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Research Article

Gastrostomy in the Complex of Measures for Enteral Nutrition

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Abstract

The analysis of the results endoscopically assisted puncture gastrostomy in children undergoing long-term tube feeding, based on 224 cases of installation gastrostomies. Advantages and disadvantages of the two basic techniques puncture gastrostomy. Explain the approaches to the choice of the operating tactics in patients with altered anatomy in the background of comorbidity. Identified contraindications to the use of this technique.

Keywords: Disphagia; Gastrostomy; Children

Introduction

One of the most important problems in the treatment of patients with swallowing disorders is the preservation or restoration of a full enteral diet. Parenteral nutrition is a costly and insufficiently effective way to maintain nutritional status and cannot be recommended for long-term use. Traditionally, for long-term (months and years) nutrition provision, the preservation of a naso-gastric tube or a standard surgical gastrostomy is used. the use of a probe for nutrition can lead to the formation of a chronic inflammatory process in the nasal passages, and also, for periods of more than 2 months, 100% of patients form pressure sores along the probe and create favorable conditions for acute bleeding. In addition, the standing of the probe exacerbates the social deadaptation of patients due to an additional cosmetic defect [2,4,5,7,10,14,18,19].

Gastrostomy was first proposed by the Norwegian military surgeon Christian Egeberg in 1837 to treat a patient with a stricture of the esophagus, but Egeberg himself never performed this operation. For the first time, this surgical intervention was performed on animals (dogs) in 1842 by the ordinary professor of theoretical surgery at Moscow University, Vasily Alexandrovich Basov. (1812-1880), in November of the same year he read the report «Remarks on the Artificial Path to the Stomach of Animals» at the Moscow Society of Nature Testers, and in December 1842 published the results of experiments and their conclusions in the Bulletindela Société Imperialedes naturalistes de Moscou and in Dubovitsky's collection Notes on the Part of Medical Sciences. The work of V. A. Basov was a year ahead of similar experiments by Blondlot in France and Watson in the USA and 4 years after Basov's work, the French surgeon from Strasbourg, Cedillo, (Russian) Fr. (Sedillot) submitted to the Paris Academy of Sciences three reports on the «Gastrostomiefistuleuse», in which he outlined the indications and technique of gastrostomy, as well as the results of his experimental operations on animals. In the Paris Academy, this report was treated with indifference, Cedillo did not receive approval for testing this operation on humans, like another French surgeon Petel de Cateau (PeteldeCateau). In the same 1846, the largest spoke extremely negatively about gastrostomy. German surgeon of the time Johann Friedrich Dieffenbach (Russian) It. (JohannFriedrichDieffenbach, 1792-1847) [1,9,16,17,20].

However, despite these skeptical remarks, Cedillo performed a gastrostomy on a human for the first time in the world. On November

13, 1849, he operated on a patient with cancerous obstruction of the esophagus. An hour later, he died due to complications that arose during surgery. Sedillo performed a gastrostomy by simply suturing the anterior wall of the stomach to the abdominal wall without forming a valve. The first successful result was achieved only in 1875 by the English surgeon Sydney Jones (SydneyJones) at St. Thomas' Hospital in London (the patient died 40 days later), and a little later by the French surgeon Verneuil in 1876 (a patient with cicatricial narrowing of the esophagus due to a burn lived 1 year and 4 months, died of pulmonary tuberculosis).In 1877, the first gastrostomy in Russia was performed in Moscow Vladimir Fyodorovich Snegiryov [1,9,11-13,15-17,20].

In the recent past, the gastrostomy procedure had the character of a full-fledged abdominal operation on the organs of the abdominal cavity with all its numerous complications: peritonitis, postoperative bleeding, a long recovery time in the postoperative period, difficulties in care [3,6,8,10,16].

Percutaneous endoscopic gastrostomy was first performed in 1979 in Cleveland by endoscopist Ponsky and pediatric surgeon Gauderer in a 4.5-month-old baby. The technique was first published in 1980 as an alternative to gastrostomy from laparotome access and was called the pull method. Subsequently, modifications of this technique were developed: the push method (Sacks-Vine), in which the gastrostomy tube can be retracted or inserted into the stomach from the outside, and the Russell technique using a conductor and a number of dilators to increase the size of the gastrostomic fistula, in which the possible setting of a thicker one tubes (Foley catheter) [1,4-7,10,16,19,21].

The most commonly used technique of percutaneous endoscopic gastrostomy is «pull» - a technique (pulling), introduced into practice in the 80s by Gauderer and Ponsky. Now only in the United States more than 216 thousand endoscopic gastrostomies are performed per year.

Endoscopic gastrostomy is considered the method of choice for extended enteral nutrition in patients with swallowing disorders, providing better patient tolerance compared to a nasogastric tube. Minor complications associated with the installation of endoscopic gastrostomy occur from 13% to 43% of cases and include tube occlusion, maceration of the skin due to leakage of gastric contents around the tube, and peristoma pain. Large complications from available sources were noted in 0.4-8.7% of procedures, and included wound infection, necrotizing fasciitis, aspiration, bleeding, perforation, peritonitis, intestinal obstruction, internal organ damage, tumor dissemination, and death. Number of deaths in the literature Associated endoscopic gastrostomy ranged from 0% to 2%, with a 30-day mortality rate of 6.7% to 26%, which may also be due to the presence of severe comorbidity [1,4-7,10,16,19,21].

Materials and Methods

In our clinic, from September 2012 to January 2022, 224 endoscopically assisted gastrostomies were performed. The age of patients ranged from 1 month to 17 years.

58 operations were performed using the pull method.

Technique of the pull method

The first stage is fibrogastroscopy, during which the least altered and vascularized area on the front wall of the stomach is selected. Air is pumped into the stomach, then the room in which the manipulation is carried out is darkened. The tip of the endoscope rests on the front wall of the stomach in order to determine the place of application of the gastrostomy due to diaphanoscopy the anterior abdominal wall (usually outside the white line of the abdomen). To clarify the localization of this point, the anterior abdominal wall is pressed with a finger. After treating the surgical field with an antiseptic and performing local anesthesia for the entire thickness of the anterior abdominal wall, the skin is cut off with a thin scalpel at the selected point 3 mm long. A special trocar under endoscopic control is punctured through the stomach through the skin. After removing the stiletto through the cannula of the trocar, a long thread is wound into the stomach, which is captured by biopsy forceps, the endoscope is removed. The end of the thread drawn through the cannula and extracted through the mouth is connected to the thread on the cone of the gastrostomy catheter, the latter is wound into the stomach with the help of a thread so that its cone rests on the cannula of the trocar. The gastrostomy catheter, together with the cannula, is carried through the wall of the stomach and the anterior abdominal wall to a stop with its end support in the anterior wall of the stomach. The plastic cone of the gastrostomy probe is passed through the central hole of the fixing board, and then through its tunnel. The board is shifted along the catheter until it is tightly fixed, after which the cone is cut off and a cannula is attached at the outer end of the stoma to introduce a mixture for enteral nutrition (Figure 1 and 2).

According to the Russell method, we have installed 166 gastrostomy tubes.

Figure 1: View of the gastrostomy tube from the stomach.

Figure 2: A type of gastrostomy tube on the skin.

Russell method technique

The first step is fibrogastroscopy, during which the least altered and vascularized area on the front wall of the stomach is selected. Air is pumped into the stomach, then the room in which the manipulation is carried out is darkened. The tip of the endoscope rests on the front wall of the stomach in order to determine the place of application of the gastrostomy due to diaphanoscopy. the anterior abdominal wall (usually outside the white line of the abdomen). To clarify the localization of this point, the anterior abdominal wall is pressed with a finger. After treating the operating field with an antiseptic and performing local anesthesia for the entire thickness of the anterior abdominal wall, a puncture installation of three anchors is performed, with a triangle with an interval of about 2 cm, on threads that pull the stomach wall to the anterior abdominal wall, the tightened wall is fixed with special fixators, then the skin is cut off with a thin scalpel at the selected point 1 mm long. under endoscopic control, the stomach is punctured through the skin. A conductor is conducted through the trocar and the trocar is removed. Through the conductor, the hole is expanded with the help of a bougie system and a destructible system is lowered into it through the channel of which a low-profile gastrostomy tube is inserted with a fixator in the stomach cavity for it is a Foley-type balloon. Stomach fixators on absorbable threads depart on their own for 2-3 weeks of the postoperative period (Figure 3 and 4).

Figure 3: Appearance of a low-profile gastostomy tube.

Figure 4: Low-profile tube on the anterior abdominal wall.

Outcomes

The pull technique in the technical version is quite simple, takes about 10-15 minutes in its implementation. She had no surgical complications. However, in 100% of cases, there was a periodic outflow of gastric juice through the canal of the standing tube, which alerted the caregivers. One patient gastrostomy was installed in an atypical place, and on the right. The patient had severe scoliosis with a violation of the topography of the stomach. Patients began to feed every other day with 1/3 of the daily volume, with an expansion of 1/3 per day. Caregivers mastered the method of caring for gastrostomy from the first day and they were given a memo on this process. The aesthetic aspect of the standing of this design left much to be desired. The tube was quite difficult to hide under clothes. Studying the gastrostomy technologies used in the world, we came to the Russell method.

The push technique used consumables from American manufacturers. In two cases, due to an enlarged left lobe of the liver covering the stomach and severe scoliosis that changes the topography of the stomach, shifting it to the left, the standard technique was supplemented with laparoscopy, which protected patients from complications. Gastrostomy tubes for these patients were installed in atypical places. Balloon tubes from the russell technique kits we also changed patients whose gastrostomy had previously been performed according to other methods - 52 patients.

In 2 cases, complications were noted. In the first case, a gastrostomy was installed according to the pull method. In the postoperative period, necrosis of the stomach wall arose with the development of peritonitis. Laparotomy was performed, suturing the opening of the gastrostomy, drainage of the abdominal cavity. The child recovered. In the second case, on the 3rd day of the postoperative period, using the push technique, bleeding arose from the gastrostomy canal, which required emergency surgical intervention: laparotomy, suturing the gastrostomy opening of the stomach, stopping bleeding. The child recovered and on the 4th day after laparotomy was discharged from the hospital. Bleeding, in our opinion, arose against the background of thrombocytopathy.

There is a patient and parent support site on the Internet with detailed care instructions. Mothers note a significant relief in care and an increase in the quality of life of patients.

Discussion

Both methods are characterized by

Advantages

- The possibility of performing in patients with high surgical risk.
- Requires only minimal sedation (there is no need for general anesthesia).
- Can be produced within 10-20 minutes.
- The possibility of spending at the bedside of the patient.
- Has a lower cost than gastrostomy from laparotomy access.
- Care for the gastrostomy, imposed by the endoscopic method, does not require any additional measures, is simple and safe for the patient.

Disadvantages

- Impossibility of performing with pronounced violations of the patency of the oropharynx and esophagus.
- The need to combine the anterior wall of the stomach with the anterior abdominal wall, which is difficult in patients with previous subtotal gastroectomy, ascites or significant hepatomegaly, as well as with severe obesity, scoliosis.

Both designs of gastrostomy tubes require a change with a frequency of 6-8 months but may be for a longer time in the absence of signs of wear. According to the second method, this process can be carried out at home, while for the implementation of the pull technique it is necessary to hospitalize the child in a day hospital.

When using the push method, the installed tube does not rise significantly above the surface of the skin and has a valve that protects the contents of the stomach from being thrown into the external environment.

And in a situation where there is an altered anatomy of the stomach, we consider the use of laparoscopy mandatory. We used it in 4 cases.

Dealing with the issues of gastrostomy, we came to the conclusion that the only relative contraindication is frequent convulsive activity, which in the postoperative period can lead

to intra-abdominal complications, due to the risk of peritonitis against the background of tissue mobility in the intervention area, as a consequence of the high risk of eruption of fixators.

Conclusion

Both of these methods are recommended in widespread use, as quite simple and reliable. The Russell method has the advantage of improving the quality of life of patients and the simplicity of caring for gastrostomy tubes.

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