The complications of jejunostomy tubes for patients receiving Duodopa: New challenges for neuroscience nurses

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Abstract:

The use of Duodopa ® Levodopa-Carbidopa intestinal gel offers patients with advanced Parkinson's disease (PD) an effective alternative therapy for the treatment of severe motor fluctuations and dyskinesia. This therapy requires the use of percutaneous endoscopic gastrostomy/ jejunostomy tube (PEG/J) to deliver gel directly into the jejunum which poses new challenges for neuroscience nurses for the care and management of patients with PD. Due to the reported number of complications associated with PEG/J our facility opted to use a direct jejunostomy tube for the first of two PD patients which resulted in an adverse outcome for our 80 year old patient. This experience highlighted that the neuroscience nurses need to increase knowledge and understanding of PEG/J and jejunostomy care as more future patients will be treated with Duodopa, and that future studies regarding the safety and value of the direct jejunostomy tubes are warranted.

Key Words: Parkinson's disease, percutaneous endoscopic gastrostomy/jejunostomy (PEG/J), Direct Endoscopic Jejunostomy (DEJ), Jejunostomy, Duodopa, complications

Background:

An 80 year old man with advanced Parkinson's disease (PD) was admitted to the neuroscience unit with a worsening decline in mobility. Medical management was the commencement and titration of the levodopa-carbidopa intestinal gel (LCIG) Duodopa ® via a naso-jejunal tube, which had been inserted under fluoroscopy in Interventional Radiology. Over a ten day trial period the patient responded well to the administration of the LCIG with much less periods of difficulty with movement (known as OFF times) although he did continue to experience periods of dyskinesia, some paranoid behaviours and notable episodes of 'punding' (repetitive non-purposeful movements). Following these promising results from the LCIG infusion, the patient consented to proceed to the insertion of a direct jejunostomy for permanent trans-jejunal intestinal infusion by a upper gastrointestinal surgeon. On day 2 post insertion of the jejunostomy tube the patient complained of nausea and vomiting and overnight he was transferred to the intensive care unit (ICU) with a suspected bowel obstruction and an aspiration pneumonia.

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Do the benefits of Duodopa eclipse the complications?

Duodopa ® has been increasingly accepted as an effective treatment for troublesome motor fluctuations and dyskinesia for patients with advanced Parkinson's Disease (Lang et al., 2016; Nyholm et al., 2008; Olanow et al., 2014).Oral administration of levodopa leads to variable plasma levels from erratic gastric emptying (Nyholm et al., 2008).The intraduodenal delivery of levodopa connected to a portable pump provides a relatively steady plasma level of levodopa (Chang et al. 2016).

The usual delivery of LCIG is via a percutaneous endoscopic gastrostomy/ jejunostomy tube (PEG/J). This system uses a percutaneous gastrostomy tube with fine bore jejunal extension, so that the gel can be directly infused into the jejunum where absorption of the medication will be optimized (Tsui, 2014). For the patients the neurologists opted for the insertion of a direct jejunostomy tube, with the placement of the tube directly into the small intestine for the administration of the gel. This decision was based on the reported complications associated with the PEG/J delivery system (Kimber & Shoeman (2014). It also highlighted the notion that persistence in focusing on the clinical benefits of Duodopa has the potential to eclipse the challenges and complications of introducing a new jejunostomy tube for patients with an already debilitating disease (Bianco et al., 2012).

Complications related to the use of the PEG/J tube:

Within the studies on the benefits of Duodopa are reports of tube/stoma complications. Nyholm et al (2008) reports the most common complication for the PEG/J tube was dislocation of the tube from the small intestine to the stomach. Another two studies noted that the main safety issue of the LCIG related to the infusion system with technical problems associated with kinking and blocking of the tube (Senek & Nyholm, 2014; Zibetti et al., 2014). Zibetti et al (2014) reported one duodenal perforation out of 59 patients, while Kimber & Shoeman (2014) report two gastric perforations out of 17 patients which required laparotomy to repair. Recurrent minor problems were tube malfunction and dislocation secondary to punding (Chang et al., 2016). A constantly dislodged tube requires repeated re-siting of the jejunal tube (Foltynie et al., 2013), which exposes patients to a return to the endoscopy suite and the increased risks of hospitalization and general anaesthesia (Kimber & Schoeman, 2014).

Complications are also related to infection around the stoma, (van Laar, Nyholm, & Nyman, 2016) with reports of excessive granulation tissue, incision site erythema, abdominal pain, peritonitis and pneumoperitoneum (Fernandez et al., 2015; Zibetti et al., 2014). Zibetti et al (2014) noted infection tended to occur within one month of the PEG/J procedure and were successfully treated with antibiotic therapy, however device complications were the contributing reason for discontinuation of the infusion for a proportion of patients.

A study of 85 patients undergoing Duodopa infusion was conducted regarding nutritional status and weight loss in patients and determined that those without tube complications had significant weight gain over a 6 month period (Galletti et al., 2011).

Major complications of PEG/J - Buried Bumper Syndrome:

Buried bumper syndrome (BBS) occurs when there is an overgrowth of the gastric mucosa over the inner bumper of the gastrostomy tube. Predisposing factors for BBS are tight fitting gastrostomy tubes, weight gain and no mobilization of the tube for the first month (Santos García et al., 2016). BBS was reported to have a higher incidence of occurrence in Freka PEG tubes (which is the preferred PEG/J tube for Duodopa), compared with a Corflo PG tube in one study (Dowman et al., 2015). Although another similar sized study claims a low incidence of BBS from Freka tubes published in October this year (Clarke & Lewis, 2016). Notably both studies examined the incidence of BBS in PEG/J tube that had been required for the purposes of enteral feeding and not for Duodopa administration.

Bezoars and Phytobezoars:

Bezoars are composed of undigested food material that has been orally ingested (Altintoprak et al., 2012) and are classified based on the type of material they contain. Phytobezoars are described as occurring in patients who consume high amounts of fibrous and long fibre foods such as asparagus or spinach that may be difficult to digest (Altintoprak et al. 2012). In a case of a 21 year old male who had received LCIG for 6 months a blockage of his tubing was discovered to be jejunal tube being knotted in the stomach around a bezoar (Negreanu et al., 2010).

A 70 year old man presented with abrupt motor deterioration from tube obstruction from a bezoar. He was treated with a liquid diet and the use of Coca-Cola ® over four days until the bezoar was successfully dissolved (Stathis, Tzias, Argyris, Barla, & Maltezou, 2014).
In another case it was reported that a phytobezoar entrapped the tip of a 71 year old male patient's jejunal tube and resulted in a jejunal wall perforation and fistulisation of 3 intestinal loops. Unfortunately the patient was reported to have died post-operatively following repair of the fistula (Vuolo et al., 2012). Given the non-motor symptoms of Parkinson's disease that include poor gut motility and constipation (Fasano, Visanji, Liu, Lang, & Pfeiffer, 2015) it would seem that the risk of bezoars would be higher when coupled with reduced gastrointestinal motility caused by the PEG/J.

A long term PEG/J study determined that the procedural outcomes and adverse rates in patients treated using the PEG-J drug delivery system were acceptable, and that benefits of the therapy outweighed these complications (Epstein et al., 2016). Kimber & Shoeman (2104) felt that the high number of PEG/J complications was justification to introduce the use of the DEJ tube.

Small bowel obstruction secondary to Jejunostomy tube:

An abdominal CT scan reported that our 80 year old patient had a jejunal obstruction due

to kinking at the level of the jejunostomyballoon; a distended stomach and fluid filled oesophagus, with consolidation in the lung bases secondary to aspiration. The balloon of the jejunal tube was deflated and a Salem sump nasogastric tube was inserted. Blood cultures returned an Enterobacter bacteraemia which was treated with IV antibiotics. He was given a beta-blocker for a new onset of atrial fibrillation secondary to his aspiration pneumonia and returned to the ward after 3 days in ICU. Once on the ward a new jejunostomy tube was inserted under fluoroscopy and sutured into place, following dislodgement of the first Jejunostomy without the ballon inflated for securement of the tube. He was restarted on the LCIG again with good motor results, less punding and no further hallucinations or paranoia. Two days after insertion of the second Jejunostomy tube, oozing around the tube necessitated review by the Stoma Clinical Nurse Consultant and the placement of an ileostomy bag. He was eventually discharged to a rehabilitation hospital and eighteen months later the patient reports fluctuations in the amount of ooze/ leaks around the stoma site, which is temporarily alleviated with reductions in faecal loading through the use of regular aperients.

PEG, PEG/J and Jejunostomy tubes:

The nurses on the neurological ward are familiar with percutaneous endoscopic jejunostomy (PEG) tubes which are used routinely for enteral nutrition for patients at high risk of aspiration typically following stroke or traumatic brain injury. PEG/J feeding tubes are rarely used on our ward, but were reported to be developed for jejunal feeding to reduce gastroesophageal reflux occurring in PEG feeding. These tubes presented new challenges with PEG/J malfunction due to clogging and proximal migration of the extension tube back into the stomach (Panagiotakis, DiSario, Hilden, Ogara, & Fang, 2008), which was also noted in the studies for Duodopa. The same authors studied the benefit of a direct percutaneous endoscopic jejunostomy tube (DPEJ) to PEG/J and determined in a retrospective study of 75 patients a decrease in the overall incidence of aspiration pneumonia.

A search of the hospital's protocol on PEG and jejunostomy tube returned guidelines for the role in enteral nutrition only with limited information for the care of a direct Jejunostomy for the sole purpose of medication administration. A search on CINAHL to compare rates of complications between DEJ to PEG/J retrieved only one retrospective study of 560 patients where the tubes were used for the purposes of enteral feeding indicated in patients with GIT / Head and Neck cancers, Stroke and other neurologic conditions which were not specifically identified (Ao, Sebastianski, Selvarajah, & Gramlich, 2015). Ao et al. (2015) concluded that there was a higher risk of tube related complications, particularly the requirement of tube replacement in the patients with the DEJ tubes (48.4%) than that of the PEG group (21.5%). To date the only other study which directly compares the two devices is a small study of 17 patients for Duodopa ® infusion where the authors advocated DEJ as a feasible alternative to the PEG/J tubes. This study reported a lower incidence in tube malfunction when comparing 8 patients undergoing PEG/J to 9 patients who received DEJ devices (Kimber & Schoeman, 2014).

Conclusion:

The administration of the LCIG has provided patients with advanced Parkinson's disease with great benefits in motor fluctuations and dyskinesia. The delivery of the intestinal gel requires an invasive PEG/J tube which brings a new set of challenges for these patients and the nurses caring for them. There is a lack of compelling evidence to support the introduction of the direct Jejunostomy tube having greater benefits, as opposed to the PEG/J. Further future studies are warranted not only to compare the safety and the rates of complications between the two devices, but also to increase knowledge and develop sound protocols for patients/families and nursing staff when using the direct Jejunostomy device to reduce complications and adverse outcomes.

References:

Altintoprak, F., Dikicier, E., Deveci, U., Cakmak, G., Yalkin, O., Yucel, M., . . . Dilek, O. (2012). Intestinal obstruction due to bezoars: a retrospective clinical study. European Journal of Trauma & Emergency Surgery, 38(5), 569-575. doi:10.1007/s00068-012-0203-0

Ao, P., Sebastianski, M., Selvarajah, V., & Gramlich, L. (2015). Comparison of Complication Rates, Types, and Average Tube Patency Between Jejunostomy Tubes and Percutaneous Gastrostomy Tubes in a Regional Home Enteral Nutrition Support Program. Nutrition in Clinical Practice, 30(3), 393.

Bianco, G., Vuolo, G., Ulivelli, M., Bartalini, S., Chieca, R., Rossi, A., & Rossi, S. (2012). A clinically silent, but severe, duodenal complication of duodopa infusion. Journal of Neurology, Neurosurgery & Psychiatry, 83(6), 668-670.

Chang, F. C. F., Kwan, V., van der Poorten, D., Mahant, N., Wolfe, N., Ha, A. D., . . . Fung, V. S. C. (2016). Clinical Study: Intraduodenal levodopa-carbidopa intestinal gel infusion improves both motor perfor-

mance and quality of life in advanced Parkinson's disease. Journal of Clinical Neuroscience, 25, 41-45. doi:10.1016/j.jocn.2015.05.059

Clarke, E., & Lewis, S. (2016). Low incidence of complications with Freka PEG tubes. Frontline Gastroenterology, 7(4), 332.

Dowman, J. K., Ditchburn, L., Chapman, W., Lidder, P., Wootton, N., Ryan, N., & Cooney, R. M. (2015). Observed high incidence of buried bumper syndrome associated with Freka PEG tubes. Frontline Gastroenterology, 6(3), 194.

Epstein, M., Johnson, D. A., Hawes, R., Schmulewitz, N., Vanagunas, A. D., Gossen, E. R., . . . Benesh, J. (2016). Long-Term PEG-J Tube Safety in Patients With Advanced Parkinson's Disease. Clinical And Translational Gastroenterology, 7, e159-e159. doi:10.1038/ctg.2016.19

Fasano, A., Visanji, N. P., Liu, L. W. C., Lang, A. E., & Pfeiffer, R. F. (2015). Review: Gastrointestinal dysfunction in Parkinson's disease. The Lancet Neurology, 14, 625-639. doi:10.1016/S1474-00007-1

Fernandez, H. H., Standaert, D. G., Hauser, R. A., Lang, A. E., Fung, V. S. C., Klostermann, F., . . . Espay, A. J. (2015). Levodopa-carbidopa intestinal gel in advanced Parkinson's disease: Final 12-month, open-label results. Movement Disorders, 30 (4), 500.

Foltynie, T., Limousin, P., Magee, C., James, C., Webster, G. J. M., & Lees, A. J. (2013). Impact of duodopa on quality of life in advanced parkinson's disease: A UK case series. Parkinson's Disease. doi:10.1155/2013/362908

Galletti, R., Sabet, D., Segre, O., Aimasso, U., Finocchiaro, E., Fadda, M., . . . Lopiano, L. (2011). Nutritional assessment in patients with Parkinson's disease treated with duodenal infusion of L-dopa (preliminary data). Nutritional Therapy & Metabolism, 29(1), 47-50.

Kimber, T. E., & Schoeman, M. (2014). Direct endoscopic jejunosotomy for the administration of levodopa-carbidopa intestinal gel in Parkinson's disease. Parkinsonism & Related Disorders, 20(7), 786-788. doi:10.1016/j.parkreldis.2014.03.015

Lang, A. E., Fasano, A., Rodriguez, R. L., Draganov, P. V., Boyd, J. T., Chouinard, S., . . . Dubow, J. (2016). Integrated safety of levodopa-carbidopa intestinal gel from prospective clinical trials. Movement Disorders, 31(4), 538-546. doi:10.1002/mds.26485

Negreanu, M. L., Popescu, B. O., Babiuc, R. D., Ene, A., Andronescu, D., & Băjenaru, R. D. (2010). Cutting the Gordian knot: the blockage of the jejunal tube, a rare complication of Duodopa infusion treatment. Journal of Medicine and Life, 3(2), 191-192.

Nyholm, D., Johansson, A., Aquilonius, S. M., Lewander, T., LeWitt, P. A., & Lundqvist, C. (2008). Enteral levodopa/carbidopa infusion in advanced Parkinson disease: Long-term exposure. Clinical Neuropharmacology, 31(2), 63-73. doi:10.1097/WNF.0b013e3180ed449f

Olanow, C. W., Kieburtz, K., Odin, P., Espay, A. J., Standaert, D. G., Fernandez, H. H., . . . Antonini, A. (2014). Articles: Continuous intrajejunal infusion of levodopa-carbidopa intestinal gel for patients with advanced Parkinson's disease: a randomised, controlled, double-blind, double-dummy study. Lancet Neurology, 13, 141-149. doi:10.1016/S1474-4422(13)70293-X

Panagiotakis, P. H., DiSario, J. A., Hilden, K., Ogara, M., & Fang, J. C. (2008). DPEJ Tube Placement Prevents Aspiration Pneumonia in High-Risk Patients. Nutrition in Clinical Practice, 23(2), 172.

Santos García, D., Martínez Castrillo, J. C., Puente Périz, V., Seoane Urgorri, A., Fernández Díez, S., Benita León, V., . . . Mariscal Pérez, N. (2016). Clinical management of patients with advanced Parkinson's disease treated with continuous intestinal infusion of levodopa/carbidopa. Neurodegenerative Disease Management, 6(3), 187.

Senek, M., & Nyholm, D. (2014). Continuous Drug Delivery in Parkinson's Disease. CNS Drugs, 28(1), 19-27.

Stathis, P., Tzias, V., Argyris, P., Barla, G., & Maltezou, M. (2014). Gastric bezoar complication of Duodopa® therapy in Parkinson's disease, treated with Coca□Cola®. Movement Disorders, 29(8), 1087-1088. doi:10.1002/mds.25930

Tsui, D. S.-Y. (2014). The Tomorrow: Advanced Treatments in Parkinson's Disease Does Not Necessarily Equate to Treatments in Advanced Parkinson's Disease. Australasian Journal of Neuroscience, 24 (2), 34.

van Laar, T., Nyholm, D., & Nyman, R. (2016). Transcutaneous port for levodopa/carbidopa intestinal gel administration in Parkinson's disease. Acta Neurologica Scandinavica, 133(3), 208-215. doi:10.1111/ane.12464

Vuolo, G., Gaggelli, I., Tirone, A., Varrone, F., Rennenkappf, S., Chieca, R., . . . Di Cosmo, L. (2012). Fistulization and bowel perforation by J-PEG in a parkinsonian patient treated with continuous infusion of DuodopaÂ®. Nutritional Therapy & Metabolism, 30 (2), 95-97.

Zibetti, M., Merola, A., Artusi, C. A., Rizzi, L., Angrisano, S., Reggio, D., . . . Lopiano, L. (2014). Levodopa/carbidopa intestinal gel infusion in advanced Parkinson's disease: a 7-year experience. European Journal of Neurology, 21(2), 312.