

Long-Term Use Of Percutaneous Endoscopic Gastrostomies: A Survey Of Duration Of Use And Level Of Maintenance

J Lachter, R Dolinsky, D Peretz, R Reshef

Citation

J Lachter, R Dolinsky, D Peretz, R Reshef. *Long-Term Use Of Percutaneous Endoscopic Gastrostomies: A Survey Of Duration Of Use And Level Of Maintenance*. The Internet Journal of Gastroenterology. 2005 Volume 4 Number 2.

Abstract

Background: There is a conspicuous absence of guidelines from the various manufacturers regarding the recommended time for replacement of a PEG (Percutaneous Endoscopic Gastrostomy). Currently, the methodology that influences a decision for PEG replacement is unknown and empiric.

Methods: 100 patients from chronic care hospitals or nursing homes with PEG tubes in place for more than six months were examined using a checklist of relevant data. Parameters considered included time since placement, quality of skin around PEG and quality of tube components.

Results: Skin breakdown became common, as was decayed PEG tube and stopcock, all beginning about eight months after PEG insertion ($p < 0.01$). Over half of patients had abnormal skin condition around the PEG consisting of either inflammation, infection, or signs of obvious discharge. Most patients had PEG tubes with varying degrees of occlusion.

Conclusion: PEG tubes should be replaced after approximately eight months in order to prevent skin infection around the PEG and fungal growth. We recommend replacement of PEG tubes by a skilled physician in the hospital at regular eight-month intervals.

INTRODUCTION

The use of endoscopy-assisted gastrostomy placement has become commonplace. The procedure Percutaneous Endoscopic Gastrostomy (PEG) was introduced about 20 years ago by Ponsky and others (1). Among the technical improvements in the procedure have been the introduction of new tubes made of materials which are hoped to have greater durability and less prone to lead to complications. The advantages of new PEG sets have emphasized convenience of packaging, such as including a single-use snare, and/or single-use sufficient quantities of lidocaine for local anesthesia and/or iodine solutions for local disinfection. The evidence that any particular set will outlast another, and be less prone to tube breakdown, are lacking.

The American Society for Gastrointestinal Endoscopy (ASGE) has published guidelines for clinical application of PEGs, and regarding the role of PEGs. However, even in 2005, 25 years after the first PEGs were described,

guidelines as to proper or suggested intervals at which PEGs should be re-examined or replaced are lacking.

The risks of PEG placement have been amply documented, and, in comparison to other endoscopic procedures, the PEG is a high-risk procedure, with mortality of 0.3-1%, serious morbidity of 3%, and overall morbidity of 17% (2,3,4,5). The risks involved in PEG replacement, which would seem intuitively to be probably less than of initial PEG placement, have not been published.

It has been our experience, and that of others, that patients in homes for the elderly who are sent to our hospital for PEG tube replacement have poor condition PEG tube which seem a likely source of morbidity. A PEG which out-stays its durability tends to break down. The stopcock and tube become crumbly, and fungus develops in the tube. The site of entry may become inflamed, and infected as the skin breaks down from the non-smooth and infested tube. Local

granulomas, infection and abscesses may be a portal of entry for systemic infections.

The literature in gastroenterology mentions the possibility of using Foley catheters and silicon replacement tubes instead of PEG tubes (₁₁). Only a few studies have objectively compared the durability of these tubes, which determine when they need be replaced, or compared them to PEG tubes. Blacka and coworkers found silicon tubes less durable than conventional PEGs (₁₂).

The current work was designed to evaluate the situation of patients with PEGs in our community and hope to encourage further prospective investigations in the future that may bring about more definitive results.

SUBJECTS, MATERIALS, AND METHODS

STATISTICAL METHODS

The study was approved in advance of its onset, by the Helsinki committee for research on human subjects, of the Naharia Western Galilee Hospital. Data collected was analyzed to compute average, standard deviation, frequency and percentage.

Correlational techniques used included Fischer's exact Test and the Chi-Square Test to examine for relationships between parameters. This allowed us to account for any correlation between PEG brand, number of times the PEG had been replaced, finding the original as opposed to any replacement valve, and presence of visible fungus on the valve or tube.

The quality of the skin around the PEG and the condition of the tube and valve were compared using the Wilcoxon rank sum test. The relationship between the time from placement of the PEG to the quality of the skin around the PEG, was examined by means of the Spearman correlation test.

SUBJECTS

Consulting with a statistician allowed us to determine that evaluating 100 subjects would provide a reasonable sample. All patients were infirm and on long-term in-patient care in nursing homes or hospitals. No specific exclusion criteria were deemed appropriate or necessary other than patients who had PEGs less than six months, or non-acceptance by the caretakers of the subjects, of which there was no occurrences.

METHODS

Patient data was collected using a checklist of relevant data including institution, reason for PEG placement, time since PEG placement, and quality of skin around PEG, ascertained by visual inspection (see appendix A). All examinations were performed in the presence of a legal caretaker, without moving the subject from his or her usual room. This required pre-arranged visitations of one researcher (RD) at six different sites.

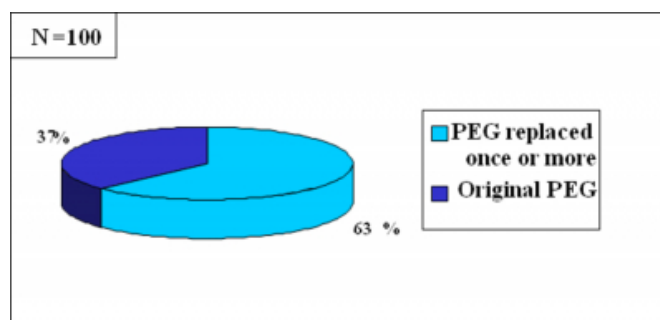
RESULTS

100 patients were examined who had PEGs in place for at least six months. 22 were hospital patients and 78 were in nursing homes. All patients were treated and fed by medical workers. Age of patients varied between 12 and 91 years of age.

Thirty-seven percent of patients had the originally implanted PEG and 63% had already had the PEG replaced at least once (see figure 1). Duration of use of the current PEG ranged from 1-27 months.

Figure 1

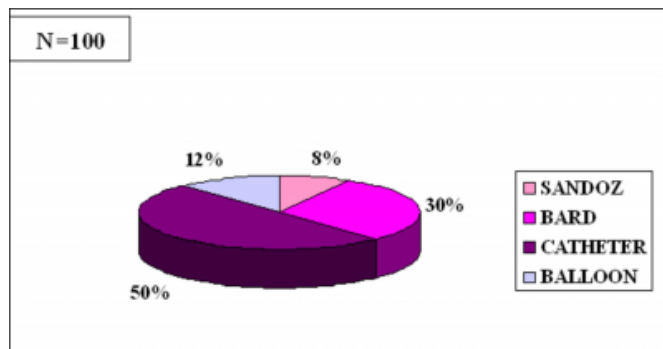
Figure 1: Patients classified by number of PEGs implanted



Indications for PEG placement were dysphagia from CVA (33%), dementia (42%), and trauma (25%). Different brand names of PEG were present in these patients. These were: Sandoz (8%), Bard (29%), Foley catheter (48%), non-Foley balloon (12%) (see figure 2).

Figure 2

Figure 2: Type of PEG

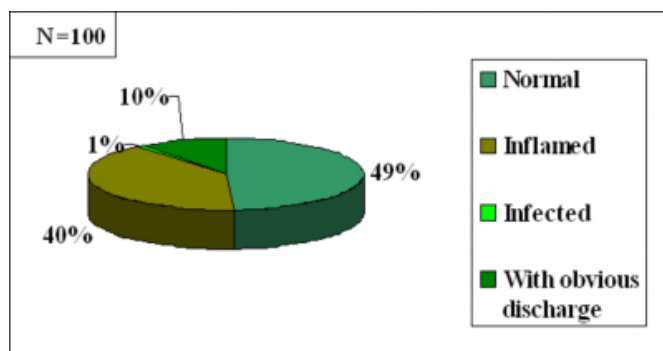


Skin breakdown became common, as was decayed PEG tube and stopcock, all beginning about eight months after PEG insertion, (Spearman's coefficient at $p < 0.01$).

The skin condition around the PEG was divided into 4 categories: normal – 49%, inflamed – 40%, infected – 1%, with obvious discharge – 10% (see figure 3).

Figure 3

Figure 3: Skin condition surrounding PEG



The patency of the PEG was considered normal in 29% of patients, minimally occluded in 59% and at least 50% occluded in 12% of the patients (see figure 4). Note that occlusion was a visual estimate from the outside, and referred to rigidity and disfigurements of the tube. Valves were present in 56% of patients. The condition of the valve, when present, was normal in 35% of these patients.

Figure 4

Figure 4: Patency of the PEG

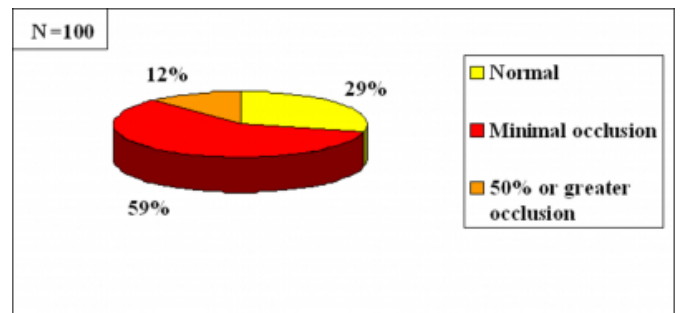
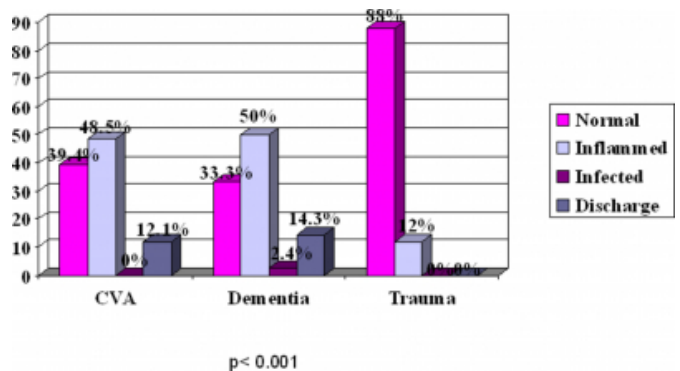


Figure 5

Figure 5: Skin condition around PEG as a function of patient's medical condition (CVA, Dementia, Trauma)



Approximately 51% of the patients had some level of visibly obvious fungus inside the PEG that was unrelated to the brand of PEG present. This was ascertained by inspection only – seeing lots of fungus discoloring the peg tube wall, and stopcock valve.

There was no significant correlation between the type of PEG used and the time before it was replaced. Most patients that had their PEGs replaced, had either a Foley catheter or balloon in its place. There was also no statistical difference between the brand name PEGs of Bard ($n=29$) and Sandoz ($n=8$) with respect to every parameter tested. We were unable to designate one brand as either better or worse with respect to any of the following parameters: time before replacement, quality of skin around PEG, tube status or the condition of the valve. Additionally, there was no difference between both tubes with regards to any visible fungal growth of any sort, nor did we find any association between the indications for PEG placement and the presence of fungus on the tube or valve.

Patients with gastrostomies placed after head trauma had significantly better skin condition around the PEG than CVA

patients or patients with dementia ($p<0.001$)(see figure 5). In addition, the condition of the tube and the condition of the valve was also superior.

DISCUSSION

The present cross-sectional study examined the condition of the PEG amongst patients who had PEGs for more than six months and were in chronic care hospitals or nursing homes. Patients who had PEGs for less than six months were excluded from this study.

The original PEG inserted among all the patients, both in the nursing home and hospital, was of a locally available brand: Sandoz or Bard. In contrast, the second and/or third PEG placed was most often a Foley catheter that was replaced by local caregivers, usually nursing staff for logistical and economical reasons.

Parameters considered in our survey included time since placement of PEG, quality of skin and PEG tube components. These were mostly subjective parameters that certainly may be regarded as limitations in our study design. To interpret our findings in an objectable manner we utilized scales determined in advance with comparison photos, used to determine how the skin and stopcock looked.

There were no differences between PEGs of the Sandoz or the Bard brands. The valve condition was similar regardless of the type of PEG. Frequency of finding fungi among the two types of PEGs was likewise similar.

There was a clear relationship between the time elapsed from PEG implantation and the quality of skin around it. The more time elapsed, the worse the skin condition. Patients who had the same PEG for more than eight months, had a tendency to have infected skin with discharge. We recommend replacing PEGs at eight month intervals. While eight months is arbitrary and has not shown to be superior to say seven or nine months, further investigation is sorely needed that may initiate guidelines for PEG maintenance and replacement. The results of this study suggest that manufacturers should recommend that PEG replacement be made no more than eight months after implantation, unless there is clear and documented evidence that the PEG that has been examined and may still be kept in place.

The quality of skin around the gastrostomy tubes of trauma patients was significantly better as compared to CVA or dementia patients. The condition of the tube and valve was also superior. We propose the following explanations for

these findings: (1) CVA and dementia patients were considerably older and more prone to skin complications, (2) the differences in disease types (3) obtaining approval for tube replacement by a gastroenterologist in the hospital was easier for trauma patients. Consequently, most trauma patients had easy access to a gastroenterologist who is skilled and easily available resulting in better outcomes including better tube, valve, and skin around the implanted PEG.

Lack of physicians who are qualified to replace gastrostomy tubes in the hospital may indeed impose significant clinical concern for the prevention of long term complications of using PEGs. We recommend establishing mandatory tube replacement by a skilled physician in the hospital, and offering the same quality of care when dealing with replacing a tube as with placing one for the first time.

PEG mortality is among the highest of any gastroenterology procedure, at 1% in-hospital mortality with high morbidity rates. The complication rates for replacements of PEGs, while it seems logical to be lower, have not been published. As PEGs need periodic maintenance, the consideration as to whether a PEG should be implanted in the first place should also address these long term risks and added costs, including occasionally endoscopic replacements.

CONCLUSIONS

1. PEGs should be replaced after approximately eight months in order to prevent skin infection around the PEG, fungal growth and ensuing complications.
2. It is preferable to use the specifically approved PEG replacement tubes. The brand name PEGs were similar in quality and durability. Other types of PEGs may be better or worse. This subject should be further investigated in an attempt to maintain the quality of the skin around the PEG and the tube quality. This in turn may prevent long term complications due to PEG placement.
3. The quality of the skin around the PEG, the condition of the tube, and the condition of the valve was better for trauma patients than it was for patients with CVA or dementia. This may be explained by: differences in patient age, disease type, and quality of treatment and care.

Figure 6

Appendix A

Patient Data:

Date: _____

1. Name: _____
2. I.D number: _____
3. Age: _____
4. Gender: _____
5. Institution (nursing home, home, other): _____
6. Date of entry into Institution: _____
7. Reason for PEG placement: _____
CVA / Organic Mental Syndromes / Trauma/Other _____ (circle one)
8. Time since placement of PEG (months) _____
9. Is this patient's first PEG? Yes / No _____
Brand of PEG SANDOZ / BARD/other _____
10. Quality of skin around PEG: _____
A. Normal B. Inflamed C. Infected D. With obvious discharge
11. Quality of PEG tube: _____
A. Normal B. Some occlusion C. 50% or greater occlusion
12. Is existing valve original? Yes / No _____
13. Valve condition: _____
A. Normal B. Slightly rigid or crumbling C. Rotten
14. Is there visible fungus on the tube? Yes / No _____
15. Who is responsible for patient feeding? _____
Nursing staff / Family / Both / Other _____

Comments: Other diseases (Diabetes / other): _____

References

1. Gauderer M.W.L. Ponski J.L. Izant R.L.M. Gastrostomy Without Laparotomy: a Percutaneous Endoscopy Technique. *J. Pediatr. Surg* 1980;15:872.
2. Segal D., Michaul., Guimber D., Ganga-Zaudzou PS, Turek D., Goffzand. Late onset complications of percutaneous endoscopic gastrostomy in Children. *J. Pediatr. Gastroenterol Nutr* 2001 Oct;33(4):495-500.
3. Verhoel M.J., Van-Rosendaal G.m. Patient outcomes related to percutaneous endoscopic gastrostomy placement. *J.Clin.Gastroenterol* 2001 Jan;32(1):49-53.
4. Wiener J., Quinn J.P., Bradford P.A., Goeriny R.V, Nathan C. Bush R. Weinstein RA. Multiple antibiotic resistant Klebsiella and Escherichia coli in nursing homes. *JAMA* 1999 Feb 10;281(6):517-23.
5. Rickman J. Percutaneous endoscopic gastrostomy: Psychological Effects. *Br. J. Nurs.* 1998 Jul 8;7(12):723-9.
6. Charles E. Gessert, Michael C. Mosier, Edward F. Brown, Bruce Frey. Tube feeding in nursing home residents with severe and irreversible cognitive impairment. *J Am Geriatr Soc* 2000; 48:1593-1600.
7. Skelly RH. Are we using percutaneous endoscopic gastrostomy appropriately in the elderly? *Curr Opin Clin Nutr Metab Care* 2002 Jan; 5(1):35-42.
8. Pien E.C. Nunee KE Pien FD. Gastrostomy tube infections in a community hospital. *Am. J. Infect Control.* 1996 Oct; 24(5):353-8.
9. Puntis J.W. Nutritional support at home and in the community. *Arch Dis Child.* 2001 Apr; 84(4):295-8.
10. Spiros D. Ladas. Endoscopic percutaneous gastrostomy - ethical problem. *J. World Gastroenterology News* 2001; 6(1)35-37.
11. Kadalakia SC, Cassaday M, Shaffer RT. Comparison of Foley catheter as a replacement gastrostomy tube with commercial replacement gastrostomy tube: a prospective randomized trial. *Gastrointest Endosc.* 1994 Mar-Apr;40(2 Pt 1): 188-93.
12. J. Blacka, J. Donogue, M. Sutherland, I. Martincich, S. Mitten-Lewis, P. Morris, G. Meredith. Dwell time and functional failure in percutaneous endoscopic gastrostomy tubes: a prospective randomized-controlled comparison between silicon polymer and polyurethane percutaneous endoscopic gastrostomy tubes. *Aliment Pharmacol Ther* 2004; 20:875-882.
13. Dwyer KM, Watts DD, Thurber JS, Benoit RS, Fakhry SM. Percutaneous endoscopic gastrostomy: the preferred method of elective
14. J. Trauma 2002 Jan; 52(1):26-32.
15. Mellinger J.D., Ponsky J.L. Percutaneous endoscopic gastrostomy: state of the art, 1998. *Endoscopy* 1998; 30:126-130.
16. G.V. Stregniann, J.S. Goff, D.Silas, N. Pearlman, J. Sun, L. Norton. Endoscopic versus operative gastrostomy: final results of a prospective randomized trial. *Gastrointestinal Endosc* 1990; 56:1-5.
17. Lin HS, Ibrahim HZ, Kheng SW, Fee WE Tennis D.S. Percutaneous endoscopic gastrostomy: strategies for prevention and management of complications. *Laryngoscope* 2001 Oct; 111(1): 1847-52.
18. Sanders D.S., Carter M.J., D'silva J., Mcalindon M.E., Wellimse P.J., Barhani K.D. Percutaneous endoscopic gastrostomy: a prospective analysis of hospital support required and complications following discharge to the community. *Eur J Clin Nutr*, 2001 Jul; 55(7): 610-4.

Author Information

Jesse Lachter, M.D.

Department of Gastroenterology, Rambam Medical Center

Rina Dolinsky, M.D.

Department of Gastroenterology, Rambam Medical Center

David Peretz, M.D.

Department of Medicine, Norwalk Hospital (Affiliated with Yale University School of Medicine)

Ron Reshef, M.D.

Department of Gastroenterology, Rambam Medical Center