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Original Article

Percutaneous endoscopic jejunostomy (PEJ) in patients with dumping syndrome: Evaluation of our center on a series of clinical cases

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SUMMARY

Background: The Dumping syndrome occurs in a variable percentage of subjects undergoing surgery involving the esophageal and gastric district. The treatment makes use of the introduction of dietary measures and artificial nutrition, especially the internal one. This study evaluates the experience of a single center regarding the use of percutaneous endoscopic jejunostomy (PEJ) in patients developing the dumping syndrome.

Methods: We evaluated the case history of our department, of all patients operated on at the level of the upper gastrointestinal tract, who had manifested symptoms referable to the Dumping syndrome in the postoperative period. We have identified 3, which we have carried out further investigations to confirm the presence of an accelerated gastric emptying, and given the poor results obtained with dietary modifications and drug therapy, we have implemented a feeding through enteral nutrition, through a jejunal probe. PEG/J positioned by Pull technique, and subsequently replaced after 8 months.

Results: Clinically, patients did not develop short- or long-term complications, symptoms were significantly reduced, and they gained weight. Psychologically, the anxiety disorders related to nutrition have improved.

Abbreviations: P.E.G., Percutaneous Endoscopic Gastrostomy; P.E.G./J., Percutaneous Endoscopic Gastrostomy/Jejunostomy; P.E.J., Percutaneous Endoscopic Jejunostomy; E.G.D.S., Oesophagus Gastro Duodenum Scopia; ASL, Local Health Authorities.

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Conclusions: By means of percutaneous endoscopic jejunostomy, the symptoms related to hypoglycemic crises following the hyperinsulinemic response to the ingestion of carbohydrates in patients with Dumping were attenuated and the anxiety of eating was lessened. Although limited to a few cases, we believe this form of nutrition is the best for patients with dumping.

Introduction

Some surgeries at the level of the esophagus and stomach can have a dumping syndrome as a complication [1,2]. This syndrome is characterized by rapid emptying of food from the gastric cavity to the small intestine, resulting in the release of gastrointestinal hormones, which in turn cause gastrointestinal symptoms and vasomotor phenomena [3]. The phenomenon of dumping can be both early, within one hour of taking the meal, and late, even after three hours. The latter would seem to be caused by the intake of carbohydrates, which would induce a marked hyperinsulinemic response, responsible for a hypoglycemic crisis [4,5]. The characteristic symptoms in this case are abdominal pain, nausea, vomiting, diarrhea, weakness, fatigue, confusion, and syncope, associated with tremor, irritability, sweating and palpitations [6]. A review of the literature shows that dumping syndrome can be present in 25% of patients operated for vagotomy, in 40% of those undergoing gastric bypass, and is also present after Fundoplication according to Nissen or myotomy according to Heller-Dor [7–10]. Significant weight loss was found linked to the syndrome, probably caused by the voluntary exclusion of food intake. All these symptoms can cause anxiety and depression and be emotionally distressing.

Nutrition in these patients is complicated and decisive in the development of the syndrome [11]. For this purpose, artificial nutrition is implemented, in particular enteral nutrition, which allows food to be brought directly to the jejunal level [1]. The methods used for this type of enteral nutrition are entrusted either to a naso-gastro-duodenal-jejunal tube or to a percutaneous endoscopic jejunostomy (PEJ). The nasal-gastro-duodenal-jejunal tube can have complications, including serious ones such as bleeding from the wing of the nose, or nasopharyngitis and laryngitis, but above all it presents an important limitation as it cannot remain in place for a long time. The jejunostomy probe, on the other hand, remains in place for long periods, even one year, except that, if not managed correctly, being of a reduced caliber compared to the gastric one, it can easily become obstructed. To exclude any obstruction of the probe, it is necessary that the staff managing it follow the guidelines issued by scientific societies, especially before starting the administration of the nutrient mixture, make sure that the jejunal probe is in the correct position, irrigate the probe with 15–30 ml of bacteriologically pure natural water every 4–6 hours, especially if the feeding is continuous. In case of malfunction or obstruction, the probe is easily replaced.

The positioning technique of a PEG/J probe is like the PEG, with the advantage of using the gastric tube for the subsequent passage of the jejunal one, which is transported with an endoscope beyond the pylorus. In our study, we evaluated the use, in 3 patients with dumping syndrome, in the first application of a PEG/J, and subsequently after 6–8 months, replaced by a low-profile PEJ.

Materials

From January 2020 to December 2021, 4 Nissen Fundoplication interventions were performed in our department in patients with hiatus hernia, and 63 Heller-Dor myotomy interventions in patients with cardio achalasia. Table 1.

For this study, we did not consider bariatric surgery, such as gastric bypass and sleeve gastrectomy, as despite having a high percentage of postoperative dumping syndrome, they did not allow the use of the enteral feeding method of our choice.

Among the 4 interventions of Nissen, only 1 patient (male) presented a dumping symptomatology in the postoperative period, while among those operated by Heller 2 patients (1 male and 1 female).

The 3 patients who came to our observation showed symptoms referable to a dumping syndrome, in particular nausea, vomiting, diarrhea: severe abdominal pain, weight loss, palpitations, confusion [12]. The drug therapy performed by the patients, with proton pump inhibitors, administered in order to slow down the digestive phase, and with cholestyramine to stop diarrhea, had not changed the symptoms.

As a diagnostic procedure we performed an esophagogastroduodenoscopy to exclude pathologies at the level of the esophagus and stomach, an esophageal manometry, an x-ray of the esophagus-stomach-duodenum with baritate meal, to evaluate the esophageal transit and gastric emptying time, and finally for the same purpose a gastrointestinal scintigraphy. Endoscopy did not reveal any mucosal changes, the results of esophageal manometry were not correlated with dumping, because the symptoms were strictly related to the mechanism of gastric emptying. While both radiography and scintigraphy confirmed accelerated gastric emptying.

Thereafter, the patients were evaluated with nutritional and psychological counseling. The nutritionist had first advised to change the eating behavior and had prescribed a diet that included the intake of food in several meals during the day. The allowed foods were particularly rich in fats and proteins, and complex carbohydrates, on the contrary eliminate milk and its derivatives and simple sugars. Another important recommendation was to drink only after meals.

Despite this diet, the patients did not achieve any improvement in symptoms. The psychological counseling had detected a particular emotional state, determined by anguish and the fear of taking food, in addition there was anxiety and depression [13].

Considering the results obtained, we decided in agreement with the nutritionist and especially with the patients, to choose artificial nutrition, in particular enteral nutrition.

Enteral Nutrition (NE) is recognized today as the first-choice method in patients who need artificial nutrition. There are numerous reasons that prefer it over parenteral, among the most important is the function that nutrients play on the trophism of the intestinal mucosa, and consequently the barrier role it plays on the translocation of bacterial flora.

The technique we have chosen was dictated above all by the long period foreseen for the use of the same, and that the method was safe, effective, and able to bring the right amount of food, directly at the jejunal level, and have the maximum compliance by patients. The method chosen by our group was the PEG/J.

The PEG technique was introduced in 1980 to perform enteral feeding in immature children. Numerous improvements have been made since then, which have greatly reduced the need for a surgical gastrostomy. In the continuous modifications and improvements of the devices, a new method has been introduced, the PEG/J, which allows to bring food and drugs directly to the jejunal level. In addition to nutrition, this method has been used for the medical therapy of one of the most disabling pathologies, Parkinson's disease, allowing the use of a Levodopa/Carbidopa gel solution directly at the jejunal level.

Table 1
Demographic and clinical data of the included patients

	N	Heller-Dor Miotomy	Nissen Fundoplication
Patients	67	63 (94%)	4 (6%)
Male	31	30 (97%)	1 (3%)
Female	36	33 (91,7%)	3 (8,3%)
Age >65 years old	20	19 (95%)	1 (5%)
Age <65 years old	47	44 (93,6%)	3 (6,4%)
BMI>30	16	13 (81,3%)	3 (18,7%)
BMI<30	41	40 (97,6%)	1 (2,4%)
ASA Score I	8	6 (75%)	2 (25%)
ASA Score II	35	33 (94,3%)	2 (5,7%)
ASA Score III	24	24 (100%)	0 (0%)
Achalasia Type I		6 (100%)	0 (0%)
Achalasia Type II		52 (100%)	0 (0%)
Achalasia Type III		5 (100%)	0 (0%)
Dumping Syndrome	3	2 (76%)	1 (34%)

In our study we made a percutaneous endoscopic gastrostomy [14], with a 20 Fr. probe, using the Pull technique. After having identified with transillumination the most favorable point for the introduction of the needle-cannula, with the aid of a guide wire we placed the probe blocking it inside the gastric cavity with the internal bumper and fixing it on the abdominal wall with the external block. At this point we introduced the 12 Fr. highly biocompatible polyurethane jejunal extension probe inside the gastric one, transporting it with the endoscope and a foreign body forceps up to the third duodenal portion.

After 8 months from the first placement, average time of replacement, we completely removed the PEG/J, and we introduced directly into the hole of the previous stoma, a transgastric-jejunal probe with double lumen, low profile with a balloon bumper inflated with 20 ml. of physiological solution, and dragging the tip directly to the jejunal level, in this way we have packaged a PEJ.

Results

Even if the PEG/J method is to be considered invasive, the literature data does not report high rates of severe complications, only some minor complications, and a mortality rate close to 0%. In our experience, new to the indication, but not new to the operative technique, adopted for years in our department, both for nutritional and therapeutic purposes, we have not had any intraoperative complications related to the method used to create the ostomy, and none in the postoperative period. Patients were able to immediately begin nutrition as required by the guidelines, after 48–72 hours. Particularly in the first days following, in the clinical controls, the patients in agreement with the nutritionists have detected with the glucose-test, the values of the glycaemia, which have not shown significant changes. A gradual recovery of body weight was noted, and the total absence of the symptoms described, related to dumping. After 8 months of implantation, the replacement of the PEG/J with a PEJ was easy and without any complications. The compliance of the method was excellent both in the PEG/J and in the PEJ phase, with a slight preference for the PEJ, as the device used had a low profile and a non-rigid bumper.

A subsequent psychological evaluation in the short and long term revealed a marked improvement, especially regarding anxiety and fear related to meals.

As regards the nursing and nutritional management of the PEG/J probe and subsequently of the PEJ, the patients were followed by the dietary centers of the ASL to which they belong.

Discussion

Some upper abdominal surgeries may have symptoms suggestive of a dumping syndrome. Any confirmation can be obtained by using the collection, through questionnaires, of symptoms, the assessment of blood sugar and the oral glucose tolerance test, and finally by performing instrumental investigations aimed at evaluating gastric emptying times. As a first therapeutic approach, the modification of the diet is fundamental, in the absence of results it may be necessary to use pharmacological therapy with proton pump inhibitors and somatostatin analogues.

Any reoperation or continuous enteral feeding can become useful especially in patients with a poor quality of life.

Enteral Nutrition allows the constant supply of nutrients over 24 hours, administered through a jejunostomy, thus avoiding the symptoms of dumping, which occur after the intake of meals, obviously, this method being invasive, must be reserved only correctly selected cases, which foresee a long duration of the type of feeding, which due to frequent complications, cannot be treated with naso-gastric, naso-gastro-duodenal, or naso-gastro-duodenal-jejunal probes.

For our study, PEG/J was chosen as the NE method. In fact, the naso-gastro-jejunal tube was not considered valid both because it is used for short-term enteral feeding, and because of the complications that can develop such as reflux esophagitis, pressure ulcers, tendency to dislocation, also the nose tube -gastro-jejunal can be a source of psychological stress for the patient, since it is a visible sign of the disease [15].

Conclusions

With the use of enteral nutrition via percutaneous endoscopic jejunostomy, symptoms related to hypoglycemic crises such as weakness, fatigue, confusion, and syncope, associated with tremor, irritability, sweating and palpitations, which patients with Dumping developed following the hyperinsulinemic response to the ingestion of carbohydrates, are attenuated. Anxiety and anxiety about food have no longer emerged from psychological counseling.

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Author contributions

Luigi Sivero: Conceptualization, Data curation; **Francesco Maione**: Data curation, Formal analysis; **Volpe Serena**: Investigation; **Gennarelli Nicola**: Methodology; Supervision; **Vitale Rosa** Resources; **Giuseppe Palomba, Marcella Pesce**: Writing - original draft; **Alessia Chini, Rosa Maione**: Writing - review & editing; **Stefania Sivero:** Project administration, Supervision, Validation; Visualization.

Conflicts of interest

The Authors declare that they have no conflicts of interest.

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