

## 2. Examples of Innovation by Surgeons: Percutaneous Endoscopic Gastrostomy and Its Ethical Implications

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It has been nearly four decades since the first performance of a percutaneous endoscopic gastrostomy [1, 2]. Small children with severe neurological impairment were first to receive this intervention and, as it happened, were benefitted by it [3]. The success of these early cases led to performance of the technique in adults and then to expansion of the indications for the procedure. Only later was laboratory investigation of the issues of tract formation and tube materials undertaken. There were no Institutional Review Boards (IRBs) at that time, and innovative therapy was quickly transformed into standard practice. Several versions of the method were developed, but ironically, over the following decades, the technique has remained much the same. However, the frequency with which PEG is performed has mushroomed, making it one of the most frequent indications for upper GI endoscopy [4]. Examination of the indications for PEG placement and the ethical implications that have accompanied this innovation may be worth examination.

### Indications for PEG

The most frequent indication for performance of PEG is the need to provide feedings to patients unable to ingest adequate nutrition [2, 4]. Patients with neurological compromise or oro-pharyngeal tumors are the most commonly seen, although others including those with failure to thrive and the need for supplemental nutrition are also candidates [4, 5].

The ethical dilemma arises from the question of what role feeding plays in the long-term outcome of the patient [6].

Clearly, patients with both traumatic brain injury (TBI) and a good prognosis for recovery will be well served by PEG. After weeks or months, it is expected that they will recover and resume eating. Other TBI patients with an inability to eat but the likelihood of recovery of some cognitive function are also good candidates [7]. In contrast, the use of PEG for long-term feeding in patients with little hope of recovery is a point of great controversy.

Patients with severe dementia, the elderly with unrecoverable strokes, and those in persistent vegetative states are frequently referred to the surgeon for PEG placement, yet the question of what the procedure offers them is debated [5]. Clearly, the nursing care of a neurologically devastated patient is greatly facilitated by PEG. Indeed, most long-term nursing facilities will require a PEG rather than a naso-enteric tube for feeding and medication administration. However, the provision of long-term feeding in such cases may prolong the duration of suffering, add expense, and prove a burden to a family [8]. Once PEG feeding is commenced, it may be difficult to terminate. In addition, complications arising from the PEG, such as peri-tubal leakage, skin excoriation, and tube dysfunction, may occasionally become a major focus of care in an otherwise hopeless case. Inpatient doctors may ask for a PEG just to facilitate transfer of an apparently hopeless patient from an acute care hospital to a long-term nursing home. The consideration and discussion of what such a decision will do for and to the patient and the family is quite often minimal, and that should not be the case.

The use of PEG for temporary feeding or supplemental nutrition when recovery is likely is unquestionably valuable and appropriate. In cases where the potential for recovery is uncertain but possible, again PEG placement may be appropriate. It is the irretrievable cases where the ethical questions arise. One way to address this issue is to request that all intercurrent problems such as pneumonia, sepsis, and multiorgan failure be corrected prior to placement of the PEG and that nutrition be provided by a naso-enteric tube until the time that PEG is agreed upon.

Patients with oro-pharyngeal tumors often benefit from PEG placement early in their course to provide nutrition while they undergo radiation, chemotherapy, and surgery. In most cases, the PEG is removed after successful treatment as they resume the ability to take oral feedings [9]. This is very gratifying. In cases where the oro-pharyngeal tumor returns and limits oral intake, the PEG may be placed again to permit the terminally ill patient to function better for the time

that they have remaining. Again, this use of PEG is quite gratifying as it permits the patient to go about his or her daily activities without the stigma of an indwelling nasal tube. Interestingly, some head and neck surgeons believe that patients who are able to take oral feedings during their therapeutic course, rather than exclusively PEG feedings, may have a lower incidence of esophageal stricture formation after radiation therapy [5].

The use of PEG for gastric decompression in patients with complicated bowel obstruction or carcinomatosis has proven a valuable adjunct to patient care [10]. Rather than extending life in patients with complicated intraabdominal malignancy, the PEG serves merely as a vent to the stomach, and it may reduce gastric distention and emesis. It should be remembered that although the PEG serves as a “vent” in these cases, it may not totally empty the stomach and thus aspiration may still occur.

In patients with recalcitrant bowel obstruction, the performance of a PEG may permit long-term gastric decompression and avoidance of a nasogastric tube, while nutrition is provided by parenteral means. When gastric atony is the diagnosis, some patients benefit from PEG for decompression when it is offered in concert with direct jejunostomy for feeding. Jejunal extension tubes in conjunction with PEG are rarely functional for long, and they are often a constant source of frustration for both the doctor and the patient. Repeated placement of jejunal extension tubes is costly and usually ineffective [11]. When jejunal feedings are anticipated to be necessary for the long term, a direct jejunostomy by means of endoscopy or surgery is a better solution.

## Conclusion

The development of the first PEG in 1979 was the result of need, vision, and ingenuity—there was no university or industry sponsor, no mechanical testing or preclinical study, and no clinical trial. Such a progression would be unlikely to occur today. In spite of its humble development, PEG has become one of the most common endoscopic procedures performed today. With the widespread adoption of this innovation have come a host of ethical considerations. Indications for PEG placement vary, and there should be strong consideration of the true benefit of this procedure and its overall impact on the quality of life and prognosis of the patient.

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The SAGES Manual Ethics of Surgical Innovation

Stain, S.C.; Pryor, A.D.; Shadduck, P.P. (Eds.)

2016, XVII, 280 p. 19 illus., 15 illus. in color., Softcover

ISBN: 978-3-319-27661-8