Case Report

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Laparoscopically-Assisted Elimination of Postoperative Complications of Percutaneous Endoscopic Gastrostomy

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ABSTRACT Percutaneous endoscopic gastrostomy (PEG) is widely used in a group of patients with dysphagia syndrome who require nutritional support with enteral nutrition. In the above observation, a severe complication of PEG is secondary non-circumscribed serous-purulent peritonitis, which developed in connection with the failure of PEG, against the background of cachexia, hypoproteinemia and hypercatabolism. The operation of choice was video laparoscopic surgery, revision and sanitation of the abdominal cavity was performed. The main stage of the operation was gastropexy (the stomach wall to the parietal peritoneum) with three vicryl sutures, which made it possible to seal the gastrostomy area.

Keywords: percutaneous endoscopic gastrostomy; peritonitis; treatment; laparoscopic gastropexy

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BP, blood pressure
PEG, percutaneous endoscopic gastrostomy
USE, ultrasound examination

To date, percutaneous endoscopic gastrostomy (PEG) is considered the safest and most reliable method for making gastrostomy in patients with signs of oropharyngeal dysphagia, which, accordingly, requires nutritional support with enteral nutrition [1,2,3,4]; A..A. Rahnemai-Azar et al. (2014) [5]; T. Hucl et al. (2016) [7]; B.A. Becker et al. (2019) [6]. So, in the United States of America, more than 200,000 such interventions are performed annually [1].

In addition to enteral feeding, PEG promotes gastric decompression, which is especially important in patients with impaired gastrointestinal motility [2,5].

Due to the low traumatic access and time of operation, the method is characterized by a low incidence of postoperative complications (from 1.8 % to 5 %) and low postoperative mortality (from 0 to 2%). [5, 6, 7].

Meantime, the main percentage of complications develops in the first week after PEG, which requires special attention in monitoring of and care for patients in this period. [6, 8].

One of the most frequent PEG complications in the early postoperative period is the gastrostomy tube migration into the abdominal cavity (from 1.3% to 2.3%) [9].

In order to prevent the gastrostomy tube displacement, some authors consider it necessary to additionally fix the anterior wall of the stomach to the anterior abdominal wall, which prevents a number of complications: gastric bleeding, unintentional migration of the tube into the abdominal cavity, and leakage of gastric contents into the abdominal cavity [1].

Below we present our clinical case report on the complicated course of PEG and minimally invasive surgical correction of the complication by means of laparoscopic gastropexy.

Clinical Case Report

Patient Z., 38 years old, was admitted at the Intensive Care Unit of the N. V. Sklifosovsky Research Institute for Emergency Medicine, having a diagnosis of "Ischemic-toxic, residually organic brain damage, central tetraparesis".

On admission, the patient's condition was severe (scored 5 by the Modified Rankin Scale), malnutrition, spontaneous breathing through a tracheostomy tube with a respiratory rate of 19 per minute, the heart rate was 109 beats per minute, blood pressure 95/65 mm Hg. Neurological status was consistent with a vegetative state with the presence of multiple pressure bedsores on the body. Nasogastric tube nutrition included Nutrizon up to 1500 mL per day. On the first day of hospital stay, the patient underwent an abdominal ultrasound examination, which revealed separation of the peritoneal layers in the right iliac regions (up to 1.2 cm and up to 0.7 cm, respectively). Given the absence of peritoneal symptoms, and hypoalbuminemia in the blood biochemistry test results (total protein 45 g/L), this collection (separation) status was regarded as ascitic fluid.

An endoscopic examination performed in the first 24 hours after admission revealed a tracheoesophageal fistula of the cervical esophagus measuring 2.0 x 0.7 cm.

The presence of severe swallowing disorders, hypoalbuminemia, and tracheoesophageal fistula was an indication for performing gastrostomy.

On the 3rd day after hospital admission, PEG was performed under endotracheal anesthesia according to the standard Gauderer-Ponsky method in the Operating Room.

The first 3 days after the operation were uneventful. The patient's condition remained steadily severe, there were no symptoms of peritoneal irritation, and there was a clear intestinal motility. On dressing change, the postoperative wound was without signs of inflammation and infiltration. The external stop of the gastrostomy tube was loosened to 5 mm 24 hours after surgery.

At 24 hours after the surgery, the patient underwent a control ultrasonogrpahy of the abdominal organs, which did not show any increase in free fluid.

Blood hematology test showed hemoglobin 120 g/L, white blood cells 9.0 x 109/L; body temperature was 36.7°C.

From the first day after the operation, the enteral nutrition via the gastrostomy was started with administering 500 ml of saline solutions in total per day (in the first 24 hours), then with the addition of 500 ml of the Nutrizon nutrient formula (from day 2) and up to 1500 ml of the nutrient formula in aliquots of 100 ml (from day 3).

On day 4 after surgery, there was noted abdominal distension the appearance of peritoneum irritation symptoms. The blood hematology test results showed a slight leukocytosis with a shift of the leukocyte formula to the left: leukocytes 12.2 x 109/L, stab neutrophils 3%, segmented neutrophils 58 %), lymphocytes 39%, erythrocyte sedimentation rate (ESR) was 58 mm/h.

An emergency esophagogastroscopy was performed, which revealed that the internal stop of the gastrostomy tube was located in the lumen of the stomach.

Ultrasound examination of the abdominal organs showed an increased separation of the peritoneal layers up to 3.0 cm in the right iliac region and up to 1.6 cm in the left iliac region, the contents were heterogeneous.

Taking into account the clinical pattern, the increased amount of free fluid in the abdominal cavity as per ultrasonography findings, the laboratory test results, the patient was diagnosed with. The decision was made to perform an emergency diagnostic laparoscopy.

Diagnostic laparoscopy revealed signs of secondary non-circumscribed serous-purulent peritonitis, which source was a loose fit of the stomach anterior wall to the anterior abdominal wall in the area of gastrostomy with the leakage of stomach contents into the free abdominal cavity (Fig. 1a, 1b, 2).

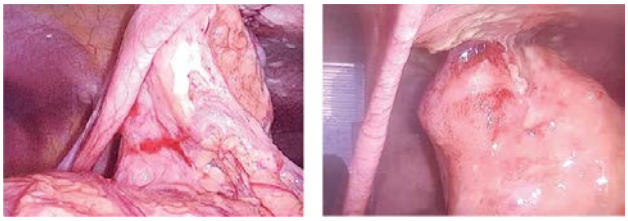

Fig. 1. Video laparoscopy. Intraoperative photo. During revision, the gastrostomy area is loosely wrapped in a large omentum, which was partially detached during the application of pneumoperitoneum

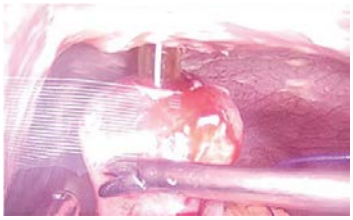

Fig. 2. Video laparoscopy. Intraoperative photo. Revealed leaking fit of the gastrostomy area to the anterior abdominal wall, where the gastrostomy cannula is visualized

The decision was made to perform gastropexy from laparoscopic access, cleaning and drainage of the abdominal cavity. Along the gastrostomy perimeter, 3 vicril sutures were applied between the stomach wall and the peritoneum, their ligatures were drawn onto the anterior abdominal wall the anterior abdominal wall using a transdermal needle (Endo-close transdermal needle). Thus, it was possible to fix tightly the gastrostomy area to the anterior abdominal wall and achieve seal (Fig. 3)

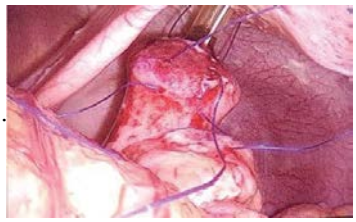

Fig. 3. Video laparoscopy. Intraoperative photo. Along the perimeter of the gastrostomy, 3 vicryl sutures were imposed, the ligatures of which were carried out with a transdermal needle (Endo-close transdermal needle) on the anterior abdominal wall

After surgery, the patient was delivered to the Intensive Care Unit, where the intensive therapy was continued. Drains from the abdominal cavity were removed on the 5th day, sutures were removed on the 9th day after surgery. The enteral (gastric) nutrition through a gastrostomy was decided to be resumed from day 3 after surgery, with a further increase in the total protein level to 51 g/L being noted.

Thus, it was possible to create conditions for adequate nutritional support. However, despite coping with peritonitis and provided intensive care, the patient died on day 64 after PEG. The cause of death was multiple organ failure, which developed due to the multiple purulent-septic complications (recurrent pneumonie, bedsores of the body, sepsis).

CONCLUSION

Thus, despite the PEG is a generally accepted intervention, in 9.5%-10.6% [10] of patients, this intervention may be associated with the risk of developing a number of complications.

Meanwhile, one of the most common complications is gastrostomy failure with the peritonitis development. This report indicates that in some cases it is possible to eliminate a severe abdominal complication in the form of gastrostomy failure by using a minimally invasive intervention from laparoscopic access. It is necessary to expand the potential of methods for preventing gastrostomy complications in order to avoid its primary failure in weakened patients with impaired reparative capacity.

REFERENCES

1. Tsujimoto H, Yaguchi Y, Kumano I, Matsumoto Y, Yoshida K, Hase K. Laparoscopy-assisted percutaneous gastrostomy tube placement along with laparoscopic gastropexy. *Dig Surg*. 2011;28(3):163–166. PMID: 21540603 https://doi.org/10.1159/000323743
2. Rahnemai-Azar AA, Rahnemaiazar AA, Naghshizadian RA, Farkas DT. Percutaneous Endoscopic Gastrostomy: Indications, Technique, Complications and Management. *World J Gastroenterol*. 2014;20(24):7739–7751. PMID: 24976711 https://doi.org/10.3748/wjg.v20.i24.7739
3. Hucl T, Spicak J. Complications of percutaneous endoscopic gastrostomy. *Best Pract Res Clin Gastroenterol*. 2016;30(5):769–781. PMID: 27931635 https://doi.org/10.1016/j.bpg.2016.10.002
4. Becker BA, Walker TC. Gastric Outlet Obstruction Due to Malposition of Replacement Gastrostomy Tube. *Clin Pract Cases Emerg Med*. 2019;3(4):442–443. PMID: 31763613 https://doi.org/10.5811/cpcem.2019.7.43626
5. Belevich VL, Brednev AO, Ovchinnikov DV. The use of percutaneous endoscopic gastrostomy for provision of the long-term enteral nutrition. *Voenno-medicinskij žurnal*. 2014;335(4):46–49. (in Russ.) https://doi.org/10.17816/RMMJ741422.
6. Richter-Schrag HJ, Richter S, Ruthmann O, Olschewski M, Hopt UT, Fischer A. Risk factors and complications following percutaneous endoscopic gastrostomy: a case series of 1041 patients. *Can J Gastroenterol.* 2011;25(4):201–206. PMID: 21523261 https://doi.org/10.1155/2011/609601
7. Petrovsky AN, Popov AYu, Baryshev AG. Percutaneous endoscopic gastrostomy (in Russian only). *Khirurgiya*. 2019;(8):69–73. https://doi.org/10.17116/hirurgia201908169.
8. Golubev KV, Topuzov EE, Oleynik VV, Gorchakov SV. The relevance of the early terms of the formation of percutaneous endoscopic gastrostomy after a stroke complicated by severe neurogenic oropharyngeal dysphagia (review of the literature). *Grekov's Bulletin of Surgery*. 2019;178(3):64–68. (in Russ.) https://doi.org/10.24884/0042-4625-2019-178-3-64-68
9. Golubev KV, Topuzov EE, Oleinik VV, Stuchevskaya TR, Gorchakov SV. General Principles for the Prevention and Treatment of Complications of Percutaneous Endoscopic Gastrostomy (Review of Literature). *The Scientific Notes of the Pavlov University*. 2019;26(3):25–30. (in Russ.) https://doi.org/10.24884/1607-4181-2019-26-3-25-30
10. Vakhonin AYu. *Chreskozhnaya endoskopicheskaya gastrostomiya: pokazaniya, tekhnika vypolneniya, oslozhneniya. cand. med. sci. diss. synopsis*. Moscow, 2009. (in Russ.) Available at: https://dlib.rsl.ru/viewer/01003465238#?page=1 [Accessed 19 Nov 2021]

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