

Importance of Percutaneous Gastrojejunostomy (PEG/J) in Advanced Parkinson Disease Treatment – Multidisciplinary Approach

B. MASTALIER

C. BOTEZATU

M. LEOVEANU

Colentina Clinic of Surgery

Bucharest, Romania

I. BURAGA

Colentina Clinic of Neurology I

Bucharest, Romania

B. POPESCU

Colentina Clinic of Neurology II

Bucharest, Romania

I. SIMION

Colentina ICU

Bucharest, Romania

Abstract

Advanced Parkinson Disease is a frequent disease that benefits from a multidisciplinary approach. In the period of 2012-2014 in the neurological and surgical clinics of Colentina Hospital there were treated a number of 27 patients, that benefited from duodenal continuous infusion with Duodopa gel through percutaneous endoscopic gastrostomy with jejunal extension (PEG/J). Results were good, without any serious surgical complication. Neurologic improvement was evident.

Keywords: advanced Parkinson Disease, duodopa gel, PEG/J, multidisciplinary approach.

Introduction

Classical scheme of treatment in case of Advanced Parkinson Disease (APD) is based on multiple oral medication association with periodic reassessment and individualise therapeutic scheme. After a period, treatment loses its efficacy, probably due to the progressive loss of dopaminergic neurons with subsequent development of a number of complications (motor fluctuations, dyskinesia). Moreover, gastrointestinal dysfunction with erratic gastric emptying

determines poor absorption of L-Dopa in APD (1) and patients may not respond any longer to the oral treatment.

There are three modern therapeutic options for continuous dopaminergic stimulation in patients with APD: duodenal infusion of levodopa / carbidopa (Duodopa), subcutaneous injection of apomorphine, respectively deep brain stimulation (DBS).

Continuous infusion of levodopa/carbidopa gel through percutaneous endoscopic gastrostomy with jejunal extension (PEG/J) is the method that provides constant plasma levodopa concentration and continuous dopamine availability with subsequent receptor stimulation. In case of patients with severe dysphagia, this solution also offers an alternative way for nutrition.

Matherial and Method

The Surgical Clinic of “Colentina Hospital” with the Neurology Clinics of the same hospital have a 3 years experience with 27 patients, using the “Pull-string Ponsky-Gauderer type” percutaneous endoscopic gastrostomy (PEG) technique, followed by insertion of the jejunal extension tube (PEG/J). This is a retrospective analysis of the patients using PEG/J for treatment with continuous dopaminergic stimulation, 10 women and 17 men, aged between 56-83 years old, diagnosed with Parkinson disease, stage 3, 4 or 5 of the Hoehn and Yahr Scale.

During a first week of hospitalization, the effect of Duodopa was investigated using a temporarily naso-jejunal tube. In this time the dose was adjusted to achieve optimal clinical response which means maximizing the "on" period of functional time during day.

Before PEG tube was inserted the written informed consent was obtained from all patients.

Antibiotic prophylaxis with a single dose of Cefort 2g intravenously administered was given to every patient (unless already on antibiotics) before doing this procedure, to prevent peristomal infection.

Results and Discussions

A PEG tube can be placed using either the pull through method (“pull” technique), the Seldinger technique (“push” technique) or by direct puncture. Literature data show that the pull method is the simplest and safest technique and has become the most commonly used in clinical practice. It was also used by our team and is presented in this article. This technique was first described by Gauderer in 1980 (2).

The 2 main classical indications for PEG technique are represented by establishing enteral access for feeding and gut decompression. But as you can see in this article there is another important indication: continuous enteral (duodenal or jejunal) infusion of levodopa/carbidopa gel via a portable

pump for treatment of Parkinson Disease. The infusion provides smooth plasma levodopa levels, more continuous dopaminergic stimulation and effective treatment of motor complications (3).

Absolute contraindications for PEG/J (4) are represented by: uncorrected coagulopathy or thrombocytopenia ($<50\ 000/\text{mm}^3$), severe ascites, hemodynamic instability, sepsis, intra-abdominal perforation with active peritonitis, abdominal wall infection at the selected site of placement, history of total gastrectomy, lack of informed consent for the procedure, respectively peritoneal carcinomatosis.

Relative contraindications (5) are represented by: presence of oropharyngeal or esophageal malignancy (potential risk of seeding of the PEG tract), hepatomegaly, splenomegaly, portal hypertension with gastric varices, history of prior abdominal or gastric surgeries (possible presence of adhesions and bowel interposition), ventral hernia, peritoneal dialysis, history of partial gastrectomy, severe psychosis or dementia, respectively clearly limited life expectancy.

Technique (6,7,8): The Gauderer-Ponsky technique which is executed under light general sedation with propofol for short term takes approximately 12 minutes and was done by us using the Freka® PEG Set Gastric FR 15 / 20 and Freka® Intestinal Tube FR 9 for PEG 15 / 20. One of the patients had a history of prior abdominal surgeries (classic cholecystectomy) and the intervention lasted longer (30 minutes) because of the presence of adhesions, but surgical maneuver was successful.

Disinfection of the skin over a round area around the puncture site was preceded by performing of a gastroscopy with inspection of the stomach and the duodenum checking for obstructions or other lesions. The stomach is insufflated with air to force the stomach wall against the abdominal wall and an optimal site for PEG placement is determined by simultaneously transilluminating the gastric/abdominal wall and indenting the abdominal wall with a finger while visualizing that indentation endoscopically. This step is of major importance to avoid possible complications such as puncturing the colon or liver. After marking the puncture site, the abdominal wall and peritoneum are anesthetized layer by layer by injection of 1% lidocaine until we can see the needle by endoscopy in the gastric lumen (9). A small incision is made and a trocar is inserted through the abdominal wall into the stomach, at a 90 degree angle with the abdominal wall. It should be ensured that the incision at the puncture site is sufficiently large (8 mm) so that the tube does not cause pressure-related lesions in the skin area with subsequent ischaemia. Next step is represented by insertion of the guide wire into the gastric cannula and grasping it with the endoscopic forceps, followed by pulling the wire through the mouth and a gastrostomy tube affixed to it.

Finally the guide wire is pulled back through the esophagus, stomach, and abdominal wall and held in place by the solid mushroom-type internal retention device (inner plate or flange) and an external bumper (outer plate or flange).

The jejunal extension tube of a PEG/J is placed immediately following PEG placement, during the same procedure: the jejunal tube is placed through the existing gastrostomy and is grasped endoscopically with a special forceps and carried into the jejunum; using the forceps, the jejunal tube is maintained in the jejunum (near Treitz angle) as the endoscope is withdrawn in the stomach, to prevent dislodgment of the jejunal tube; once the endoscope is in the stomach, the forceps is released and withdrawn in the endoscop working channel, so that the jejunal tube remains in position; the endoscop is exteriorised and the procedure is done.

The external fixation plate should be initially subjected to very low traction, without tension, overnight. It must thereafter be ensured that the tube has at least 2-3 mm of free movement when the Y-compress is inserted under the external fixation plate (10).

Connectors are coupled according to the instructions provided by Fresenius Kabi Set (fig 1) and the results showed good long-term treatment with Duodopa in the group of patients with advanced Parkinson's disease and, therefore, it is recommended.

Radiological confirmation if the distal intestinal tube is located beyond the Treitz ligament in distal duodenum or first jejunal loop.



Figure 1: Instruction for Using and Changing of the Connector. A- intestinal tube, B- Internal plate fixation, C- External fixation plate, D- PEG tube, E- Screw, F- "Y" Connector, G- Click Connector, H- Luer Lock Connector.

Complications – are classified as frequent, long-term and rare; the most important are as it follows:

- frequent complications: local wound infection (needs antiseptic measures and daily change of dressings under sterile conditions and, after taking a swab for microbiological examination, persistent local infections should additionally be treated by antibiotics), pneumoperitoneum (11), abdominal pain, leakage (due to displacement of the outer fixation plate of the PEG or to ageing of the tube material after a few years);
- long-term complications (dependent on the quality of aftercare given to the tubing system): occlusion of the tube (due to loop creation or to tube warping), tube porosity, fracture with subsequent leakage from the tube or the tube connection;

- rare complications: contact cancer at the puncture site due to the presence of occluding proximal tumours (12), buried bumper syndrome (removable in nearly all cases by endoscopic means using a needle knife sphincterotome) (13), hemorrhage in gastric cavity (needs clipping of damaged vessel with maintaining PEG/J in place) or in peritoneal cavity (needs immediate surgery and, if not associated with infection, maintaining of PEG/J on place), peritonitis (needs immediate surgery with quitting PEG/J for a minimum of 2 months).

Periodic evaluation of surgical and neurological point of view:

Initially at 24 hours when we did the external bumper relaxation, at 4-5 mm from the abdominal wall. Until granulation of the stoma canal has taken place (10 days) it is recommended to change the sterile dressing daily and provide local disinfection, then every 2-3 days. The wound area is inspected for: bleeding, erythema, secretion, induration, allergic skin reaction and afterwards is cleaned, disinfected and dried completely to prevent the wet chamber development. In order to avoid adhesions the tube should be pushed approximately 2–3 cm ventrally and carefully pulled back up to the resistance of the internal fixation plate. Then a Y-compress is applied under the tube and the external fixation plate is secured with free movement of at least 5mm and a sterile dressing is applied (10). Disinfectants such as povidone-iodine (Betadine) and dihydrochloride phenoxyethanol (Octanosept) should not be used, because it may have negative effects on physical / mechanical tube; we strongly recommend the use of medicine alcohol and clorhexidine.

Neurologically, all patients had a good evolution with an “on” period with slightly dyskinesias for about 14 hours per day and short “off” period which responded quickly to an extradose.

After discharge, the initial evaluation was made monthly and after that, at 3 months. At 18 months after therapy one patient experienced an aggravation of her symptoms. We suspected a failure of his pumping system and decided to do an endoscopy to verify the patency of his tubing system. Our surprise was when we visualised calcareous deposits on the whole system of tubes (fig. 2) that had to be replace.



Fig 2: Calcareous deposits on the intestinal tube



Fig 3: Internal bumper calcified



Fig 4: Calcareous deposits inside the tube

This is the first complication of this kind described with the Duodopa infusion technique. The patient told us that the water in the area where she lives is extremely tough, which is why we can see calcareous deposits on the internal bumper (fig.3) and inside the tube because of the daily wash with the same type of water (fig 4).

Conclusion

In patients with advanced Parkinson disease, levodopa/carbidopa formulated as a gel suspension (Duodopa) permits continuous delivery into the small intestine using a portable pump, resulting in less variability in levodopa concentrations and fewer motor fluctuations and dyskinesias than with oral levodopa administration (14). We observed a high level of acceptance by patients and a marked improvement in their quality of life.

REFERENCES

1. M. Pierantozzi, A. Pietroiusti, L. Brusa et al., "Helicobacter pylori eradication and L-dopa absorption in patients with PD and motor fluctuations," *Neurology*, vol. 66, no. 12, pp. 1824–1829, 2006.
2. Gauderer MW, Ponsky JL, Izant RJ Jr. Gastrostomy without laparotomy: a percutaneous endoscopic technique. *J Pediatr Surg*. Dec 1980; 15 (6):872-5
3. Nyholm D. Enteral levodopa/carbidopa gel infusion for the treatment of motor fluctuations and dyskinesias in advanced Parkinson's disease. *Expert Rev Neurother*. 2006; 6:1403–1411
4. American Society For Gastrointestinal Endoscopy. Role of PEG/PEJ in enteral feeding. *Gastrointest Endosc* 1998;48:699–701.
5. Grant JP. Percutaneous endoscopic gastrostomy. *Ann Surg*; 1993;217:168–74.
6. Gauderer MW. "Percutaneous endoscopic gastrostomy-20 years later: a historical perspective". 2001
7. Fan A, Baron T, Rumalla A, Harewood G. Comparison of direct percutaneous endoscopic jejunostomy and PEG with jejunal extension. *Gastrointest Endosc* 2002; 56
8. John C. Fang. "HOW I DO IT" Endoscopic placement of percutaneous feeding tubes
9. Ponsky JL. Transilluminating percutaneous endoscopic gastrostomy. *Endoscopy* 1998;30:656
10. Chr. Loser, G. Aschl, X. He'buterne, E.M.H. Mathus-Vliegen, M. Muscaritoli, Y. Niv, H. Rollins, P. Singer, R.H. Skelly. ESPEN guidelines on artificial enteral nutrition—Percutaneous endoscopic gastrostomy (PEG); *Clinical Nutrition* (2005) 24, 848–861

11. Dulabon GR, Abrams JE, Rutherford EJ. The incidence and significance of free air after percutaneous endoscopic gastrostomy. *Am Surg* 2002;68:590–3
12. Deinzer M, Menges M, Walter K, et al. Metastatic implantation of esophageal carcinoma at the exit site of percutaneous endoscopic gastrostomy. *Z Gastroenterol* 1999;37:789–93
13. Vu CK. Buried bumper syndrome: old problem, new tricks. *J Gastroenterol Hepatol* 2002;17:1125–8
14. Nyholm D, Lewander T, Johansson A, Lewitt PA, Lundqvist C. Enteral levodopa/carbidopa infusion in advanced Parkinson disease: long-term exposure. *Clin Neuropharmacol.* 2008;31:63–73.