysis.

In particular, parameter E-medium energy and parameter K-longitudity of spectral line in spectrum zone, were defined in gastric duodenal, fejunal and ileal spectral zones. Parameter E characterises the general bioelectrical gastrointestinal sections activity, and parameter K-bioelectrical wave processus regulating. Bioelectrical activity was studied 30 min before, during and 30 min after EP.

RESULTS and DISCUSSION

Results are given in Table I.

There is a considerable difference between hyperbaric and isobaric enteral perfusions in their influences on the bioelectrical and motor activity. Hyperbaric perfusion provocated a significant reduction of the bioelectrical activity, which was reduced in comparison with normal level. This was the mostly manifested in the perfused section of small intestine-jejunum. Once the perfusion made, the bioelectrical activity increased, firstly in the jejunal BEW spectral zone. It is interesting to notice, that the parameter K in perfusions of the initial sections of small intestine BEW spectral zone reduced the most, and after the perfusion increased more than parameter E. This fact shows, that by perfusion the regularitv of the bioelectrical wave was fallen, and after this procedure it grew.

In isobaric perfusions the bioelectrical activity increased in all GIT sections, especially in the duodenal BEW spectrum zone. This tendency sustained after the perfusion. Parameter K in this case was above the parameter E. showing the growing of the bioelectrical wave process regularity. So, the comparison of two kinds of

second. When the stone was hard, the intensity was increased to 3,5. A Small-Ca-liber choledochofiberscope (CHF-B 20) and a choledochoscope (TJF-M 20) were used by video endoscopy ssytem. 0.9% saline infusion was used during the procedure. Because infusion of saline through its larger biopsy channel permitted us to keep the endoscopic view clear during the procedure. Extracorporal shock wave therapy was used before EHL in 4 patients.

Choledochoscopy was first attemped 1 week after endoscopic papillotomy. The drainage catheter was removed, leaving a guide wire in the biliary tract over the guide wire placed in the catheter channel. After a gallstone was visualized, the lithotripsy probe was passed through the catheter channel, the tip was kept in the close proximity of the stone, and the discharge sparks were applied to the stone under direct vision. After the stone was disintegreted, a large fragment of the stone was grasped in a basket catheter and pulled out along with the choledochoscope through the sinus tract. This procedure was repeated to remove as many large fragmants as possible. Small fragmants were removed by irrigation and suction through the choledochoscope. The lithotripsy was performed once or twice a week, each session being to one hour.

RESULTS

All of patients had right upper abdominal pain. 5 patients had icter, 9 patients had fever and chills. Only 7 patients had intrahepatic bile duct stones, but 8 patients had intra and extra hepatic bile duct stones. In intrahepatic bile duct stone group, stones were seen only in left bile duct in 4 patients, in right and left bile duct in 10 patients, only in right bile duct in 1 patients. Generally, stones were seen in left intrahepatic bile ducts.

1 patients, the stones were disintegrated into sludge or fragments measuring 5 mm or less in diameter, yielding the overall success rate of 60%. In 4 patients, removal of the stones was of incomplet and success rate was 26.6 %. This therapy was failure in 2 patients. In this group, reason of failure was bile duct stricture and stenosis. This 2 cases were sent to the surgery department.

The procedure was well tolerated by all the patients and caused no serious adverse effects. Minor bleeding from the mucosa of the bile duct occured in 3 patients. One patient had transient chills and fever the procedure; this was probably due to cholangiovenous reflex caused by increased biliary pressure during saline infunsion into the bile duct.

DISCUSSION

As described in this report, the use of choledochoscopic electrohydraulic lithotripsy has enabled us to remove stones from the common bile duct, intrahepatic ducts. Even large immobile stones were successfuly removed after fragmantation once the stones were localized under direct vision by choledochoscopy. The success or failure did not depent on the nature of the stones, even hard, calcified cholesterol stones could be fragmented. Presence of bile duct stricture may prohibit the efficient use of the forreps and failure can be seen in this group(6,7).

As shown by the number of choledochoscopy sessions and period of time for complete lithotomy, common bile duct stones were most easily removed, chiefly because the common bile duct was straight, allowing easy choledochoscopic access to the stones, and the number of stones was small. This seems to be the first choice of the treatment in patients who are poor surgical risks (8). Furthermore, choledochoscopic lithotomy before surgery may also be justified even in patients without any risk factors (9,10,11,12). An appropiate operative

procedure for the treatment of hepatolithiasis should be selected on the basis of anatomical location of bile duct stricture often associated with this disease (5). This can be achieved more accurately after complete removal of the intrahepatic stones beacause bile duct stricture tends to be improved after removal of the stones. The combination of choledochoscopic lithotomy and electrohydraulic lithotripsy would allow for quick removal of the stones before the surgical procedure is planned (13,14).

Complications encountered in this series include minor bleeding and shivering chills. The bleeding occured due to friction of the ductal wall by the sharp edge of the lithotripsy probe. There were not serious complications Therefore, this therapy is efficient and useful to remove biliary calculi in hepatolithiasis.

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