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Is short-term PEG-tube placement beneficial in acutely ill cognitively intact elderly patients? A proposed decision making algorithm

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Abstract

Aim—Percutaneous Endoscopic Gastrostomy (PEG) tube is an important method of enteral feeding for patients who require temporary or long-term artificial nutritional support to prevent or correct disease-related malnutrition. However, there is paucity of data on the utility of short-term PEG tube placements in acute illnesses in cognitively intact elderly.

Methods—We present a series of seven, cognitively intact patients (age range = 72 to 93 years), who had PEG tubes placed for short periods. These patients were diagnosed with “failure to thrive” and were managed by placing a PEG tube temporarily for nutritional management. None of these patients had terminal illness or hospice eligibility and all of our patients were community dwellers.

Results—All our elderly patients experienced good outcomes in terms of their functional status and nutritional support.

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Conclusions—Our series clearly supports the notion that short-term PEG tube placement in cognitively-intact elderly patients could be a successful strategy to support them during an episode of acute illness and to improve their nutritional deficits and survival.

Keywords

Short-term; PEG tube; Elderly

INTRODUCTION

Percutaneous Endoscopic Gastrostomy (PEG) tube placement, to deliver nutritional support to patients who are unable to maintain adequate nutrition orally, is a common practice (1). Rates of PEG tube placement have risen, especially in the age group 75 years and older (2). In a recent retrospective study by Mendiratta et al, PEG tube placement was noted to have increased by 38% in elderly patients (age group ≥ 65 years) and incidence of PEG tube placement doubled from 5% to 10% during the study period (1993 to 2003) among patients with Alzheimer's dementia (3). Short-term advantages of PEG tube placement include provision of nutrition, hydration, and administration of medications. The main perceived benefit of PEG tube placement has been longer survival (4, 5).

The current notion among some clinicians is that PEG tube placement may not be beneficial in the very elderly and might even be futile or harmful. Studies suggest that PEG tubes may not prolong life in a declining patient. However this notion may not be completely true if certain criteria for the procedure are used.

MATERIALS and METHODS

This study was conducted at University of Arkansas for Medical Sciences/Reynolds Institute on Ageing. Seven consecutive elderly patients who underwent short-term PEG tube placement were included in this series.

RESULTS

Our series summarizes the outcomes of short-term PEG tube placement in cognitively intact, elderly patients, including some in their nineties.

Case 1

92 year-old woman, with a history of severe reflux stricture requiring multiple esophageal dilations, presented with weight loss and anorexia (Table 1). She was investigated extensively with liver function tests (LFT), Vitamin D level, complete blood count (CBC), thyroid function tests (TFT), C-reactive protein (CRP) and basic metabolic panel (BMP), all of which were unremarkable. She had lost about 12 kgs (26 pounds) in 10 months, with consequent decline in her functional status but was cognitively intact. Her pre-albumin (8.5 mg/dL) and albumin (3.0 g/dL) were extremely low. She was admitted for 'failure to thrive' (FTT) and a swallow study showed luminal narrowing of distal esophagus and chronic aspiration. In the hospital a PEG tube was placed which was used exclusively for several months. She had subsequent speech/swallow follow-ups. Her weight increased over the next

1 year and BMI increased from 17.3 to 21.3 (Figure 1A) and her diet was gradually advanced to a regular diet, at which point her PEG tube was removed and she improved functionally and was able to carry out her instrumental activities of daily living (IADL) and activities of daily living (ADLs). The only PEG related complication was superficial erosion at the PEG tube site, which improved with topical treatment.

Case 2

93 year old man with history of diabetes and severe ischemic cardiomyopathy (EF<30%) presented with anorexia, nausea and 7 kgs (15 lbs) weight loss over few months. His weight fluctuated because of his poorly controlled CHF and he was admitted on many occasions for weight gain and diuresis. He had significantly elevated level of Interleukin-6 (22.1 pg/mL), which is a marker for cardiac cachexia and very low pre-albumin (6.5 mg/dL) and albumin (2.9 g/dL). A PEG tube was placed for malnutrition and cardiac cachexia (Table 1). His IL-6 levels and pre-albumin levels were monitored every month and pre-albumin gradually improved to 16.6 mg/dL over 9 months. His BNP also improved from 856 to 206 pg/mL, and BMI increased from 22.9 to 24.1 at six-months after PEG tube placement (Figure 1A). His PEG tube was subsequently removed in one year after his weight stabilized. The patient did not develop any PEG tube related complications. This patient was also cognitively intact and remained independent with his ADL's and IADL's. He went back to his previous functional level once his nutritional status improved.

Case 3

86 year old woman with history of peptic ulcer disease, recurrent *Clostridium difficile* infections, right total knee arthroplasty, and chronic pain presented for "failure to thrive" with a 9 kgs (20 lbs) weight loss over a couple of months, along with abdominal discomfort and diarrhea. She was evaluated with LFTs, CBC, BMP and TFT, all of which were unremarkable. She underwent esophagogastroduodenoscopy (EGD) which was not significant for any lesion, however, her symptoms persisted. Her weight decreased further from 56 kgs (123 lbs) to 51 kgs (113 lbs) (Figure 1B), and she became completely dependent for her IADLs, required assistance in her ADLs and became wheelchair bound. She was started on megestrol acetate briefly, with no improvement, and after detailed discussions with patient and family, a PEG tube was placed. She started gaining weight gradually and also increased her oral intake. Her PEG tube use decreased and her weight increased to 55 kgs (121 lbs) over three months (Figure 1A). Six months later the patient's functional capacity improved; she started doing her own household work and her use of assistive devices for ambulation decreased and the PEG tube was then removed. She had no complications related to PEG tube and did well subsequently in terms of returning back to her baseline and being independent with her ADLs and IADLs.

Case 4

88 year old cognitively intact man with history of hypertension and prostate cancer, status post androgen ablation, was admitted with diagnosis of pneumonia. During the course of his hospitalization, he developed difficulty swallowing. A dobhoff tube was placed initially, upper endoscopy was normal and subsequently a PEG tube was placed prior to hospital discharge to prevent malnutrition. His albumin and pre-albumin were slightly low at 3.7

g/dL and 20 mg/dL respectively. The feeding tube was removed after 4 months when the patient reported good caloric intake without problems. The patient was subsequently followed for 9-10 months post PEG tube removal and his oral intake continued to be good, his weight remained stable at 91 kgs (200 lbs), with BMI of 24.7 (improved from pre-PEG BMI of 23.8) (Figure 1A).

Case 5

72 year old woman with history of coronary artery disease status post bypass surgery, and had difficulty swallowing due to squamous cell cancer of tonsils. She received chemotherapy and radiation but failed to maintain her weight with consuming high protein diet with whey protein and egg whites. She lost weight further from 60 kgs (132 lbs) to 57 kgs (125 lbs) and her BMI decreased to 17.4. At that point a PEG tube was placed to supplement her oral nutrition. Post PEG tube placement she was able to maintain her weight at around 58-59 kgs (129-131 lbs) and her BMI increased to 18.7-19 (Figure 1A). The only complications that she had were PEG tube dislodgment necessitating several G-tube replacements during her course.

Case 6

81 year old man with history of Parkinson's disease, chronic bronchitis and reflux presented to clinic with loss of appetite and weight loss of 18 kgs (40 lbs) in one year. He weighed 58 kgs (127 lbs) on examination, with a BMI of 17.5. His albumin was 3.5 g/dL, but all other labs including CBC, BMP, LFT, CRP and TFT were normal and imaging including CT abdomen/pelvis was negative. After organic causes of weight loss were ruled out, he was started on mirtazapine for anorexia, along with boost and protein supplements for FTT, however, continued to lose weight (to BMI 16.5) and his albumin dropped to 2.6 g/dL and pre-albumin was 17.1 mg/dL. About 9 months later he was admitted to hospital for community acquired pneumonia and complained of dysphagia. He was evaluated by speech therapy with fiberoptic endoscopic examination of swallowing (FEES) and video fluoroscopy, which showed aspiration of thin and nectar thick liquids, and hence PEG tube was placed for nutritional supplementation. Over the next 5 months, his oral intake improved, tube feeds were gradually weaned down and subsequently PEG tube was removed without any complications. His weights post-PEG tube placement ranged between 57-59 kgs (125-129 lbs) and BMI 17.4 to 18 (Figure 1A).

Case 7

89 year old woman with history of dysphagia, hypertension, who had been living independently, was admitted to the hospital for low back pain and FTT. Her spinal MRI showed L3 vertebral compression fracture and underwent vertebroplasty. During her hospital stay she had persistent nausea, vomiting and could not tolerate oral intake. Her blood work was significant for mild anemia, azotemia and high creatinine of 1.3 mg/dL, but otherwise unremarkable. A dobhoff tube was placed temporarily for nutrition, but she continued to have nausea. CT of the abdomen ruled out bowel obstruction. She was started on total parenteral nutrition (TPN) briefly for 5 days and then a PEG tube was placed. After PEG tube placement her appetite gradually improved and she gained in weight and strength steadily. The PEG tube was removed after one month at the patient's request, without any

complications. She was followed up in clinic and her weights improved progressively from 53 to 59 kgs (117 to 130 lbs) over next 3 years and BMI increased from 23.6 to 26.3 (Figure 1A).

Table 1 compares the demographic profile of our seven patients (age range = 72-93 years; 4F:3M). All our patients were community dwellers. The body mass indices (BMI's) of these seven patients pre-PEG tube and post-PEG tube placement are depicted in a histogram (Figure 1A). The percentage change in weights from baseline both pre-PEG tube and post-PEG tube placement are presented in a bar graph in Figure 1B.

DISCUSSION

Our cases clearly demonstrate that short-term PEG tube placement in cognitively intact elderly patients may be a successful strategy to support them during an episode of acute illness, and to improve their nutritional and functional status, as well as to prolong their survival. These patients were frail and rapidly declining and any delay in PEG tube placement would have likely resulted in irreversible morbidity and in some cases, even premature death.

Percutaneous endoscopic gastrostomy (PEG) tube is the preferred route for enteral feeding when the duration of treatment is expected to last longer than a few days. It is proven to be associated with less complications and better nutritional outcomes than naso-gastric tube feeding (6). Common indications for PEG tube placement include swallowing difficulties caused by stroke, dementia, Parkinson's disease, cancer or neurodegenerative diseases like amyotrophic lateral sclerosis (3,7,8,9,10). Short-term advantages of PEG tube include provision of nutrition, hydration, administration of medications, prolonged survival with improved quality of life (1,4,5). However, PEG tube placement is not entirely risk-free. In a study by Attansasio *et al* in dementia and stroke patients, the rates of aspiration were 15.5% for patients on nasogastric feeds and 7.9% in patients on PEG feeds; and tube dislodgment was seen in 62.2% patients (11). Dehydration is another complication related to PEG tube feeding, which is likely due to inadequate free water administration through the tube flushes. Less common complications include esophageal perforation, tube migration, bleeding, wound infection, constipation and clogging of the PEG tubes (11,12). Approximately one-third of tube-fed elderly patients may occasionally experience transient gastrointestinal adverse effects like vomiting and diarrhea (13).

Previous research has suggested that feeding tubes do not prolong survival (4,5,14,15). However, most of these studies were limited to a single institution (12,16-19) or arrived at this conclusion based on multivariate analysis, but did not distinguish between naso-gastric and PEG-tube outcomes (20,21). One plausible explanation for the poor outcome could be that by the time the patients were referred for a feeding tube placement, it may have been too late for them to benefit from additional nutritional support (22). In the current report, we present seven instances where the patients were frail and rapidly declining in their functional status, and timely intervention with PEG tube, for a temporary period of one to several months, enabled them to recover from the acute illness, restored their functional capacity

and successfully prolonged their survival, which would have been unlikely without temporary artificial feeding.

Most of the studies regarding use of PEG-tube feeding have been in patients with cognitive impairment, and especially those with severe impairment (15,21). In a study of 36,492 nursing-home patients with PEG tube placement, all had a cognitive performance scale (CPS) score of 4 or 5 that transitioned to 6, which implies that these patients needed assistance with feeding and had severe cognitive impairment. It was suggested that feeding tube placement does not have a survival benefit and that “early insertion” was not associated with longer survival in those severely demented patients. “Early insertion” was defined as placement of a PEG tube within one-month of onset of requiring assistance with feeding versus the usual four months (21). Various studies have been conducted to evaluate survival and hospital characteristics in older patients after PEG-tube placement, but these were in patients with advanced cognitive impairment (15,21,23,24) and/or were nursing-home residents (23,24). In a study performed by Malmgren *et al* that studied indications for PEG-tube placement and survival in older adults, it was noted that patients over the age of 80 years, especially those with cognitive dysfunction, had slightly worse prognosis than younger patients. However, the limitation of this study was that the investigators did not report the baseline cognitive status in these patients at the time of PEG-tube placement (8), which would likely be an important determinant of PEG success. The overall 30-day mortality was 22% and 1-year mortality was 50% in a study by Callahan *et al*, reporting on the outcomes of PEG tube placement in elderly community dwellers (9), and these numbers have been corroborated by other studies (25, 26). This high short-term mortality may be a reflection of the delay in arriving at the decision to insert a PEG tube rather than a failure of PEG tube to improve survival per se (8). There are emerging data supporting the temporary use of PEG tubes in patients after a stroke and/or head and neck cancer (3,7,8,27,28). However, currently there is still a dearth of literature about the utility of short-term PEG tube placement during an acute illness in cognitively intact elderly patients.

Notably, the patients in our series did not have cognitive impairment or advanced dementia, as noted by St. Louis University Mental Status (SLUMS) assessment, which is the standard tool used at our hospital for cognition testing. These patients were functionally independent prior to their acute illness, and were failing acutely and losing weight fast. They were identified correctly and promptly, artificial feeding through a PEG tube was used as a temporary measure to support them during their acute phase of malnutrition and hence helped them to recover, regain their pre-illness functional status and return to their baseline independent living situation. After the brief artificial nutritional support, and once their appetite improved, these patients were weaned off their enteral feeds.

After a critical review of available literature and examination of our own case series, we propose a conceptual model for decision-making for PEG-tube placement in elderly patients that can be used as a guide by primary care physicians and geriatricians (Figure 2). The initial evaluation for any frail elderly patient with weight loss should focus on investigating the cause, excluding malignancy, treating the cause and trying non-invasive interventions first, including dietary supplementation, patient and caregiver training/support, treatment of depression, speech/swallowing evaluation and therapy and possibly a trial of appetite

stimulants. The importance of adequate care-giver and family support cannot be overestimated and the discussion of PEG tube placement should be initiated early with both the patient and the care-givers (28). In the absence of any end-stage chronic illness or hospice diagnosis, the next step should be assessment of cognitive status and overall functional status of the patient. In the presence of intact cognition or mild-moderate cognitive impairment, and adequate functional status, a short-term PEG-tube placement may be considered regardless of the patient's age. In patients with cognitive impairment and moderate functional impairment or in those with severe functional impairment, careful consideration of possible PEG tube placement, together with goals of care, will be required. However, in the setting of mild-moderate dementia with severe functional impairment or in those with advanced dementia, we concur with the available literature and would not recommend PEG-tube placement. A limitation of our report is that it is a case series of temporary PEG tube placement in acutely ill elderly patients. However, this report can be used as a platform to consider a broader perspective. One should not dismiss the option of temporary PEG tube placement in elderly patients, based on age alone. Some, especially the cognitively intact, community dwelling seniors, may potentially benefit from PEG tube placement, and resume their highly functional and meaningful lives after they recover.

In summary, short-term PEG-tube placement in elderly patients may be a valuable strategy which can be considered safely in acutely ill but otherwise cognitively intact and functionally independent patients. Appropriate patient selection and prompt implementation are the key to success for short-term PEG-tube placement in the cognitively intact elderly.

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Figure 1.

A: Comparison of Body Mass Indices (BMI) of seven patients: baseline (pale solid), pre-PEG (dark solid) and post-PEG tube placement (stripped).

B: Bar graph depicting a percentage change of body weights from baseline to pre-PEG and post-PEG tube placement. * $p < 0.05$, Mann-Whitney-U test.

Figure 2.

Proposed conceptual model for decision-making for PEG-tube placement in the elderly patients.

* Dashed arrows indicate that very careful consideration for PEG placement will be required in patients with significant functional impairments and cognitive deficits.

** Not recommended.

Characteristics of patients presented in our series, including their age, gender, ethnicity, co-morbidities, indications and duration for PEG-tube and complications.

Table 1

Parameters	Case#1	Case#2	Case#3	Case#4	Case#5	Case#6	Case#7
Age (in years)	92	93	86	88	72	81	89
Gender	F	M	F	M	F	M	F
Race	Caucasian	Caucasian	Caucasian	African American	Caucasian	Caucasian	Caucasian
Indication for PEG	Failure to thrive	Cardiac Cachexia	Failure to thrive	Dysphagia	Tonsillar Carcinoma	Failure to thrive	Failure to thrive
Comorbidities	Severe reflux, esophageal strictures	DM type II, severe ischemic cardiomyopathy (EF-30%)	Peptic ulcer disease, recurrent C.difficile infection, chronic pain, DID	HTN, BPH, Prostate cancer s/p androgen ablation	CAD s/p CABG, seizures, squamous cell cancer of tonsils s/p chemo and radiation	Parkinson's disease, COPD, Reflux, BPH	HTN, dysphagia, spine fractures, TIA, DID
Cognitive Impairment	None	None	None	None	None	None	None
PEG tube related complications	Erosion at tube site	None	None	None	Tube dislodgement	none	none
Duration of PEG tube	Few months	One year	Six months	Four months	2004 to present	Five months	One month

(Abbreviations: PEG = Percutaneous Endoscopic Gastrostomy; F = Female; M = Male; DM = Diabetes Mellitus; EF = Ejection fraction; DID = Degenerative joint disease; HTN = Hypertension; BPH = Benign Prostatic Hyperplasia; s/p status post; CAD = Coronary artery disease; CABG = Coronary Artery Bypass Graft; COPD = Chronic Obstructive Pulmonary Disease; TIA = Transient Ischemic Attack)