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Mini Review

*Corresponding author
Angelo Zelante, MD
Digestive Endoscopy Unit
Department of Medicine
University Hospital "S. Anna"
Via A. Moro 8, 44124 Cona (FE)
Italy
Tel. +39-532-237558
Fax: +39-532-236932
E-mail: zelans@libero.it

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Percutaneous Endoscopic Gastrostomy: Use and Abuse in Clinical Practice

Angelo Zelante*, Sergio Sartori and Lucio Trevisani

Digestive Endoscopy Unit, Department of Medicine, University Hospital "S. Anna", 44124 Cona (FE), Italy

ABSTRACT

Nowadays, Percutaneous Endoscopic Gastrostomy (PEG) is considered the method of choice for long-term enteral feeding, and is spreading all over the world because of its effectiveness and easy carrying out. This review encompasses indications and contraindications of PEG tube placement, and deals with the problem of the growing disconnect between scientific evidence and clinical practice. Despite the evidence shows an advantage in the outcome from PEG placement only in selected subgroups of patients, this technique is also used for questionable indications in clinical practice, such as advanced dementia, permanent vegetative state, and even in end-life patients. Such an overuse is indirectly confirmed by several studies reporting a high 30-day mortality rate after PEG placement in elderly patients. The decision of placing PEG in end-stage patients involves very complex ethical issues, and the authors of this review are not so pretentious as to think themselves capable of dealing with and solving such a dramatic issue. However, patients' interests should be better protected by a case-by-case decision making, based not only on technical competence, but also on sympathetic awareness, avoiding to perform procedures that can be disadvantageous for the patients.

KEYWORDS: Percutaneous Endoscopic Gastrostomy (PEG); Indications; Contraindications; Clinical practice; Ethical Issues.

ABBREVIATIONS: PEG: Percutaneous Endoscopic Gastrostomy; ESPEN: European Society for Clinical Nutrition and Metabolism; LCIG: Levodopa-carbidopa intestinal gel; PEG-J: PEGs with jejunal extension.

INTRODUCTION

Malnutrition is a common problem that affects up to 40% of hospitalized patients, increasing their morbidity and mortality. The problem of malnutrition is often not recognized, and patients can often remain malnourished throughout their hospital stay.[1]

The guidelines of the European Society for Clinical Nutrition and Metabolism (ESPEN) underline that frail and dysphagic patients benefit by adequate nutritional support, that can reduce the complications after bone fractures, prevent and help to heal pressure ulcers, and prolong survival.[2] Nowadays, Percutaneous Endoscopic Gastrostomy (PEG) is considered the method of choice for long term feeding when nutritional intake is likely to be inadequate for more than four to six weeks. Indeed, nutritional support by PEG can stop the decline in quality of life caused by insufficient nutritional intake.[2,3]

The first PEG was performed in a pediatric patient in 1979, and the first paper was published in 1980,[4] generating great interest. Many efforts were done to improve some technical aspects, and the "push" and "introducer" endoscopic techniques were suggested as more effective alternatives to the original "pull" technique.[5,6] Moreover, non-endoscopic, radiologically-controlled techniques were also proposed.[7] In the last two decades, the number of PEG procedures has exponentially increased worldwide.[8]

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INDICATIONS AND CONTRAINDICATIONS

Indications

PEG tube placement has two main classic indications: feeding access and gut decompression.[9] Moreover, an increasing number of PEGs with jejunal extension (PEG-J) have recently been placed in patients with advanced Parkinson's disease, to enable the intra-jejunal infusion of Levodopa-carbidopa intestinal gel (LCIG). The LCIG infusion was developed to overcome the limitations of oral levodopa-carbidopa treatment. The LCIG system (Duodopa®) consists of a suspension of levodopa-carbidopa monohydrate in an aqueous gel that is continuously delivered *via* a portable infusion pump to the proximal small intestine through a PEG-J.[10]

Table 1 reports the main conditions for which adult patients are commonly referred for insertion of a PEG, even if PEG tube placement may also be useful in the setting of severe bowel motility disorders.[11] However, PEG are increasingly requested and inserted for indications with uncertain long term outcomes.

ENTERAL NUTRITION
Neurological dysfunctions
• *Cerebral vascular accident*
• *Motor neurone disease*
• *Multiple sclerosis*
• *Parkinson's disease*
• *Dementia*
Brain trauma
Oncological indications
• *Head and neck cancer*
• *Esophageal tumours*
• *Sequelae after radiation therapy or surgery*
Intensive care patients
Miscellaneous
• *Cachexia*
• *Burns*
• *Fistula*
GUT DECOMPRESSION
Advanced malignancies causing chronic intestinal obstruction/ileus
DRUGS ADMINISTRATION (PEG-J)
Advanced Parkinson's disease

Table 1: Main indications for PEG placement in adult subjects.

Contraindications

Besides the general contraindications to upper gastrointestinal endoscopy, absolute contraindications to PEG tubes placement are few: the most common is the severe coagulophaty, whereas infrequent contraindications are the portal hypertension with gastric varices, peritonitis, sepsis, digestive tract ischemia and gastric cancer. Some authors consider the impossibility of obtaining transillumination an absolute contraindication,[12] but high success rates of PEG placement have been reported even without transillumination.[13]

Relative contraindications include recent gastrointestinal bleeding, severe hepatomegaly or splenomegaly, moderate or severe ascites, presence of prior abdominal surgery (especially procedures involving the stomach) and morbid obesity. Furthermore, recent myocardial infarction, hemodynamic instability and respiratory distress are obvious systemic contraindications to PEG placement.[12,14]

A GROWING DISCONNECT BETWEEN EVIDENCE AND PRACTICE

Since its introduction in the eighteens, PEG tube placement has become the preferred way for those patients requiring long-term nutrition, who have functionally normal gastrointestinal tract but who cannot meet their nutritional needs because of inadequate oral intake. In the last years, the number of patients with PEG is exponentially increasing,[15] but the beneficial effects of PEG feeding on morbidity and mortality have been described only in certain subgroups of patients. For instance, randomized studies in patients after stroke who received PEG feeding have shown improved nutritional outcomes, higher survival, and earlier discharge.[16] However, in 2012 a Cochrane systematic review on the interventions for dysphagia and nutritional support in acute and subacute stroke, did not show any difference between PEG and nasogastric tube feeding for case fatality or composite outcome of death or dependency, even though PEG was associated with fewer treatment failures and gastrointestinal bleeding, and higher feed delivery and albumin concentration.[17]

Several clinical studies have also shown clear benefits of PEG feeding in patients with head and neck cancer, either in terms of improving nutritional status, or less discomfort and lower rates of complications such as bleeding, blockage and dislodgment of the tube.[18,19]

In patients with motor neuron disease, PEG is usually placed to maintain adequate nutrition when the patients have difficult chewing and swallowing. However, a recent Cochrane Database Systematic Review observed that there are no randomized controlled trials to indicate whether enteral tube feeding is beneficial compared to continuation of oral feeding, with regards to survival, maintenance of adequate nutrition, and quality of life, although non-randomized evidence suggested a benefit from enteral feeding.[20]

The most relevant disconnect between literature evidence and clinical practice has been observed in elderly patients with advanced cognitive impairment. Swallowing impairments are known to increase with age. Estimates of the prevalence of dysphagia in older adults range from 15% of those living in the community[21] to 40-60% of those living in a care home.[22] Placement of PEG tube is increasingly being advocated in these patients to provide nutrition, hydration, and to administer medications with the long-term goal of improving quality of life and life span.

In a recent retrospective analysis, Mendiratta, et al. reported that in the USA. PEG tube use in hospitalized elderly patients increased significantly, and PEG placement in patients

with Alzheimer's dementia doubled (5%-10%) over a 10-year period.[23] These data are in keeping with those reported by other authors, who observed a high prevalence (18%-34%) of PEG tube use among US nursing home residents with advanced cognitive impairment, and about one third of them were patients with dementia.[24-27] Such a habit is not limited to the USA, being observed in many other countries, even though with different percentages.[28]

However, despite the widespread use, benefits associated with PEG placement in patients with dementia or advanced cognitive impairment remain quite questionable. There are few studies examining PEG insertion and outcome, and there is a particular dearth of studies using randomized controlled trials to examine outcomes. PEG placement has been associated with futile procedures and significant mortality and morbidity.[29] Although large prospective studies have examined outcomes of PEG feeding in patients with dementia, a Cochrane review showed no evidence of increased survival, reduced pressure ulcers, or improved quality of life, nutritional status, function, behaviour, or psychiatric symptoms of dementia in patients with advanced dementia who were fed using gastrostomy tubes.[30] Moreover, some studies reported a high 30-day mortality rate (22%) after PEG placement in elderly patients,[31] and a 30% mortality rate during hospital stay in inpatients undergoing PEG.[32] For these reasons, many authors claim that PEG is not indicated in severe dementia,[30] and should be cautiously pondered in patients older than eighty years with moderate dementia.[31]

ETHICAL ISSUES

The use of artificial nutrition and hydration, especially by PEG, resulted in media attention also as a consequence of some emblematic cases that modified the way of thinking of the public opinion.

Nutrition and hydration are intuitively and instinctively linked to the concept of the life itself. It follows that physicians run the risk of deciding to place a PEG on the basis of their own opinion about the significance of the end-life time.[33] Patients are usually considered terminal by many societies of palliative care when their life expectancy is below six months. However, the decision of placing a PEG involves different ethical considerations in presence of different morbidities, such as cancer, amyotrophic lateral sclerosis, dementias, Alzheimer's disease and so on.[34] For instance, artificial nutrition does not prolong survival in patient with advanced cancer. However, PEG is a relatively simple and safe way to administer artificial nutrition at home, and could not be considered as a therapeutic obstinacy but, on the contrary, as an opportunity to offer a more acceptable quality of life to patients with short life expectancy.

The ethical issue of PEG in the last six months of life must be distinguished from the ethical issue of the long-term artificial nutrition in patients with neurological disorders that can strongly compromise either the quality or the dignity of life. However, different cultures may have a different concept of dignity of life, which may also vary from person to person.

Before seventies, most patients with advanced dementia refusing nutrition died of starvation. Afterwards, enteral nutrition became increasingly used, and to date most patients with end-stage dementia undergo artificial nutrition by nasogastric tube or PEG.

Indeed, religious beliefs play a key role in such an increasing request of enteral nutrition,[35] and the presence of a home care nursing can extend the request of PEG placement, to make easier the management of enteral nutrition. When PEG is not placed, patients usually undergo parenteral support or long-term enteral nutrition *via* nasogastric tube. Therefore, both medical and ethical issues are not represented by the dichotomy PEG or no nutrition, but by the comparison between PEG and parenteral nutrition, or between PEG and enteral nutrition *via* nasogastric tube, which is uncomfortable and less safe than PEG, but has some advantage such as the easier and scarcely invasive positioning, usually not requiring a written informed consent.[36,37]

Finally, PEG placement in patients with permanent vegetative state involves ethical issues so complex and deep that overcome the mere technical aspects of PEG placement, and the authors of this paper are not so pretentious as to think themselves capable of dealing with and solving such a dramatic issue.

CONCLUSIONS

Placement of a percutaneous endoscopic gastrostomy feeding tube has become a common medical intervention instituted to maintain or improve a patients' nutritional status. After its introduction in clinical practice in 1980, the use of PEG has exponentially increased because of its easy carrying out, low complication rate, and long-term cheapness. However, these characteristics have also prompted to its overutilization, according to what claimed by Gauderer, one of the two inventors of PEG.[38] In fact, improved nutritional status and survival have been demonstrated only in selected subgroups of patients, whereas the use of PEG tubes in advanced dementia did not show any benefit with regards to outcomes and survival. Since the advanced cognitive impairment and permanent vegetative state are growing indications to PEG placement, this technique is often used inappropriately, because of unrealistic and inaccurate expectations of what it can achieve.

Based on this evidence it could be worthwhile to explain to the family that it is inappropriate and useless place the PEG in terminally ill patients.

We agree with Brody, et al. who stated "we seem to have forgotten the difference between people who die because they stop taking in food and water, and people who stop taking in food and water because of the natural dying process".[39]

In conclusion, we believe that patients' interests should be better protected by a case-by-case decision making, based not only on technical competence, but also on sympathetic awareness.

CONFLICTS OF INTEREST

The authors whose names are listed immediately below certify that they have NO affiliations with or involvement in any organization or entity with any financial interest (such as honoraria; educational grants; participation in speakers' bureaus; membership, employment, consultancies, stock ownership, or other equity interest; and expert testimony or patent-licensing arrangements), or non-financial interest (such as personal or professional relationships, affiliations, knowledge or beliefs) in the subject matter or materials discussed in this manuscript.

Author names: Angelo Zelante**,** Sergio Sartori and Lucio Trevisani

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