Clinical applications and technical aspects of percutaneous endoscopic gastrostomy in head and neck malignancies.

Doktori (PhD) értekezés

Dr. Lujber László

Doktori iskola vezetője:	Dr. Nagy Judith
Programvezető:	Dr. Rőth Erzsébet
Témavezető:	Dr. Bellyei Árpád

Pécsi Tudományegyetem
Általános Orvostudományi Kar
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INTRODUCTION

Not until recently, the importance of nutrition in the critically ill patients was disregarded, as the focus was primarily directed towards curative therapy. Nutritional supplementation was thought to have a less significant impact on the final outcome of the diseases. Later, physicians started to realize the role nutrition plays in the recovery of patients. Malnutrition severely impairs the prognosis, the healing, the therapeutic outcome, the quality of life, the hospital stay, and thus the cost of care (1). There is a consensus in the literature that early postoperative nutrition benefits surgical patients by decreasing septic morbidity, maintaining immunocompetence, and improving wound healing (2,3).

Patients with head and neck cancers are at particular risk for malnutrition during the whole course of their disease. Malnourishment is the result of several local and systemic factors. Alcoholism, smoking and poor diet have a high prevalence in patients with head and neck cancers leading to decreased protein, vitamins and minerals uptake. Local tumor growth adds to these problems by causing dysphagia, odynophagia, smell and taste distortion, and aspiration. On the other hand increased metabolic rate of cancer cells and accelerated protein catabolism require high calorie and protein diet to maintain nutritional balance (4; 5). Surgery causes anatomical alterations, pain, dysmotility, and can predispose to aspiration further worsening the ability of proper alimentation. Mucositis, pain, edema, nausea and xerostomia as the result of radio-, and chemotherapy all have an adverse effect on feeding (6; 7). All of these factors finally deplete the protein and fat stores of the body,

leading to severe weight loss, impairing the immune function and resulting in progressive protein-calorie malnutrition. For these reasons, patients with head and neck cancer require continuous nutritional assessment and adequate calorie-protein supplementation.

The relationship between nutrition and cancer have several other aspects. We know that deficiency of some nutrients in the body might predispose to tumor growth, while the presence of others impedes it (8) ((9). However details about these interactions are not the topic of this PhD.

ARTIFICIAL NUTRITION

Proper diet of patients with head and neck cancer is essential. "When the gut works, use it" should be a common sense practice of physicians dealing with nutritional care. Hence, total parenteral nutrition (TPN) is still provided, in several instances to patients with well functioning gastrointestinal tract, because of the ease and reliability of administration. Yet, more and more data suggest in the literature that enteral feeding is not just more natural way of administering food but also has a positive influence on the recovery of patients (10;11). It seems that not only the quantity and quality of food that matters, but also the route of alimentation. A normal well-fed intestine besides absorbing nutrients, also maintains a protective barrier against intraluminal toxins and bacteria. Peristalsis, secretory Immunoglobulin A, mucin and an intact mucosa have a protective and supportive role to achieve this function (12). It is shown in laboratory studies and animal experiments that starvation causes changes in the structure of gastrointestinal mucosa, increases the

permeability to bacteria and toxins, results in bacterial colonization and translocation, and alters the immunologic function of the gut (13-15). Whereas by enteral feeding gut mass stays unchanged (13), the metabolic, hormonal (16) and immunologic (17;18) responses of gastrointestinal mucosa are preserved. Experimental (19) and prospective clinical trials (10; 11; 20) in trauma and burnt patients clearly show a reduced rate in risk of morbidity and mortality in patients fed enterally. Randomized, controlled, prospective studies demonstrated that enteral feeding compared to total parenteral nutrition, leads to a significantly lower incidence of complications in surgical patients (10; 21).

ENTERAL FEEDING

There are number of ways to deliver food into the gastrointestinal tract (Table 1). To pick the best choice that suit patient the most, can be very difficult. It is usually a decision based on several factors such as the patient's nutritional state, type of disease, therapeutic plan and possible outcome. This PhD focuses on percutaneous endoscopic gastrostomy and its aspects in head and neck cancer patients.

The introduction of percutaneous endoscopic gastrostomy in clinical practice by Gauderer and Ponsky in 1980 (22), has revolutionized our practice in enteral feeding.

WAY OF ENTERAL FEEDING

I Per oral

II. Tube feeding

1. Naso-gastric, -duodenal, -jejunal
2. (Oro- gastric, -duodenal, -jejunal)

III. Stomal feeding

1. Oesophagostomy
2. Gastrostomies
    a. Surgical open (Stamm`s)
    b. percutaneous endoscopic
    c. percutaneous radiologic
    d. percutaneous ultrasound guided
    e. percutaneous CT or MRI guided
    f. laparoscopic
3. Jejunostomies
    a. surgical
    b. PEG with jejunal extension
    c. laparoscopic
    d. percutaneous endoscopic
    e. needle catheter

Table 1.

Historical background of PEG

Direct enteral access by gastrostomy, such as Stamm's or Janeway's surgical procedures (23) were not new when percutaneous endoscopic gastrostomy was developed in 1979. Surgical gastrostomies were well-described methods, yet their use for enteral alimentation was not popular or widely employed. They required laparatomy and often general anesthesia that deterred physicians and surgeons to use surgical gastrostomy "just" for obtaining feeding access for patients with poor general condition or with debilitated neurological state. In most cases, naso-enteric tubes were utilized in order to provide alimentation. Dr. Jeffrey Ponsky, pediatric gastroenterologist and Dr. Michael Gauderer pediatric surgeon, both worked in Cleveland, USA and performed upper gastrointestinal endoscopy in small children regularly for a variety of indications. They noted the ease and simplicity with which the anterior abdominal wall could be transilluminated, indicating the close contact between the abdominal and gastric walls. This gave them the idea to work out the details of a technique that would allow percutaneous puncture of the insufflated and transilluminated stomach under endoscopic control for gastrostomy tube placement. The original kit used was a home-made 16-F de Pezzer latex tube with a tapered intravenous cannula fitted to its distal end. The first five cases (all babies) of percutaneous endoscopic gastrostomy were presented at the annual meeting of The American Society of Gastrointestinal Endoscopy in May 1980 (22). The method was welcomed and rapidly recognized by the gastroenterologist, but initially looked upon with skepticism by the surgeons. Soon PEG gained wide acceptance as a safe, simple and

efficient method of providing nutritional support in patients with variety of pathologies. As experience accrued using this technique, potential risks, complications, and benefits became more apparent. These were studied that allowed further refinement of the technique. Since its introduction, modifications, improvements and adaptations of PEG have been published continuously to reduce complications, and to broaden the indication. The general indication for percutaneous endoscopic gastrostomy is summarized in table 2 (24). The maintenance of nutrition and fluid balance during the treatment of head and neck tumors is one of the most important indications for PEG placement. More than 216,000 PEGs are performed annually in the United States and thus it is the second most common indication for upper gastrointestinal endoscopy (25).

GENERAL INDICATIONS FOR PEG PLACEMENT

I. *LONG-TERM NUTRITION*

- **Head and neck tumors**.

  (Maintenance of nutrition and fluid balance during treatment of cancer is a strong indication for PEG {1990}.)

- **After an acute stroke**

  (Strong recommendation based on the finding that 25-40% of patients develop dysphagia after an acute cerebrovascular episode {1536}.)

- **Extensive traumatic injury.**

  (e.g. certain maxillo-facial trauma, abdominal trauma {1587})

- **Neurological disorder**

  (Diseases that are chronic in nature and result in significant dysphagia {1552}, psychiatric indications)

- **Growth failure in children.**

  (Prevention and treatment of pediatric clinical conditions such as e.g. Crohn`s disease, cystic fibrosis {1907} etc.)

- **Other hyperkatabolic states**

  (severe burns {1902}, Crohn`s disease {1737}, toxic epidermal necrolysis {872})

II. *DECOMPRESSION*

- **Diabetic gastroparesis** {1621}
- **Intestinal pseudo-obstruction**
- **Mechanical obstruction**

  (tumor {520}, surgery, etc.)

III. *OTHERS*

- **gastric volvulus / gastric fixation** {1556}{1912}
- **formation of biliogastric shunt** {877}
- **to deliver pharmacotherapy** {1765}

  (administration on non-palatable medications)
- **access "avenue" to stomach**

  (multiple PEG portals to permit intragastric surgical interventions)

Table 2

Comparison of *percutaneous endoscopic gastrostomy, and nasogastric tube.*

The traditional way of providing enteral nutrition for patients with head and neck cancer is by means of nasogastric feeding tube (NGT). Nasogastric feeding is still important in the alimentation of head and neck patients, however PEG is preferable in long-term nutritional support. Nasogastric tubes are uncomfortable, socially unacceptable, and associated with several side effects, such as nasal alar ulcerations and rhagads, rhinosinusitis, mucosal-ulcers, -edema, chronic throat irritation, gastro-esophageal reflux, aspiration,

and aspiration pneumonia (26). The incidence of these complications is exponentially increases by the time of tube in use. Besides, it has been shown that feeding through NGT on a long run is less efficient than via PEG, mainly due to frequent unintentional removal of the nasogastric tube and pulmonary aspiration (27) The frequent need for replacement of NGT due to dislodgement or plugging becomes risky when a freshly sutured pharyngeal wounds must be passed. It has also been shown that head and neck surgical patients who underwent PEG placement had decreased surgical complication rate compared with patients treated with nasogastric tube feeding (28). Moreover, the constant, visible presence of the tube makes NG feeding unacceptable to many patients, especially outside the hospital environment. Patients are more likely to resume normal social activities when they are not additionally disadvantaged by NG feeding tube. In general, fine-bore nasoenteric tube feeding remains a good choice for patients anticipated to require short-term nutritional support, however PEG is advised, if the expected duration of artificial feeding exceeds 4 weeks.

Comparison of percutaneous endoscopic gastrostomy and open surgical gastrostomy

Minimal invasive techniques, such as percutaneous endoscopic gastrostomy have limited the indication for open surgical gastrostomy. It is a handy alternative to laparotomy with numerous advantages. PEG can be performed quicker in 15-20 minutes (29), requires only sedation, if at all, and has low morbidity(30-32). It can be performed at bedside if needed, cost effective (33)

with shorter hospitalization (34) and has an overall success rate of 95% (30). In contrast, Stamm open surgical gastrostomy (23) requires usually general anesthesia, more invasive, more expensive and has higher mortality and morbidity rates (6-46%) (35-37). However, it still has its primary role in certain clinical situations and in cases of explorative laparotomies for solving major complications of minimal invasive techniques.

PEG IN HEAD AND NECK CANCERS

Percutaneous endoscopic gastrostomy is usually a straightforward procedure in cases of neurological indication, but certain technical aspects and clinical applications should be strongly considered when indicated for patients with head and neck malignancies. The insertion methods, the placement routes, and the timing of PEG insertion require certain adaptation and modification of the usual PEG procedure. These aspects will be detailed in the following sections.

INSERTION METHODS OF PEG

Mainly, "pull", "push", and "poke" methods are in use for PEG insertion.

The "*pull method*" originally described by Gauderer and Ponsky in 1980 (38), has changed little since its introduction and remained the most popular method of PEG tube placement.

Percutaneous endoscopic gastrostomy procedures were started in the University of Pécs, Medical School, ENT Department with the collaboration of

the Department of Internal Medicine on the 7th of January 1997. Most often the "pull method" is used in our department. Patient is instructed to use antiseptic oral wash the day before the procedure. Adequate sedation and analgesia are given intravenously prior to the start of gastroscopy along with few puffs of Lidocain 10% spray to the oral cavity for posterior pharyngeal anesthesia (39){appendix 1}. Initially antibiotic prophylaxis was not used. however later one dose of broad-spectrum antibiotic, usually from the cephalosporin family, was given routinely to PEG patients prior to the procedure. Gastroenterologist carries out a complete upper gastrointestinal endoscopy in left lateral position of the patient. Afterwards the patient is turned back into supine position. The abdomen is insufflated to allow proper apposition of the stomach to the abdominal wall. This is checked by transillumination and indentation of an examining finger in the gastric lumen. An optimal point is chosen for the puncture in the abdominal upper left quadrant, away from the costal margin. The skin is prepped, cleaned, and draped. Local anesthetic is then infiltrated to the site and a small skin incision is performed. A trocar needle is advanced into the stomach under visual control and grasped by the snare of the gastroscope for secure hold. A strong suture is threaded through the needle-cannula and is withdrawn to the oral cavity by a snare along with the gastroscope. The other end of the suture is retained. The tapered end of PEG tube is then attached to the suture-end at the mouth, and pulled back to the site of the abdominal puncture. The inserted needle-cannula and the PEG tube are withdrawn together through the anterior abdominal wall until the inner bumper of the PEG rests against the inner wall of the stomach. This can be approximately judged by finger palpation in case

of thin abdominal wall and by the cm markings on the tube. Excessive tension on the tube should be avoided as this may produce ischemia and necrosis leading to peristomal infection or tube extrusion. The tube is secured externally by an additional bumper. Then a second gastroscopy is performed to ensure the correct position of the tube and to exclude complications.

The "*push method*" is similar to the "pull method" except that the feeding tube is pushed over a guide wire (40). A flexible wire is passed via the needle-cannula instead of the suture and pulled out of the patient's mouth by the snare. Specially designed PEG tube is pushed over the wire and eventually withdrawn. The advantage of this technique is that the operator has full control over the tube at all times.

The "*poke*" or "*introducer*" method is basically a Seldinger technique. Under direct gastroscopic visualization the stomach is punctured and the tract is serially dilated by a dilator peel-away sheath (41). To keep the stomach approximated to the abdominal wall during the introduction, T-fasteners are usually needed. Unfortunately this means additional punctures on the stomach to counterbalance the complicating loss of insufflating air and the pneumoperitoneum during the procedure. In addition the openings in the abdominal wall and the stomach are bigger than the feeding tube itself, that can result in higher incidence of peristomal leakage and tube displacement (42). The "introducer" method is technically more difficult than the "pull" or "push", however the single pass of the endoscope is a potential advantage (Table 3).

The number of gastroscopic procedures needed to perform PEG, have significance in patients with head and neck cancer. First, every procedure, so

does the endoscopy has its own risks (43). A study reviewing the literature on endoscopic complications, lists 4 major and 45 minor complications related to the procedure itself (44). Although, the overall incidence of complications in routine cases is not high (0.1%), the chance of causing perforation or hemorrhage in patients with head and neck cancer is greater.

Second, there are additional risks when gastroscopy is done in cancer patients for creating a PEG. The repeated pass of the gastroscope increases the chance of tumor cell seeding to the stoma site and the risk of bacterial translocation causing peristomal infection. In addition, manipulation around the laryngeal or hypopharyngeal area with tumor growth can cause edema, further compromising the airway.

Third, the pass of the gastroscope can be very difficult in an area with extensive tumor mass or major postoperative anatomical changes. Technical details about how to avoid some of these problems will be discussed under the chapter "Placement routes of PEG".

Last but not least, gastroscopy causes discomfort for the patient unless carried out in general anesthesia.

In sum, the second pass of the gastroscope during the "pull" or "push" method basically increases the risks of the above-mentioned problems. Though "introducer' method allows single gastroscopy, this technique is time consuming, technically more demanding, and increases the chance of some major procedure-related risks and complications (42). Thus, it is not in a routine clinical use.

In order to keep the advantages and to eliminate the disadvantages of the different PEG methods, the author has introduced a novel technical

modification. In this method a "pull-back" or "push" type PEG is inserted in a traditional fashion but instead of the second per oral gastroscopy, a flexible laryngofiberscope is passed via the inserted feeding tube to provide the option for a "second-look" (45;46). Please refer to appendix 5, 6, and 7, regarding technical details and clinical use of "transtubal" laryngofiberscopy.

There are some studies suggesting that the second pass of the gastroscope can be omitted when "pull-back" or "push" methods are used (47;48). Certainly, in straight forward cases, with experience of the physician, the correct position of the inserted PEG tube can be judged either by finger palpation of the internal bumper or by checking the centimeter markings on the feeding tube. However this lacks the more reliable visual control of the correct position of PEG tube, and of the possible complications, such as hemorrhage. Even these studies emphasize the importance of "second-look " gastroscopy in obese patients, in patients with previous gastric surgery or if there is any doubt in the mind of the endoscopist, regarding complication or inadequately placed PEG tube. Author thinks that the thickness of the abdominal wall shows individual variations, thus relying on the centimeter markings of the feeding tube or finger palpation of the internal bumper, to guess the correct position of the tube needs experience. Yet, adjusting the appropriate tightness of the PEG tube is important, as too tight tube can cause cellulites and later peristomal leakage. On the other hand, too loose tube can lead to peritonitis (49; 50) Moreover, "second look" endoscopy also stands for excluding complications. Probably due to these reasons most of the "pull-back" and "push" methods are carried out with a "second look"gastroscopy worldwide. "Transtubal" fiberscopy can play a role in

checking the correct position of the feeding tube and in excluding complications. It can be performed in most cases when otherwise a second per oral gastroscopy is planned. In addition, it is also worth reflecting on the possibility, that "transtubal" access to the gastrointestinal tract by flexible scopes might provide a diagnostic or therapeutic tool for the physicians in the future. However, at this time, this is just a speculative idea.

ALTERNATIVE TECHNIQUES FOR CREATING GASTROSTOMIES

There are several other options to create gastrostomy for patients with head and neck cancers, who are not fit for gastroscopy due to different reasons (e.g. extensive obstructing tumor mass) {table 1}. Percutaneous radiologic gastrostomy (PRG) is one of the most commonly used for creating gastrostomy for patients with head and neck cancer. Detailed discussion about these possibilities is beyond the scope of this PhD.

Advantages and disadvantages of various PEG methods in head and neck cancer patients

PEG TECHNIQUES	ADVANTAGES	DISADVANTAGES
"pull-back" or **"push"** PEG with **second-look gastroscopy**	• relatively easy procedure • quick	•double gastroscopy • increased procedure-related risks and complications • increased risk for bacterial translocation and tumor cell seeding • double discomfort
"introducer" PEG	• single gastroscopy • direct insertion of the feeding tube	• technically demanding • extra gastric punctures (T-fasteners) • higher complication rate • time consuming
"pull-back" or **"push"** PEG with single pass of gastroscope **without second-look**	• easier • shorter procedure • no second per oral gastroscopy	• no second look, no chance to exclude disposition of tube or any complication • more experience needed for positioning the feeding tube
"pull-back" or **"push"** PEG with single pass of gastroscope with **"trans-tubal" fiberscopy** for second-look	• option for second-look • less discomfort for patient • decreased gastroscopy-related risks and complications	• additional scope needed • additional experience needed

Table 3.

PLACEMENT ROUTES OF PEG

The route of introducing the gastroscope into the stomach is one of the crucial points of PEG procedures in head and neck cancer patients. Mainly, percutaneous endoscopic gastrostomy is carried out by passing both the gastroscope, and the feeding tube through the oral cavity. However, one of the main hurdles for creating endoscopic gastrostomy in patients with head and neck cancers is the presence of the tumor mass that hinders the easy introduction of the gastroscope to the stomach. Tumors can block the way for gastroscopy either by narrowing the passage or by causing trismus, hemorrhage, edema or severe pain. To overcome such problems one can use pediatric or ultra-thin gastroscopes (51; 52). In other cases it can be very challenging for the gastroenterologist to find the way down to the stomach by a flexible scope among massive tumor growth. Kleinsasser's rigid direct laryngoscopy and the experience of ENT surgeon, who is familiar with the location and extent of the cancer, usually proves to be a good help, maneuvering the gastroscope into the esophagus (53). When the tumor mass is located in the oral cavity and causes obstruction or trismus, transnasal pass of both the gastroscope and feeding tube provides a solution (54;55). In the latter two methods, I have to point out the pioneering work of my Hungarian colleagues, Taller et al. One of the complications, which can occur after major head and neck surgery, is the formation of cervical pharyngo-cutaneous fistula. Beside others, this is the result of narrow pharynx caused by postoperative anatomical changes or irradiation-induced fibrosis. None of the conventional techniques would allow endoscopic placement of gastrostomy

feeding tube due to the narrow alimentary tract. However, author described and carried out PEG via the cervical fistula for such cases, avoiding the need for open gastrostomy (56). Please refer to Appendix 4 for details.

In case, the tumor is so extensive that hinders any type of endoscopy and the patient is scheduled for surgical resection, an ideal option is intraoperative PEG. After resection of the cancer, PEG can be inserted directly into the pharynx or esophagus through the opened operative field (39;57-60) {Appendix 1, 2, 3} (Table 4).

PLACEMENT ROUTES OF PEG

1. Per oral with standard-size gastroscope
2. Per oral with pediatric / ultra-thin gastroscopes
3. Per oral-with assistance of Kleinsasser`s rigid laryngoscope
4. Trans-nasal
5. Via cervical fistula
6. Trans-cervical during head and neck surgical procedure (intraoperative)

Table 4

The method of intraoperative PEG is detailed in Appendix 1.

TIMING OF PEG

Patients with head and neck malignancies are usually malnourished. Early nutritional support has a positive impact on the therapeutic outcome. Thus, timing of PEG is crucial in the nutritional and effective management of head and neck cancer patients. The use of percutaneous endoscopic gastrostomy and its timing should be considered individually based on the tumor's extension, localization, the therapeutic plan, the possible outcome, and the expected life span of the patient. The experience of the treating physician is needed to evaluate all these factors in order to make the correct decision regarding when and how to create gastrostomy. Generally, PEG can be inserted prior to the definitive surgery, during the surgery or after the surgery. So, we can speak about pre-, intra or postoperative insertions. Other PEGs are the non-surgical cases, for those receiving either curative or palliative radio- and/or chemotherapy or any other form of palliation.

Preoperative insertion has the great advantage of early nutritional supplementation. As most of the head and neck cancer patients undergo staging panendoscopy and biopsy, it appears reasonable to insert PEG, if needed, at the same time in general anesthesia. It not only avoids an additional operative event for the patient, but also carries less procedure-related morbidity. There are reports suggesting higher incidence of acute cardio-vascular incidence during PEG insertion in local anesthesia for patients with head and neck cancers (61;62) and also higher rate of perioperative PEG complication, if PEG is inserted before the tumor is resected (60). Beside the usual co-morbidities, the airways of these patients are often compromised by

the tumor. General anesthesia with a secured airway by endotracheal intubation provides preferable protection during the PEG procedure in advanced malignancies. On the other hand preoperative PEGs have numerous disadvantages. Extensive tumors can block the passage of the gastroscope and the risk for tumor cell seeding to the gastrostomy site is higher. In addition, the procedure related morbidity and the risk for any cardiovascular event during the procedure is reported to be higher in preoperative insertions, if done in local anesthesia (60;62). Any arising complication due to PEG, can delay the time of definitive surgery. Last but not least, surgeon needs much more experience to decide at this early stage of management, whether patient really needs a gastrostomy {Table 5}.

Intraoperative PEG means that, the endoscopic gastrostomy is carried out via the opened pharynx immediately after the surgical resection of the tumor mass. Unimpeded passage of the gastroscope and feeding tube, no chance of tumor cell seeding and the lack of additional discomfort for the patient, are all in favor for intraoperative PEG. The risk for complications is reduced due to the protected airway by general anesthesia (60). Yet, drawbacks of intraoperative PEG are the extra time needed, and special preparation required providing sterility {Table 5}. Percutaneous endoscopic gastrostomy should not be indicated in the early postoperative period, as it is risky to pass the gastroscope and the feeding tube through a fresh surgical field with e.g. tenuous hypopharyngeal closure.

ADVANTAGES AND DISADVANTAGES OF PEG TIMING

	Advantages	Disadvantages
Preoperative PEG	• Early nutritional supplementation • General anesthesia › less morbidity • Avoids additional surgical event for patient, if done along with staging endoscopy	• Higher risk for tumor cell seeding • Higher complication rate • Large tumors can obstruct way for gastroscopy • PEG complication can delay time of definitive surgery • More difficult to set up correct indication for PEG
Intraoperative PEG	• Free passage for gastroscope and feeding tube • No tumor cell seeding • Less PEG-related complication • No additional discomfort for patient	• Special care needed for draping and sterility • Overall surgical procedure is longer
Postoperative PEG	• Easier to set up correct indication for PEG	• Delayed nutritional supplementation via PEG • Additional surgical event for the patient

Table 5.

Nasogastric tube is inserted during the surgery in most of these cases, anticipating that, the patient will regain the ability of normal per oral feeding and swallowing after the healing takes place. If this fails for any reason, and

the patient needs nutritional supplementation longer than 4 weeks, it is recommended to change nasogastric tube to gastrostomy. Indication for PEG is obvious in such cases. However postoperative PEG means an additional surgical intervention with extra discomfort for the patient {Table 5}. Certain complications after major head and neck surgery and the altered anatomy caused by the ablative surgery can make PEG insertion difficult. It would be desirable to indicate preoperative or intraoperative PEG in the first place to patients, whose tumor location, -extension, and the type of operation, allow the surgeon to anticipate the need for long-term nutrition.

SPECIFIC INDICATIONS FOR PEG IN HEAD AND NECK CANCER

The most important challenge for surgeons performing PEG placement is good patient selection. Patients undergoing resection of advanced-stage head and neck cancers often require weeks to months of rehabilitation before normal deglutition is achieved. This delay may be related to decreased oral competence due to resection of tissues needed for normal swallowing (e.g. tongue base), bulky reconstructive tissues, cranial nerve damage, or a combination of these factors. This delay of normal per oral feeding can be particularly prolonged by the side effects of postoperative radiotherapy. In order to set up a correct indication for PEG insertion in patients undergoing major head and neck surgeries, all the head and neck cancers treated in our ENT department in the last 7 years were worked up.

PATIENTS AND METHODS

1325 malignant head and neck cancer patients were treated as inpatients in the University of Pécs, Medical School, ENT Department between 7th of January 1997 and 31st of December 2003. 1325 patients had 2125 hospital admissions over the 7-year-period. 177 (13%) patients were females and 1148 (87%) were males (chart 1).

Malignant tumours of males and females

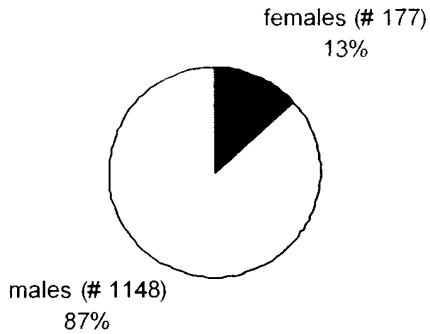


Chart 1

The average age for females was 53 years (range 21-90 years) while it was 45 years (range 17-93 years) for males. Of the 177 female patients 76 (43%) had laryngeal-, 14% had hypopharyngeal- and 7% had tonsillo-lingual cancers (chart 2a and 2b).

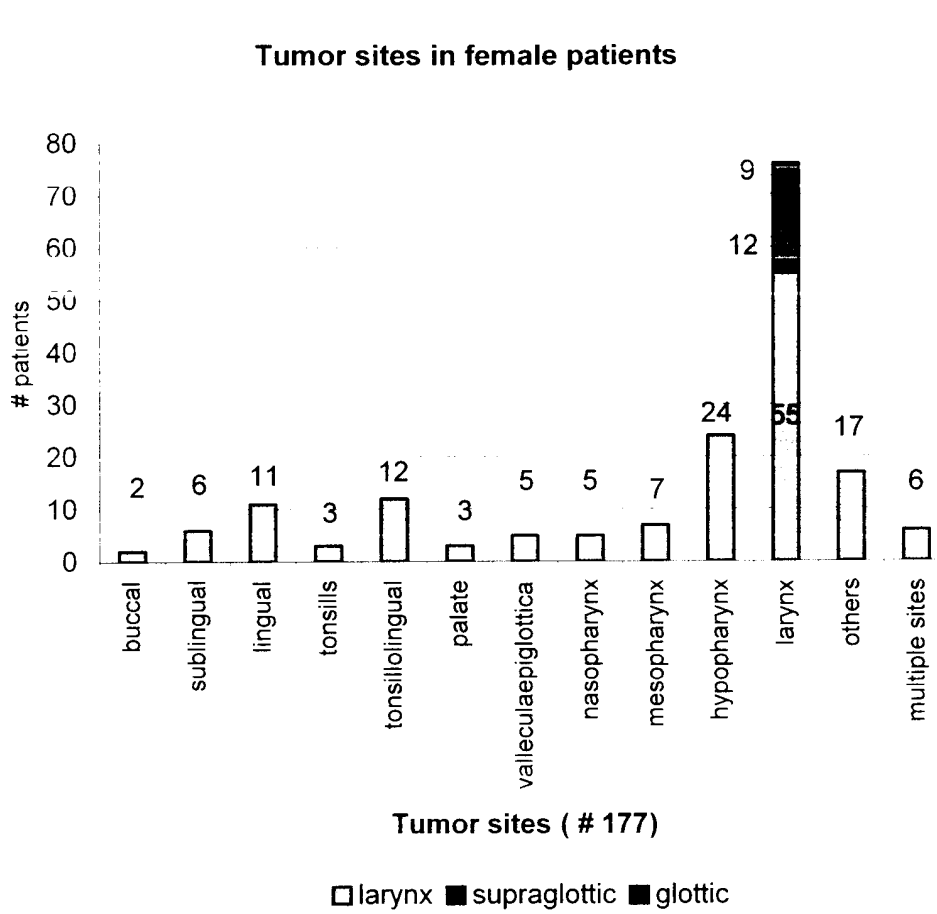


Chart 2 a

446 (39%) laryngeal-, 209 (18%) hypopharyngeal-, and 104 (9%) tonsillo-lingual cancers were diagnosed among the male patients with head and neck malignant tumors (chart 3a and 3b). The distribution of tumor sites was almost identical among the males and females (chart 4).

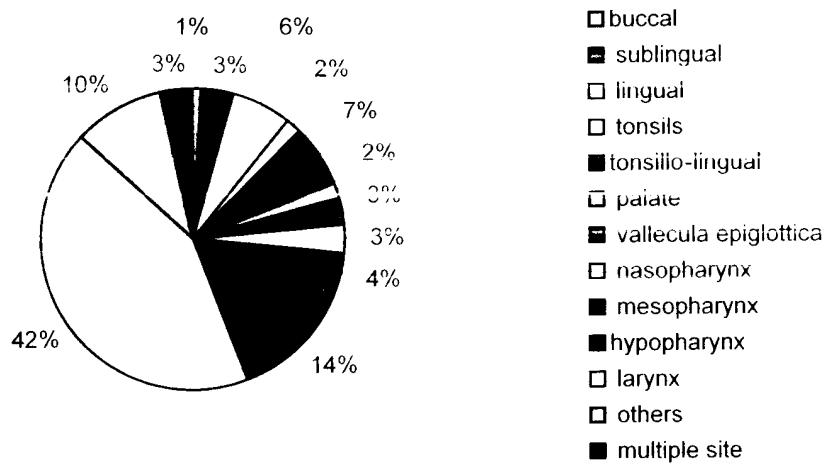


Chart 2 b

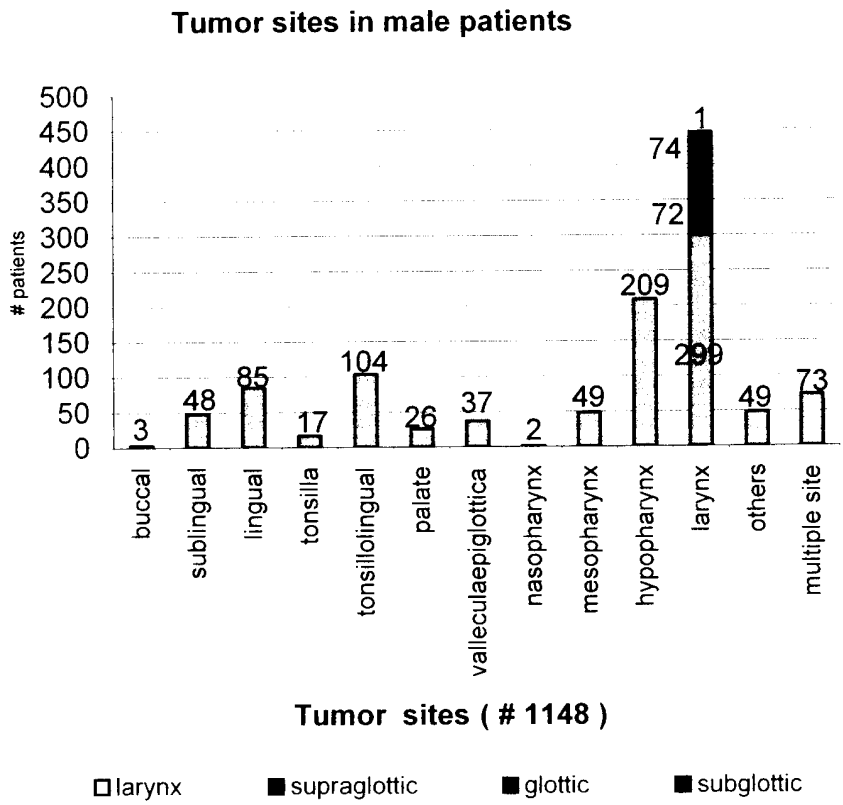


Chart 3 a

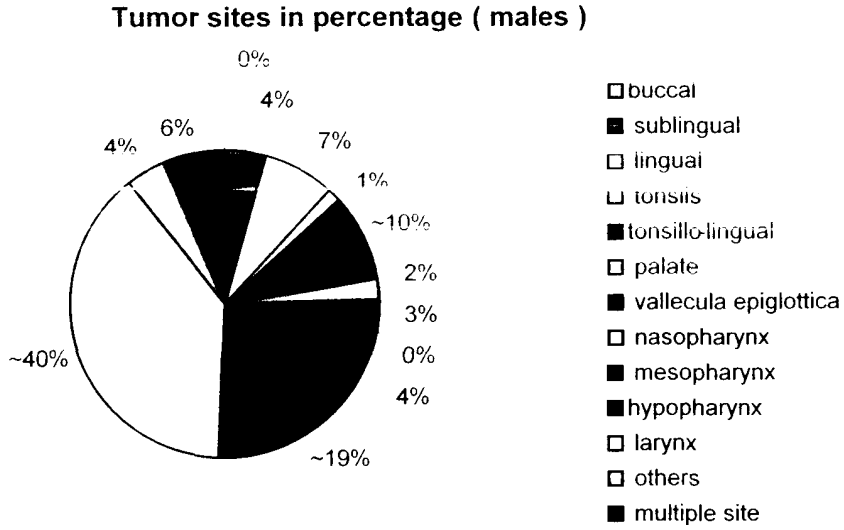


Chart 3 b

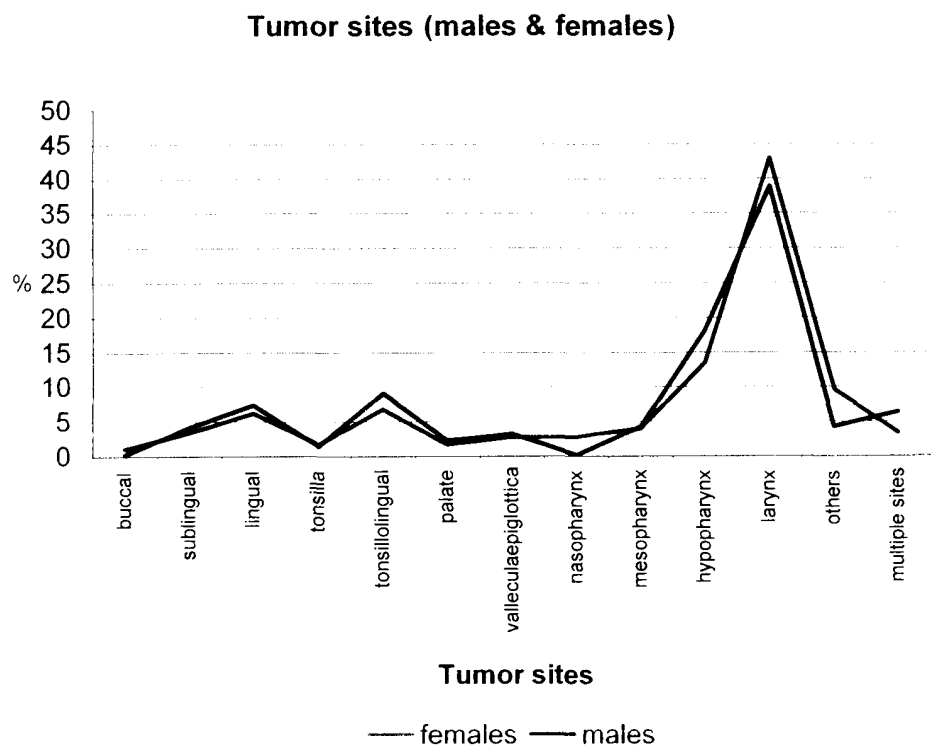


Chart 4

Overall 41 % of the patients were treated with surgery, 10% with radiotherapy, and 10% with combination of surgery and radiotherapy. 30 % underwent diagnostic procedures only, and the remaining 9 % was admitted to the hospital for other reasons, such as e.g. palliation (Chart 5a and 5b).

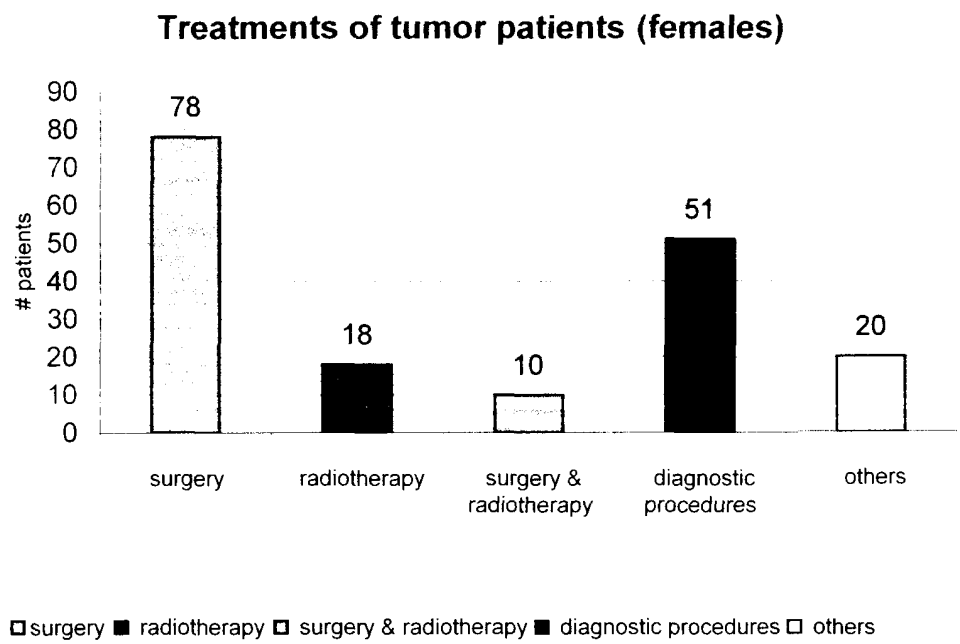


Chart 5a

Out of the 1325 patients with head and neck cancer, 676 patients had surgery (Chart 5a and 5b). 23 different surgical procedures were performed on 834 occasions. The type and nature of the surgical procedures made it necessary in 559 cases, to insert a nasogastric tube or to create a gastrostomy for the recovery period. Unfortunately, missing and inaccurate data were only available regarding the exact number of nasogastric tube inserted and the time they were used, during the course of treatment in the different subgroups of oncology patients.

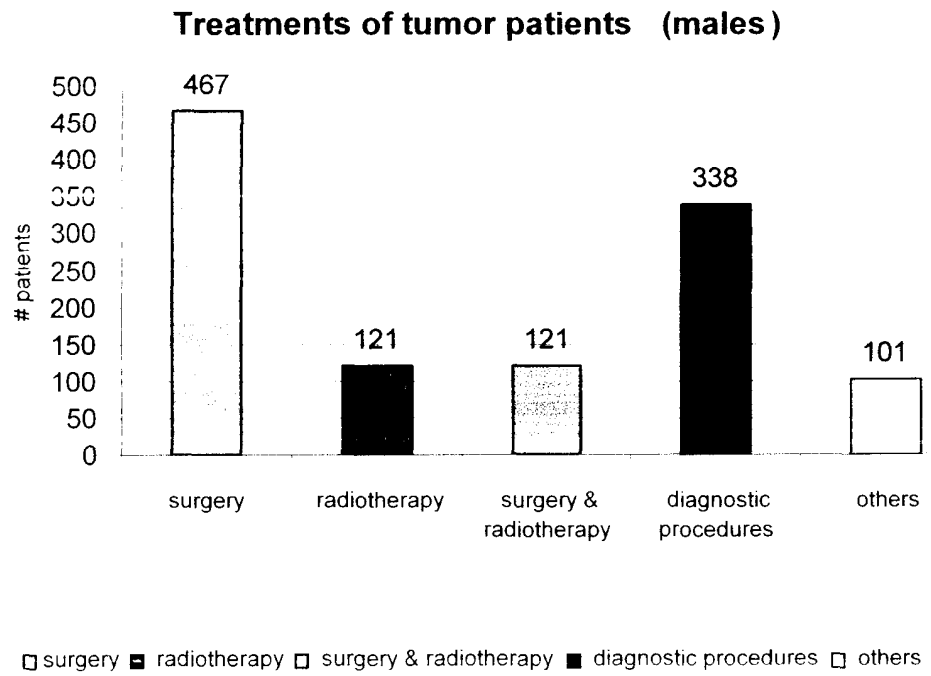


Chart 5b

Number of PEG procedures, timing of insertions, feeding days and replacements

115 percutaneous endoscopic gastrostomies were carried out on 98 head and neck cancer patients in the University of Pécs, Medical School, ENT Department between 7th of January 1997 and 31st of December 2003. The average age was 62 years (range 48-76 years) for female and 54 years (range 31-78 years) for the male patients. 73 PEGs were performed in 59 patients in the postoperative period 5 patients (6 PEGs) had preoperative, and 10 patients (11 PEGs) had intraoperative PEG insertions. One patient each had PEG inserted twice from the preoperative and intraoperative groups.

The second PEG procedure took place postoperatively in both cases. 25 PEGs (24 patients) were carried out as part of palliative treatment to provide nutritional support (Table 6). "Pull back" technique was used for PEG insertion, except for two cases of "push" technique. See details of the insertion technique under the chapter of "Insertion methods of PEG"

The insertion was performed either in general anesthesia or in sedation (Appendix 4). The assistance of a rigid laryngoscope was used, whenever difficulty was encountered during the introduction of the gastroscope. "Second-look" endoscopy was always performed, either per orally, or via the inserted PEG feeding tube (Appendix 5, 6, 7). PEG feeding was started gradually 12-24 hours after insertion, if postoperative assessment showed no signs for bleeding or leakage at the PEG site.

RESULTS

The average number of feeding days through PEG was 307 in the postoperative group. This value was calculated from results of 66 PEGs, as the data were missing in 7 cases. The shortest duration of PEG feeding was 6 days, while the longest was 2403 days. Postoperative PEG insertions took place 84 days in average (range 4-283 days) after the definitive surgical resection. The mean PEG feeding duration was 316 days (range 40-534 days) in the intraoperative group and it was 81 days (range 10-143 days) in the preoperative group. 24 patients had PEG as part of palliative therapy. The mean PEG feeding days in this group was 142 days (range 5-554 days) (Table 6).

In 10 postoperative patients the PEG had been permanently removed after 243 days in average (range 62-581 days), as adequate swallow function returned. In one preoperative case, PEG was removed on day 10 and in one palliative case on day 15, due to subsequent complication (Table 9). 11 patients had PEG insertion more than 1 time. PEG was change 4 times respectively in two patients, 3 times in another two patients and twice in 7 patients (Table 6). Complication was the reason for PEG replacement in 12 cases. 5 PEGs were removed as adequate per oral feeding returned, but later PEG had to be reinserted due to e.g. recurrence of tumor.

	No. of patients	No.of PEG insertion	No. of patients with multiple PEG insertions	Duration of PEG feeding (days)	Missing data (cases)
Postoperative group	59	73	8	307 (6-2403)	7
Intraoperative group	10	11	1	316 (40-534)	4
Preoperative group	5	6	1	81 (10-143)	3
Palliative group	24	25	1	142 (5-554)	3

Table 6

Tumor sites and types of surgical procedures

20 tonsillo-lingual-, 7 tongue base-, 2 tongue-, 5 sublingual-, 10 supraglottic-, and 7 hypopharyngeal cancers were diagnosed in the surgical groups with PEG. 16 cancers involved multiple sites and 7 were localized elsewhere (Chart 6). 13 of the 16 multiple site cancers involved the tongue base along with other sites such as supraglottic area, mesopharynx or hypopharynx. The

"others" group represented 3 mesopharyngeal, 2 trans-glottic, 1 parotid and 1 maxillary tumor.

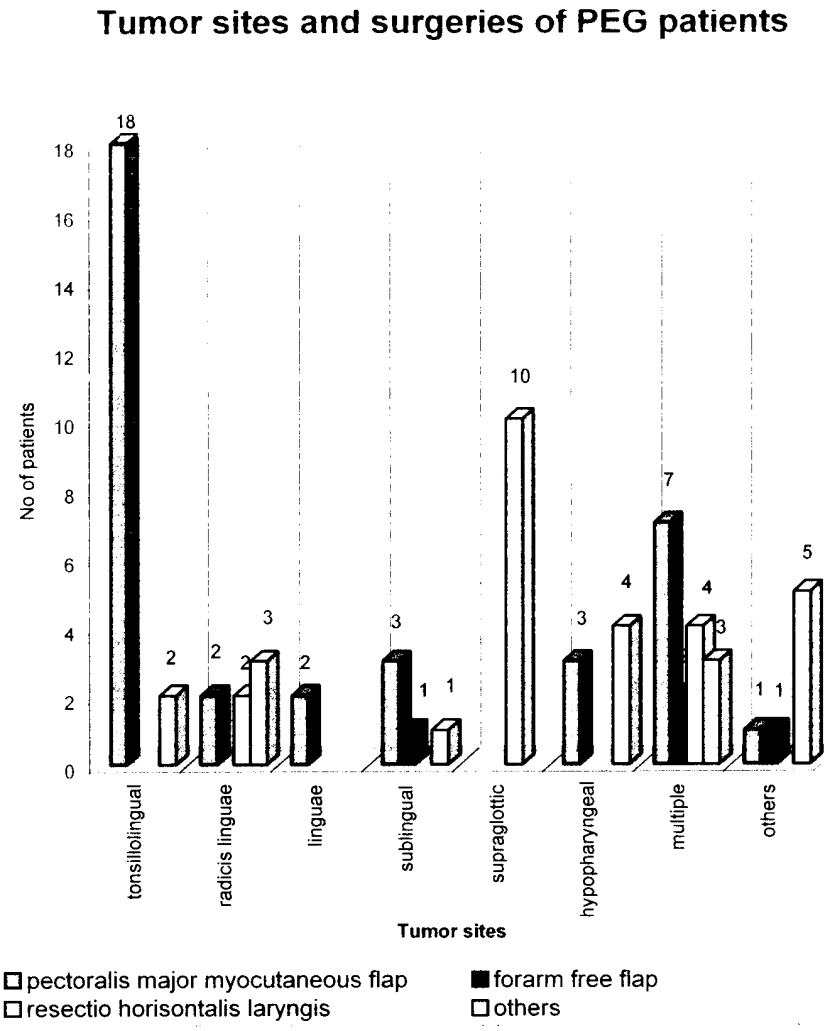


Chart 6

In total, 47 patients had cancers involving muscles responsible for tongue movement. Of the 74 patients in the surgical group, 36 had pectoralis major myocutaneous flap-, and 4 had radial forearm free flap reconstruction after radical resection of the tumors. 16 patients underwent horizontal supraglottic resection of the larynx. 6 of these cases also had tongue base involvement. In

18 cases, the tumors were resected radically without flap reconstruction. 8 surgical resections in this group also involved the muscle of the tongue and in 5 cases significant portion of the meso-hypopharynx were resected Involvement of hypopharynx by cancer was found in 16 surgical cases. (Table 7).

		No surgery	PMMF+ Radial forearm flap	Horizontal supraglottic laryngectomy	Radical surgery without flap
Tumor tonsillo-lingualis		6	**15, 3**		**2**
Tumor radicis linguae		3	**2**	**2**	**3**
Tumor linguae			**2**		
Tumor sublingualis		1	**2,** 2		**1**
Tumor laryngis supraglotticus				**10**	
Tumor hypopharyngis		6	**2,** 1		**1,** 3
Multiple sites	Larynx+rad.ling.		**1**	**4**	**2**
	Hypoph.+rad.ling.		**4,** 2		
	Meso-hypoph. +larynx	5	**1** 1		1
Others		3	1, **1**		**5**

Black numbers: postoperative group; red numbers: intraoperative group; blue numbers: preoperative group; green numbers: palliative group.
PMMF: Pectoralis major myocutaneous flap; Rad. ling.: tongue base; Hypoph.: hypopharynx; Meso-hypoph.: mesopharynx-hypopharynx;

Table 7.

General anesthesia, antibiotic prophylaxis, complications

Percutaneous endoscopic gastrostomy insertions took place under general anesthesia in 33 cases (Table 8). The rest was performed in local anesthesia (few puffs of 10% Lignocain spray) with or without sedation. Antibiotic was given to all patients in the preoperative and intraoperative group. Single dose antibiotic prophylaxis was used in 50 postoperative and in 14 palliative PEG procedures respectively. Most often, antibiotic was chosen from the cephalosporin group. Antibiotics were not routinely administered to patients needed PEG replacement.

	Laryngoscopy assistance	General anesthesia	Antibiotic prophylaxis	Complications	
				"in-use"	Procedure-related
Postoperative group (75 PEGs)	1	11	50	10	7 (2 AB)
Intraoperative group (10 PEGs)	0	10	10	0	0
Preoperative group (5 PEGs)	5	4	5	0	1
Palliative Group (25 PEGs)	4	8	14	0	2 (1AB)
Total	10	33	79	10 (8.77%)	10 (8.77%)

2 AB: Two patients received antibiotic prophylaxis; 1 AB: one patient received antibiotic prophylaxis.

Table 8

We experienced complications in 20 instances. "In-use" complications were dislodgement, fracture, and blockage of the feeding tube. Displacement and deterioration of the tubes occurred in 10 cases after a mean of 351 days (range 6-594 days). All 10 tubes were replaced. Peritonitis, peritubal leakage and wound infection were noted, among the procedure-related complications. 2 PEGs had to be removed for good and 2 needed replacement. Each patient with complication was put on antibiotic therapy. The rate of procedure-related complication was 8.77%, while the overall complication rate was 17.54%. 36 PEG insertions were performed without antibiotic coverage while 79 were covered. Of the 36 PEGs, with no antibiotic prophylaxis 7 complications were noted versus the 3 among the 79 covered with antibiotics (19.44% vs. 3.79%). This was significant difference (CHI square test $P<0.006$). No complication was found in the intraoperative group. They all received antibiotics (Table 8). Four patients in the palliative group died within two weeks after PEG insertion. None of the deaths were related to the procedure.

Technical notes

Always "pull" method was used to insert PEG, except for two cases with "push" technique. The introduction of the gastroscope into the stomach required the assistance of a Kleinsasser's laryngoscope in 4 preoperative, 4 palliative and 1 postoperative case. PEG was inserted once via a cervical pharyngo-cutaneaus fistula (Appendix 4). "Second-look" endoscopy was performed by a laryngofiberscope via the feeding tube in 12 instances (Appendix 6).

Outcome and mortality

On 31 December 2003, 52 (53%) patients were dead and 30 (31%) were alive. No data were available in 16 cases. 26 patients were using PEG for feeding out of the 30 still alive. 4 patients had their PEGs removed permanently due to return of adequate per oral feeding (Table 9). Death occurred within 2 weeks of PEG insertion in 4 palliative cases. None of the deaths were related to the PEG procedure. 48 patients died with their PEG still in place, while 4 had it removed earlier (Table 9).

	PEG removed			Died with PEG	Alive with PEG	No data
	Died	Alive	No data			
Postoperative group	4	4	2	23	21	5
Intraoperative group	8			6	1	3
Preoperative group	0	0	1	1	1	2
Palliative Group	1	0	0	17	3	3
Total	12			47	26	13

Table 9

DISCUSSION

Majority of patients with head and neck malignancies need artificial nutrition during the course of their disease. Nasogastric tube is sufficient for short-term (less than 4 weeks) nutritional support, however for long-term, percutaneous endoscopic gastrostomy is favored. The type of surgery, the tumor site, the extension, and the therapy determines the possible need for long-term feeding. These factors were studied in our oncology patients in order to define indication for PEG in head and neck surgical cases. The focus of our attention was on tumor site and surgical procedures that hinder swallowing the most. Swallowing is a complicated integrated process whereby a variety of different muscles and many nerves, somatic and visceral, afferent and efferent, are involved. The food is transferred from the oral cavity to the stomach and at the same time, prevention of aspiration is necessary. The intrinsic and extrinsic muscles of the tongue play a crucial role in both the oral and pharyngeal phase of swallowing. Good coordination of muscle contraction, tongue mobility and lingual propulsion are essential for proper function. Besides, coordinated and timed movement of the anatomical structures of the

supraglottic area is needed for airway protection. Thus, it is not surprising that tumors and consequent surgeries on these structures effect temporarily or permanently the swallowing capability of the patients.

Indication for PEG in head and neck surgery

The tumor registry and inpatient charts of patients hospitalized for treatment of head and neck cancers at Pécs University, Medical School, ENT Department were retrospectively examined. From January 1997 through December 2003, 1148 male and 117 female patients were admitted with head and neck malignancies. 23% of primary tumors involved the tongue and its muscles. Out of the 676 patients who underwent surgery, the resection involved the tongue, the tongue base or the tonsillo-lingual region on 187 (28 %) occasions.

82 times pectoralis major myocutaneous flap and 19 times radial forearm free flaps were used for reconstructions. These flaps were utilized 87 times to reconstruct the excision site of the tongue-base, sublingual, or tonsillo-lingual regions. 69 (79%) of the patients who underwent such surgeries needed tube feeding more than 4 weeks in the postoperative period.

Among the 74 patients with percutaneous endoscopic gastrostomy in the surgical groups, 47 (64%) had tumors involving the muscular structure of the tongue and tongue base. The ratio was somewhat less in the non-surgical, palliative group (10 out of 24 patients, 42%).

40 (54%) patients underwent pectoralis major myocutaneous flap. or radial forearm flap reconstructions after radical excision of their malignancies (Table

7a and 7b). Tongue involvements by the tumor or the need of musculo-cutaneous skin flaps for reconstruction seem to be important indicators for possible poor swallowing capability in the postoperative period. Either or both of these factors were present in 73% of all the surgical case and 80% in the postoperative group.

Supraglottic region also plays important role in the mechanism of deglutition and airway protection against aspiration. In our study, 6% of all head and neck oncology patients had supraglottic laryngeal malignancies. In the 7-year period, 47 horizontal supraglottic resections were performed, all requiring postoperative tube feeding. Out of the 47 supraglottic horizontal laryngectomies 16 (34%) had percutaneous endoscopic gastrostomy tube inserted for long-term nutritional support. The cancer was localized in the supraglottic region in 10 cases, and it also involved the base of tongue in the remaining 6. Among all the patients with PEG in our postoperative group, 16 (30%) underwent horizontal supraglottic laryngectomy previously.

16 patients in the surgical groups had tumors involving the hypopharynx. Due to the large extension of the tumor, 11 out of the 16 underwent radical surgical excision with skin flap reconstruction.

98 % of the patients who needed PEG feeding in the postoperative period had radical excision of cancers in the tongue region with or without skin flap reconstruction, or underwent supraglottic horizontal resection. The same figure was 86% among all the patients in the surgical groups receiving PEG (Chart 7a and 7b).

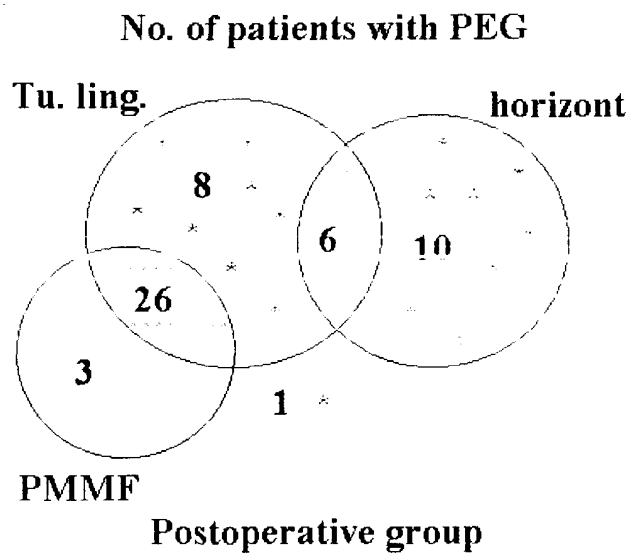
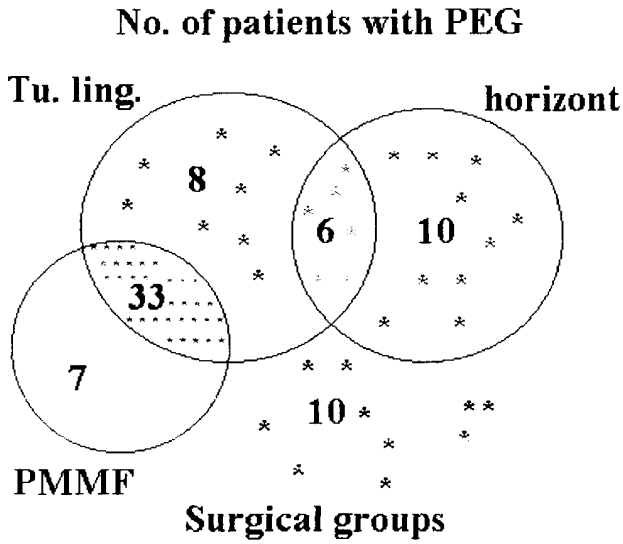


Chart 7a



Tu. Ling.: Tongue cancer; **Horizont**: horizontal supraglottic laryngectomy; **PMMF**: Pectoralis major myocutaneous flap or radial forearm free flap

Chart 7b

Excision of tumors in the lingual, sublingual, tonsillo-lingual or tongue base regions, all influence and hinder proper swallowing function. The need for different types of musculo-cutaneous skin flaps, also indicate that the resection was large and extensive. Besides, these musculo-cutaneous skin flaps cannot play an active role in the swallowing function, as do the tongue muscles, which they replace. They neither have muscle contracting capability nor innervations. The resection of the supraglottic region of the larynx also impairs proper deglutition and causes aspiration especially in elderly (63).

Based on our findings, we indicate PEG, if extensive surgical resection of the extrinsic tongue muscles needed, with skin flap reconstruction. Besides, we also noticed that there is a high risk for prolonged swallowing difficulties and aspiration in patients with supraglottic horizontal resections, especially, if the tongue base also had to be resected due to tumor involvement. This finding is not surprising, and is a well-known consequence of horizontal supraglottic laryngectomy, both when using endoscopic transoral, or transcervical approach (64-66). In such cases patients often need nutritional support for 2 to 9 month (66).

Extensive resection of primary tumors in mesopharynx or hypopharynx can also result in swallowing problems. The primary goal of head and neck surgery is to achieve local tumor control, however this means in most of the cases that the surgical site can only be closed by recruiting different flaps for reconstruction. This increases the risk for cervical pharyngo-cutaneous fistula, prolongs healing and delays the return of normal deglutition.

In sum, I suggest the use of percutaneous endoscopic gastrostomy at the time of the definitive surgery under the same general anesthesia on patients

undergoing extensive resection of tongue base with musculo-cutaneous flap reconstruction. Based on the experience acquired during our head and neck practice, we also advise PEG, if supraglottic horizontal laryngectomy is carried out with partial resection of the tongue base. Similar findings were reported by Gibson et al. recommending the routine preoperative placement of PEG in patients undergoing primary resection of advanced cancers in the larynx, pharynx, and tongue base (34). The third indication for PEG in our practice is when large portion of the mesopharynx or hypopharynx is required to be excised, with skin flap reconstruction (Table 10).

Indication for PEG in head and neck surgery

- Extensive resection of the extrinsic muscular structure of the tongue, with skin flap reconstruction.
- Supraglottic horizontal laryngectomy, with partial resection of tongue-base.
- Extensive resection of mesopharynx or hypopharynx with skin flap reconstruction.

Table 10

Timing of PEG procedure

From nutritional point of view, it would be ideal to perform PEG in the preoperative period. In addition, inserting PEG during staging endoscopy under general anesthesia is safer, carries less procedure-related

complications and more comfort for the patients. On the other hand, beside some disadvantages (Table 5), several other problems make preoperative PEG insertions impossible. At the time of staging endoscopy, no histology is available. Patient is informed about his or her disease only after the histology result confirms cancer. Usually, team of doctors (head and neck surgeons, oncologists, radiotherapists) set up the appropriate therapeutic plan, after all the necessary reports (CT, MRI, histology, endoscopic findings etc.) are available. The suggested therapy determines the possible later need for artificial feeding. Moreover, patient needs to agree and consent the planned surgery. All the above issues are difficult to resolve in the early stage of patient care, thus the preoperative percutaneous endoscopic gastrostomy has limited use. This explains the low number of cases in our preoperative group. The insertion of PEG in general anesthesia at the time of the definitive surgery eliminates these problems. Intraoperative placement of percutaneous endoscopic gastrostomy has few negligible disadvantages besides numerous benefits (Table 5). The fact that, it is in general anesthesia and the insertion takes place after excision of the cancer, allows a safe and obstacle-free introduction of gastroscope and PEG tube. Often, in head and neck cancers, this is the only way to carry out endoscopic gastrostomy as the tumor mass blocks the passage to the stomach. It has also been shown that placing the PEG tube during the surgery after tumor removal had low complication rate. Studies also revealed that the recovery of oral feeding and the healing of the resection site are faster, if PEG is used instead of nasogastric tube (60). In our series, 10 PEGs were inserted intraoperatively, after excision of the cancers. In 7 cases this was the only way to perform endoscopic gastroscopy

as tumor mass obstructed the way. In all of the 10 intraoperative cases, we anticipated prolonged inability to take adequate oral nutrition following surgery. This anticipation was based on the extension and site of the original tumor, and the type of surgery planned. The mean value of 316 PEG feeding days in the intraoperative group supported, that our presumption was correct. PEG was inserted most often in the postoperative period for patients with sustained swallowing problems. PEG procedure took place 84 days in average (range 4-283 days) after the definitive surgery. This basically means that patients were fed through nasogastric tube almost for a mean of three months following surgery. Indicating PEG in such cases is obvious, however our aim should be to select these patients preoperatively and to provide PEG early. Better quality of life could have been achieved by appropriate preoperative patient selection. Based on our experience, findings and comprehensive evaluation of the results of the postoperative insertions, we were able to define the primary tumor sites, types of surgeries that most often lead to impaired deglutition (Table 10). 80% of the patients in the postoperative PEG group had radical excision of cancers in the tongue region with or without musculo-cutaneous flap reconstruction. Though some cases overlap with the previous category, 30% of the patients underwent horizontal supraglottic laryngectomy, and 30% had tumor mass involving the hypopharynx (Chart 7a, and Table 9). The mean feeding period via PEG was 307 days in the postoperative group. This also underlines that patients with the above tumor sites and surgeries often need long-term nutritional support.

24 patients had PEG inserted as part of palliation. The role of PEG in the palliative care of demented people is the core of discussion in some

publications (67) (68). It is not questionable, that PEG is not indicated for patients with rapidly progressive and incurable disease. However, life expectancy can be hard to predict in head and neck cancer patients. PEG has no benefit compared to NGT in a short-run. There is also no evidence that enteral feeding via PEG improves the quality of life in such patients. In our material, the mean PEG in-use time during palliative care, was 142 days (range 5-554days). Though, it was less than 4 weeks in 5 cases, the rest of the patients had a definite benefit from PEG feeding. In our practice, the same basic principle applies for patients on palliation as for any other surgical cases, meaning that PEG is indicated, if the expected time for assisted feeding exceeds 4 weeks.

Procedure failures, complications, antibiotic prophylaxis, general anesthesia

The literature cites approximately 5 % failure rate for inserting PEG both in demented and head and neck cancer patients (69; 70). Most of the time, unsuccessful gastroscopy and the inability to transilluminate the stomach are the causes of failure. We were unable to perform percutaneous gastrostomy twice in our practice. In one case, we failed to achieve trans-illumination of the abdomen on a patient with previous gastric surgery. In the other, we could not pass the gastroscope through the narrow pharynx, developed after surgery and radiotherapy. However, it is worth reflecting on the fact, that we conducted a careful patient selection before the PEG procedures. The relative and absolute contraindications of PEG are listed in Table 11.

Contraindications of PEG

Absolute contraindication

- Inability to transilluminate the gastric and abdominal wall
- Failure of adequate identation of the proposed PEG site with finger
- Limited life expectancy
- Inability to pass the gastroscope through the oesophagus
- Peritontis
- Gastric outlet obstruction

Relative contraindication

- Massive ascites
- Coagulopathy
- Portal hypertension
- Peritoneal dyalisis
- Hepatomegaly
- Large hiatal hernia
- Morbid obesity
- Prior subtotal gastrectomy
- Anorexia nervosa
- Neoplastic, inflammatory, infiltrative diseases of gastric wall
- Ongoing immunosuppression
- Ileus

Table 11

Percutaneous endoscopic gastrostomy complications are usually divided into two categories, major and minor. However, there is a mix up in the literature, sorting these complications into either category. My view is that, even a minor complication, such as peristomal leak can be symptom-free for some patients, while it can progress to severe infection in others. I listed in Table 12 the complications found on Internet since 1997.

COMPLICATIONS OF PEG

- Peritonitis (72)
- Bleeding from gastrostomy site (30) (81)
- Aspiration (71)
- Peristomal leakage (71)
- Buried bumper syndrome (82)
- Gastrojejunal- (83), gastrocolic- (84), cologastric- (85), or colocutaneous fistula (86)
- Respiratory distress (72)
- Oesophageal perforation (72)
- Wound infection (87)
- Necrotizing fasciitis (88)
- Gastro-oesophageal reflux (89)
- Peritoneal leakage (90)
- Device dislodgement (91)
- Large-bowel perforation, obstruction (92)
- Bronchoesophageal fistula (93)
- Pneumoperitoneum (94)
- Gastric outlet obstruction (95)
- Metastasis to gastrostomy site (96) (97)

- Pharyngeal injury (98)
- PEG tube migration (99)
- Gastric wall haematoma (100)
- Transverse colon injury (101)
- Retroperitoneal hemorrhage (102)
- Aortic perforation (103)
- Gastric ulcer (104)

Table 12.

The mortality of PEG is around 1-2 %, and the morbidity rate is around 3-15 %. Peritonitis, hemorrhage, buried bumper syndrome, and gastrocolic fistula used to be cited as major complications of PEG, whereas wound infection, peristomal leak, hematoma are usually listed among the minor complications. Major complications occur in approximately 3 % in large series (30; 71). Minor problems are noted in 5-15% of PEGs (72-74). Complications can also be divided into "in-use" or "procedure-related". "In-use" complications include problems such as feeding tube blockage, fracture, dislodgement, and detachment of bumpers or deterioration of the tube. In our series we needed to change the PEG 10 times due to "in-use" reasons. 7 times the tube dislodged, 2 times it fractured, and once blocked. These events happened 351 days in average (range 6-594 days) after PEG insertion. "Procedure-related" complications were supposed peritonitis, peritubal leak, and wound infection. We noticed peritubal leakage on 4 occasions with clinical symptoms of infection. The onsets of symptoms were on day 3, 6, 37, and 149. All the

patients were put on systemic antibiotic therapy along with H-2 blockers. Enteral feeding was suspended for few days. Zinc paste was applied locally, to prevent maceration of the skin. Three times drainage bag was necessary to collect the discharge. In the case, where we noted peristomal leak on day 149 after PEG insertion, we removed the PEG, and reinserted few days later when the infection subsided. All cases with peritubal leakage resolved within two weeks. Afterwards PEG feeding was continued for 97 days in average (range 58-123 days). Starting with pain around the stoma site and peritubal discharge on day 5 after PEG insertion, we noted severe abdominal pain, tenderness and distension in two cases. Patients also developed fever, nausea and fatigue. The abdomen was firm, with board-like rigidity around the stoma site. In these two cases we supposed the presence of local peritonitis. Same treatment was used as for peritstomal leakage, but we were also compelled to remove feeding tubes. In one case this complication happened in the preoperative period, and delayed the definitive surgical procedure. This verifies our previous statement, that PEG at the time of the definitive surgical event is more favorable. Additionally, 4 times marked wound infections were noticed around the stoma site that developed 4, 4, 5, and 569 days after the PEG insertion. In all 4 cases local and systemic antibiotic treatment was started. PEG was also changed in the last case.

To reduce the incidence of peristomal leak, "second-look" gastroscopy or "trans-tubal" fiberscopy are important for checking the tightness of the feeding tube at the time of insertion. The inner bumper of the feeding tube should be relatively tight in the first few days but later should be loosened. Too loose adjustment can lead to pneumoperitoneum or peritonitis, whereas too tight

can cause cellulites or peristomal leak by pressure necrosis of the gastric wall We faced no complication among intraoperative PEG patients.

Four patients in the palliative group died within two weeks after PEG insertions (day 5, 5, 7, and 13), of causes unrelated to the gastrostomy tube insertion. The overall procedure-related complication rate was 8.77 %. This compares favorably with the results found in the international literature (75).

At the beginning, antibiotic prophylaxis was not routinely used for our PEG procedures, but later we found it useful to prevent wound infections. 36 PEG insertions were performed without antibiotic coverage, while 79 patients received antibiotics, either for prophylaxis or for treatment. Usually, antibiotics from the cephalosporin family were chosen. Of the 36 PEGs, with no antibiotic prophylaxis 7 complications were noted versus the 3 among the 79 done under antibiotic coverage (19.44% vs. 3.79%). This was significant difference (CHI square test $P< 0.006$). No complication was found in the intraoperative group. They were all covered by antibiotics (Table 8). The use of perioperative antibiotics seemed to be an important factor in minimizing intra-abdominal infections, as well as preventing local exit site infections. The significantly reduced rate of infection among those receiving antibiotics, is similar to the findings, reported in the literature (76-78). We recommend the use of antibiotic prophylaxis as a general measure in percutaneous endoscopic gastrostomy.

One advantage of PEG compared to the surgical open gastrostomy, is that, it does not necessarily requires general anesthesia. This eliminates the risk of anesthesia-related complications, more cost effective (79;80) and less time consuming (33). PEG should be performed in local anesthesia whenever it is possible. However, several specific issues should be considered in head and

neck cancer patients. Firstly, obstructing tumors might impede the free pass of the gastroscope, necessitating the assistance of a rigid laryngoscope in general anesthesia. Secondly, PEG might be also safer to do on an intubated patient, if airway is compromised by the tumor mass. Thirdly, PEG can be inserted at the time of the tumor excision, as a planned procedure, which saves the patient from an additional surgical event. For such reasons, 33 PEGs were carried out under general anesthesia in our series (Table 8). We recommend to consider the above specific issues and to weigh carefully on individual basis the risk-benefit of general anesthesia, before performing PEG in head and neck cancer patients.

The relevance of different insertion techniques was discussed in the chapter of "Insertion methods of PEG". Except for two "push" techniques, we mainly used "pull-back" insertion method. "Second-look" gastroscopy was always performed for checking the correct position of the inserted feeding tube. In 12 cases "second-look" was achieved via the inserted feeding tube by a flexible laryngofiberscope (Appendix 5, 6, and 7).

In 9 cases, maneuvering the gastroscope to the esophagus was only possible by using a Kleinsasser`s type rigid laryngoscope. Direct visual control enabled us to guide the gastroscope manually through the tumor mass into the esophagus.

In one postoperative case, both the gastroscope and the PEG tube was lead through cervical pharyngo-cutaneous fistula (Appendix 4).

In most of our patients, the decision to place PEG proved to be correct, as the majority of patients both in the surgical and palliative groups required enteral feeding on a long-term basis (Table 6). However, this is not surprising as most of the PEGs were inserted for patients, who already had permanent problem with per oral feeding. In 10 postoperative patients, PEG was removed permanently, as they had regained their ability of per oral feeding after 243 days in average (range 62-581 days). At the end of the study, 26 patients still used PEG for nutritional support. 47 patients expired of causes unrelated to the gastrostomy tube, with their PEG *in situ* at the time of death (Table 9).

THESES

1. Percutaneous endoscopic gastrostomy is advised for long-term enteral feeding in head and neck cancer patients.

2. The author recommends the use of percutaneous endoscopic gastrostomy in the first line, instead of nasogastric feeding tube for patients scheduled for the following surgeries:
    - Extensive resection of the extrinsic muscular structure of the tongue, with skin flap reconstruction.
    - Supraglottic horizontal laryngectomy, with partial resection of tongue- base.
    - Extensive resection of mesopharynx or hypopharynx with skin flap reconstruction.

3. PEG insertion is recommended at the time of the ablative tumor surgery in the same general anesthesia. If difficult gastroscopy is suspected due to massive tumor load, intraoperative PEG is advised.

4. "Second-look" gastroscopy should be performed for checking the correct position of the feeding tube and to exclude complications. The author recommends the use of his novel method ('trans-tubal" endoscopy), instead of the second per oral gastroscopy. A laryngofiberscope can be passed through the inserted PEG tube for adequate visual control.

5 Antibiotic prophylaxis is essential when performing percutaneous endoscopic gastrostomy in head and neck cancer patients. Antibiotic prophylaxis results in statistically significant reduction of the infectious complications.

6. PEG can be successfully performed via a cervical pharyngo-cutaneous fistula, if no other route is possible.

NOVELTIES

1. The author introduced for the first time, the use of percutaneous endoscopic gastrostomy for the management of patients with head and neck cancers in Pécs University, Medical School, ENT Department.

2. The author set up specific indications of PEG in head and neck cancer surgery, by working up the data of head and neck oncology cases treated in his department.

3. He detailed the procedure of intraoperative PEG. Emphasized the importance of timing the PEG procedure and recommended intraoperative PEG placement after careful patient selection, based on the specific indications, set up by him.

4. The author worked out and introduced first in the international literature a novel technique for "second-look". Instead of passing the gastroscope to the stomach second time when performing PEG procedure, a flexible laryngofiberscope is passed through the inserted feeding tube. Please refer to the text regarding the multiple advantages of this technique.

5. He published first in the international literature the possibility of performing PEG via a cervical pharyngo-cutaneous fistula formed after a major head and neck surgery

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APPENDIX 1

*Pécsi Orvostudományi Egyetem Fül-Orr-Gégeklinika (igazgató: Pytel József dr., egyetemi tanár)
**Pécsi Orvostudományi Egyetem és Irgalmas rend II számú Belgyógyászati Klinika
(igazgató: Nagy Judit dr. egyetemi tanár)

Perkután endoszkópos gasztrosztómia: pre-, intra- vagy posztoperatív beültetés

*LEHRER LÁSZLÓ DR., *SAÁROSSY KATALIN DR., **FÁBIÁN GYÖRGY DR., *PYTEL JÓZSEF DR.

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Kulcsszavak: fej-nyaksebészet, intraoperatív PEG, perkután endoszkópos gasztrosztómia, posztoperatív PEG, preoperatív PEG

A szerzők a fej-nyaksebészeti daganatos betegek hosszantartó mesterséges táplálása a nazogasztrikus szonda helyett a perkután endoszkópos gasztrosztomát (PEG) ajánlják. Felhívják a figyelmet a pre-, intra- és posztoperatív beültetés előnyeire és hátrányaira. Ismertetik az intraoperatív PEG lényegét és jelentőségét.

1997. január 07.–1998. február 28. között 25 sikeres PEG beültetést végeztek, 22 férfi és 3 nőbetegen „pull-through" technika szerint. A betegek átlagéletkora 56 (40–76) év volt. A PEG táplálási napok száma átlag 161 (10–416). 2 preoperatív, 2 intraoperatív és 19 posztoperatív beültetésre került sor. Két esetben nyaki műtét nélkül, palliatív célból történt a beültetés. Négy esetben (16%) észleltek szövődményt.

BEVEZETÉS

A rosszindulatú daganatos betegek testsúlycsökkenése közismert, melynek kialakulásában számos tényező szerepel. A csökkent tápanyagbevitel, a daganatos sejtek korlátlan tápanyag-, illetve energiafelhasználása és az előtérbe kerülő katabolikus folyamatok hatására fokozatosan alakul ki a fehérje illetve kalória alultápláltság állapota. Az alultápláltságot legtöbb esetben a daganat következményének tartjuk. A nemzetközi irodalomban azonban egyre többen számolnak be arról, hogy a keringési rendszerben előforduló kismolekulák (aminosavak, nukleobázisok, vitaminok, monoszacharidok) vérszintjének változása és a tumorgenezis között ok-okozati összefüggés van (5). A táplálékfelvételtől függő, elemi tápanyagmolekulák vérkoncentrációjának tartós csökkenésekor, vagyis a szervezet egyfajta éhezési állapotában, a daganatok kialakulásának valószínűsége nő (6). Ezt támasztja alá az a klinikai megfigyelés is, miszerint alultáplált, rossz szociális helyzetben élő, alkohol fogyasztók és erős dohányosok között nagyobb arányban fordulnak elő malignus tumorok. A fej-nyak területén elhelyezkedő daganatos elváltozások és az ilyen betegek műtéti-, illetve sugárkezelése kapcsán fellépő, átmeneti vagy végleges rágási és nyelési nehézség a táplálékfelvétel további csökkenését okozza. A posztoperatív szakban és az irradiációs terápia során, fokozott tápanyagbevitelre lenne szükség. Számos tényező tehát együttesen felelő a tumoros cachexia kialakulásáért.

Kielégítő tápláltsági állapot elengedhetetlenül szükséges a megfelelő kezeléshez, a gyor

*7621 Pécs, Munkácsy M. u. 2.

sebgyógyuláshoz, a szövődmények kialakulásának csökkenéséhez és ezáltal a beteg mielőbbi rehabilitációjához.

A fül-orr-gégészeti gyakorlatban mesterséges táplálás céljából a nazogasztrikus szonda használata a legelterjedtebb. Viszonylag egyszerűen levezethető és olcsó, azonban számos hátránya miatt nem célszerű 3–4 hétnél tovább tartó enterális táplálásra használni.

Várhatóan hosszabb időn át tartó enterális táplálás esetén perkután endoszkópos gasztrosztóma (PEG) készítése javallt.

Gauderer, Ponsky és Izant 1980-ban közölték az ambulanter, helyi érzéstelenítésben és laparotomia nélkül elvégezhető perkután endoszkopos gasztrosztomia módszerét un. „pull-back" („visszahúzás") technika szerint (1). A beültetés menetét Horváth, Harsányi, Faller és Elő ismertették részletesen 1996-ban (3). A PEG beültetésére számos egyéb technika is ismert, mint például a „push on wire" (vezetődróton történő betolás") (Sacks, Vine, Palestrant, Ellison, Shropshire és Lowe 1983) (11), „poke" („átszúrás") (Russel, Brotman és Norris 1984) (10) vagy a fluoroszkópos módszer (Wills és Oglesby 1983) (13). A fenti módszerek ismertetése meghaladja közleményünk kereteit. Az intraoperatív perkután endoszkópos gasztrosztómia módszerét hazánkban először Dubecz, Bodoky és Harsányi ismertették (7).

Klinikánkon a fej-nyak daganatos betegek mesterséges táplálása céljából 1997 elején vezettük be a perkután endoszkópos gasztrosztómát.

Beteganyag és módszer

A pécsi Fül-Orr-Gégeklinikán 1997. január 07.–1998. február 28. között 24 betegen összesen 25 sikeres PEG beültetést végeztünk. Egy betegen két alkalommal került sor a beavatkozásra.

Minden esetben CH 18-as Flocare PEG Set-et (Nutricia), használtunk, melynek beültetése „pull back" technika szerint, a cég által ajánlottaknak megfelelően történt. A gasztrosztómiát 19-szer helyi érzéstelenítésben és 6-szor intratrachealis narkózisban végeztük. A beavatkozás előtti napon a betegnél rendszeres szájöblögetést kezdtünk Phlogosol oldattal, majd a beültetést megelőző órában 2,5 mg Dormicumot és 100 mg Contramalt tartalmazó 0,9% NaCl i. v. infusiót adtunk premedikációként. Percekkel az endoszkóp levezetése előtt még 2,5 mg Dormicumot adtunk i. v. illetve a szájnyálkahártya érzéstelenítésére 10% Lidocain spray-ből 3–4 befújást alkalmaztunk.

A beavatkozást 21 férfi- és 3 nőbetegen végeztük (egy férfi betegen két alkalommal történt a PEG), átlagéletkoruk 56 (40–76) év volt. Közülük 10 mesopharynx-, 5 szájüregi-, 4 gége-, 2 hypopharynx- és 3 több regióra is kiterjedő tumoros beteg volt. Két esetben preoperatíve, 2-szer intraoperatíve és 19 alkalommal posztoperatíve zajlott a perkután endoszkópos gasztrosztómia. Két betegen palliatív citosztatikus kezelés előtt került a PEG beültetésre. A posztoperatív esetekben a PEG készítése átlag 3 hónappal a műtétet követően történt (a 13. beteget a statisztikába nem számítottuk bele, mert évekkel a műtét után történt a PEG beültetés). A PEG táplálási napok száma átlag 161 (10–416) nap volt. 14 esetben a tumorexcisiot követően kialakult szövethiányt pectoralis major myocutan lebennyel és egy alkalommal pedig alkari radiális szabad lebennyel pótoltuk. Hat esetben végeztünk gégerezekciót. 11 betegen történt pre- vagy posztoperatív telecobalt irradiáció (1. táblázat).

I. táblázat

beteg	kor (év)	tumor helye	beavatkozások	műtét és PEG között eltelt napok	PEG napok	szövődmények	megjegyzés
Posztoperatív inszerció							
T.J.ffi	57	mesopharynx	tu.exc.+PMMF	130	416	-	appendect.
M.G.ffi	51	mesopharynx	tu.exc.+PMMF	70	109	-	preop.irrad.
B.M.nő	71	larynx	res.horisont.laryngis	58	273	bőrreactió	†
N.L.ffi	46	larynx	res.horisont.laryngis	38	337	-	-
K.K.ffi	56	mesopharynx	res.horisont.laryngis	169	380	-	-
L.J.ffi	71	cavum oris	tu.exc.+PMMF	83	336	-	-
T.J.nő	76	cavum oris	tu.exc.+PMMF	90	306	bőrreactió	preop.irrad.
F.I.ffi	61	mesopharynx	tu.exc.+PMMF	70	264	-	-
V.B.ffi	57	hypopharynx	tu.exc.+PMMF	10	218	-	-
K.J.ffi	58	mesoph.+larynx	total+res.radic.ling.	120	204	-	-
T.A.ffi	51	mesopharynx	tu.exc.+PMMF	42	105	peritub.váladék	preop.irrad. †
H.J.ffi	64	meso-hypoph.	total+tu.exc.+PMMF	22	106	-	ITN, †
W.G.ffi	52	cavum oris	tu.exc.+PMMF	1825	59	peritub.váladék	postop.irrad., †
B.J.ffi	69	larynx	res.horisont.laryngis	230	115	peritub.váladék	postop.irrad.
M.A.ffi	40	mesopharynx	total+res.radic.ling.	137	82	-	postop.irrad., †
K.F.ffi	46	larynx	res.horisont.laryngis	78	67	-	-
M.G.ffi	51	mesopharynx	tu.exc.+PMMF	203	47	-	preop.irrad.
Sz.B.ffi	50	mesopharynx	res.horisont.laryngis	50	82	-	ITN
S.J.ffi	65	mesopharynx	tu.exc.+PMMF	34	74	-	preop.irrad.,ITN
Intraoperatív inszerció							
B.P.nő	59	meso-hypoph.	tu.exc.+PMMF	-	135	-	ITN
K.P.ffi	44	hypopharynx	tu.exc.+rad.free flap	-	37	-	ITN,preop.irrad
Preoperatív inszerció							
H.J.ffi	57	cavum oris	tu.exc.+PMMF	-	10	peritub.váladék	hasműtétek,irrad
Sz.I.ffi	51	mesopharynx	tu.exc.+PMMF	-	31	-	ITN
Palliatív							
L.J.ffi	44	cavum oris	palliatív th.	-	?	-	-
K.L.ffi	49	mesopharynx	palliatív th.	-	82	-	irradiáció

Rövidítések: tu. exc.: tumor excisio; res. horisont. laryngis: resectio horisontalis laryngis; PMMF: pectoralis major myocutan lebeny; total: laryngectomia; res. radic. ling.: resectio radicis linguae; rad. free flap: radialis szabad lebeny; th.:therápia; appendect.: appendectomia; preop. irrad.: preoperatív irradiáció; postop. irrad.:posztoperatív irradiáció; peritub.:peritubális; ITN: intratrachealis narkózis

Eredmények

Az elmúlt évben vezettük be a perkután endoszkópos gasztrosztómia módszerét klinikánkon. Elsősorban a már régóta mesterséges táplálásra szoruló betegeinknél cseréltük ki a nazogasztrikus szondát PEG-re, ezért található nagyobb számban posztoperatív beültetés beteganyagunkban. Mindezt alátámasztja, hogy a műtét és a PEG beültetés között átlag 3 hónap telt el.

A posztoperatív csoportban 11 olyan betegnél alakult ki nyelési panasz, akiknél a tumor kiterjedtsége miatt a nyelv, nyelvgyök, szájfenék vagy lágyszájpad részleges rezekciójára is szükség volt. A hiányt pectoralis major myocutan lebennyel pótoltuk. További 6 esetben gégerezekciót követően és két alkalommal nyelvgyöki rezekcióval járó gégecsonkolás után jött létre dysphagia. Ezen esetek egy részében is a kiterjesztett nyelvgyöki rezekció volt a nyelési nehézségért a felelős. A 6 parciális gégeműtét után kettő betegnél tapasztaltuk, hogy a nazogasztrikus szonda PEG-re való cseréjét követően, a már hónapok óta rossz nyelési

funkció napok múlva javult, mellyel párhuzamosan az arytájak ödémája is csökkent. Három betegnél altatásban történt a PEG. Egyik alkalommal, szájüregi sebrevízió kapcsán került sor altatásban a PEG beültetésére. A másik esetbe horizontális gégerezekció és radikális egyoldali blokk-dissectio után nem állt helyre kielégítő nyelési funkció, így az első műtétet követő 6. hétre tervezett szekunder radikális nyaki dissectio alkalmával készítettük el a gasztrosztómát. Harmadszor garatfisztula kürettázs miatt altattuk a beteget.

A két intraoperatív esetünkben a preoperatív gasztroszkópiát lehetetlenné tette a mesoés hypopharynx hátsó és részben oldalsó falán elhelyezkedő tumoros szövetszaporulat. A tumor excisiojat követően a rekonstrukciós lépések előtt végeztük el a gasztrosztómiát úgy, hogy a gasztroszkópot a műtéti területen keresztül közvetlenul a rezekalt nyelocso kezdetébe helyeztük. Az eszköz levezetése után ujjunkkal enyhe nyomást fejtettünk ki az oesophagusbemenetre, megakadályozva ezzel, hogy az insufflalt gyomorbol a levego elszokjon. A perkután punkciót és fonal kivezetést követően a tápszondát a nyelőcsövön és a gyomron keresztül húztuk vissza és vezettük ki retrográd módon a bőrön át. Mindkét esetben szövődménymentes volt a gyógyulás.

Kiterjedt sublingualis tumoros férfi betegnél preoperatíve történt a PEG elkészítése, a beteg tápláltsági állapotának javítása céljából. A beültetést követő 4. napon azonban először a szonda körül bőrgyulladást majd gyomortartalom peritubalis ürülését, ezt követően pedig lokális peritonitis jeleit észleltük. Konzervatív kezelés ellenére a folyamat progrediált, így a szonda eltávolítására kényszerültünk.

A másik preoperatív esetben a „preoperatív" jelző csak éppen hogy megállja a helyét, hiszen a beültetés a tumor excisioja előtt, az intubálást követően történt.

További 2 alkalommal palliatív terápia részeként készítettünk perkután gasztrosztomát.

A 25 betegnél összesen a perkután endoszkópos gasztrosztómán át történő táplálási napok száma 3875 nap (átlag 161) volt. A legrövidebb 10, a leghosszabb 416 nap.

Kezelést igénylő szövődményt 4 alkalommal (16%) tapasztaltunk. Ez az arány összehasonlítva a nemzetközi irodalomban leírtakkal, elfogadhatónak mondható (8). Minden esetben a beültetést követő 4–5. napon lokális bőrreakcióval járó szonda körüli gyomorváladék ürülést észleltünk. Ilyenkor a betegeket néhány napig parenterálisan tápláltuk és a PEG-en át antacidumot illetve antibiotikumot adtunk. A korábban említett eset kivételével, a szövődményeket 2–3 nap alatt a fenti kezeléssel szanálni tudtuk.

Nyaki fisztula a preoperatív és az intraoperatív esetekben nem alakult ki. A posztoperatív csoportban pedig néhány esetben éppen a meglevő nyálsipoly gyorsabb záródásának elősegítése érdekében döntöttünk a PEG mellett. Eddigi tapasztalataink szerint kevesebb nyaki fisztula alakul ki illetve ezek záródása gyorsabb PEG esetén.

Megbeszélés

Klinikánkon évente nagy számban folyik a fej-nyaksebészeti daganatos betegek műtéti-, sugár- és citosztatikus kezelése illetve gondozása. Számos betegnél a műtét kiterjesztettsége, a sugárterápia vagy a tumoros folyamat előrehaladott állapota miatt nyelési illetve rágási képtelenség alakul ki. Az elmúlt évekig elterjedt általános magyar fül-orr-gégészeti gyakorlatnak megfelelően a betegek mesterséges táplálására nazogasztrikus szondát használtunk. Ennek ismert hátrányai miatt, ma már nyilvánvaló, hogy a 4–6 hétnél tovább tartó enterális táplálás esetén perkután gasztrosztómia a modern eljárás. A pre-, intra- vagy posztoperatív beültetés lehetősége azonban számos kérdést vet fel.

A kis esetszám miatt saját tapasztalatunk még nincs, de nyilvánvaló, hogy a preoperatív beültetéssel korán megkezdhető táplálás miatt jobb tápláltsági állapotú beteg kerül műtétre. A beavatkozást elvégezhető altatásban a „staging" endoszkópia során, ami így nem

elent külön megterhelést a beteg számára. Előfordulhat azonban, hogy PEG kapcsán szövődmény alakul ki, mely a tervezett műtét időpontját kitolva, rontja a beteg gyógyulási esélyeit. Sajnos a mi első preoperatív beültetésünknél is ez történt, így a tervezett műtétet sót háttel el kellett halasztanunk. További hátránya a műtét előtti PEG készítésnek, hogy a gasztroszkóp illetve a tápszonda levezetése tumoros környezetben történik, ami a suffocatio kialakulásának (9) és a tumor transzplantálódásának esélyét növeli. Ritkán, de előfordul, hogy fej-nyak daganatos betegeknél PEG beültetést követően bőrmetasztazis alakul ki a készített gyomorsipoly körül (4, 12). Az indikáció helyes felállítása a preoperatív csoportban a legnehezebb.

Százzárat okozó tumorok esetén a transznazális levezetés (14), míg az endoszkópot lehetetlenné tevő, kiterjedt daganatok esetén az intraoperatív beültetés (7) jelenthet megoldást. A tumor excisiója követő intraoperatív perkután endoszkópos gasztrosztómia könnyen, akadálytalanul elvégezhető és a tumor transzplantálódásától sem kell tartanunk. A módszer a „pull" és a „push" technika előnyeit is egyesíti. „Pull" technika esetén ugyanis a fonal húzási iránya és a tápszonda haladása nem egy vonalba esik, így a fonal a cardia nyálkahártyáját végigvághatja, sérülést és vérzést okozhat. „Push" technika ezt vezetődrót használatával igyekszik kiküszöbölni. Intraoperatív beültetés során a tápszonda közvetlenül a rezekált nyelőcsőbe kerül, rövidebb utat kell a szondának a cardiáig megtennie és így annak vége könnyen a cardia alá tolható anélkül, hogy a fonal segítségével húznánk, ami a sérülését okozhatja.

A műtét alatti levezetés hátránya, hogy a műtéti terület izolálására és a sterilitásra nagyobb gondot kell fordítani, valamint a műtét ideje is megnő (kb. 20 perccel).

A posztoperatív beültetésnek talán az egyetlen előnye, hogy valóban csak azoknak a betegeknek kerül a PEG beültetésre, akiknél erre igazán szükség van (2. táblázat).

A fent vázolt hátrányok az egyes csoportokon belül csupán a beültetés időpontjából fakadnak, nem pedig a módszer hibájából.

Beteganyagunkból jól kitűnik, hogy műtétet követően hosszantartó nyelési panasz elsősorban kétfajta műtét után alakult ki. Egyik csoportot, az elsősorban idősebb betegeknél végzett gégerezekciók esetei képezik, ahol a tumor kiterjedtsége miatt nyelvgyök nagy részének rezekciójára is szükség volt. A másik csoportot azok, ahol a tumor excisioját köve-

II. táblázat

Preoperatív PEG		Intraoperatív PEG		Posztoperatív PEG	
előnye	hátránya	előnye	hátránya	előnye	hátránya
korán elkezdhető enterális táplálás	kiterjedt tu.gasztroszkópos akadályt jelent	nincs akadálya a gasztroszkóp levezetésének	bonyolultabb műtéti izolálás	könnyebben felállítható az indikáció	később kezdhető enterális táplálás a PEG-en át
ITN-ben, staging endoszkópia során elvégezhető	tumorsejt transzplantáció lehetősége	nincs tumorsejt transzplantáció	megfelelő sterilitás elérése		plusz megterhelés a betegnek
	suffocatio kialakulhat	nincs suffocatio	műtét idejének hosszabbodása		
	szövődmény kitolja a műtét tervezett idejét	"pull" és "push" technika előnyeit egyesíti			
	nehezebben állítható fel az indikáció	nem terheli a műtéti területet			

Rövidítések: ITN : intratrachealis narkózis; PEG : perkután endoszkópos gasztrosztómia; tu : tumor

tően valamilyen lebenypótlásra került sor (pectoralis major myocutan- vagy szabad lebeny). Különösképpen a kiterjedt nyelv-, nyelvgyök-, szájfenék- vagy lágyszájpad rezekciója esetén javasoljuk a preoperatív PEG megfontolását, hiszen nagy a valószínűsége, hogy a beteg normalis nyelési funkciója maradéktalanul sohasem tér vissza és így a részben vagy egeszben mesterseges táplálásra szorul.

Irodalmi adatok szerint a PEG a műtéti területet tehermentesíti, a sebgyógyulás gyorsabb és kevesebb nyaki fisztula alakul ki. IV stádiumú fej-nyaki tumor műtétek után nazogasztrikus szondás betegeknél 42%-ban, míg PEG-gel rendelkező betegeknél 25%-ban alakul ki nyaki sipoly. A fentiek által a hospitalizációs idő és a kórházi költségek is csökkennek (2).

Megfigyeléseink szerint számos esetben a nazogasztrikus szonda állandó irritációja ödémát és ezáltal nyelési panaszt tart fent, ami megszűnik PEG-re való áttérés után. PEG esetén a betegek kedélyállapota is jobb.

Összegzés

- 4–6 hétnél tovább tartó enterális táplálás esetén PEG javasolt.
- A „pull-back" technika szerinti PEG beültetés kevés szövődménnyel járó, gyors és biztonságos módszer.
- A posztoperatív esetekből levonható tapasztalataink alapján, kiterjedt nyelv, nyelvgyök, szájfenék vagy lágyszájpad rezekció során már az első lépésben javasoljuk a PEG beültetését.
- Gégecsonkoláson átesett idős betegek nyelési képessége javul, amennyiben az állandó irritációt fenntartó nazogasztrikus szondát perkután endoszkópos gasztrosztómára cseréljük.
- Gasztroszkópos akadályt jelentő tumoros folyamat jelenlétekor intraoperatív beültetés is szóba jön.

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SUMMARY

Lujber L., K. Saárossy, Gy., Fábián, J., Pytel: Percutane endoscopical gastrostomy: pre-, intra- or postoperative implantation

In the course of treatment of patients with head- and neck tumours, who are undernurtured the adequate feeding is extremely important.

The authors recommend the percutane endoscopical tube to feed patients with head- and neck tumours artificially during a long period. They have done 25 successful PEG implantations between 7th January of 1997 and 28th January of 1998, in 22 male and in 3 female patient according to the "pull through" technique. Average age of the patients was 56 years (between 40-76). The average nourishing time with PEG was 161(10-416)days.

The authors had to manage implantations in 2 cases preoperatively, in 2 cases intraoperatively and, in 19 cases postoperatively. In 2 cases, implantation was done withouth nack-operation with palliative purpose. They observed complications in 4(16%) cases.

Beginning of artificial nourishing to improve condition of ill-fed patients, the authors recommed PEG already in the preoperative peroid. PEG is recommended as the first step especially in cases, where the malignant tumour sits widespreaded in the tongue, radix of the tongue, in the floor of the mouth or in the soft palate, which conditions require resection.

They call the attention to advantages and disadvantages of pre-, intra- and postoperative implantation. The authours review the essence and importance of intraoperative PEG.

ZUSAMMENFASSUNG

L. Lujber, K. Saárossy, Gy. Fábián, J. Pytel: Perkutane endoskopische Gastrostomie: prae-, intra- oder postoperativ

Bei der Behandlung von unterernährten Patienten mit Tumoren im Kopf-Hals-Bereich ist die entsprechende Ernährung außerordentlich wichtig. Für eine langzeitige künstliche Ernährung dieser Patienten empfehlen die Verff. anstelle der nasogastrichen Sonde das Anlegen eine perkutane endoskopische Gastrotomie (PEG).

Zwischen dem 7. Januar 1997 und dem 28. Januar 1998 führten sie 25 erfolgreiche PEG (22 Männer, 3 Frauen) nach der "pull through" - Technik durch. Das mittlere Alter der Patienten war 56 (40-76) Jahre. Die Ernährung über die PEG dauerte im Durchschnitt 161 (10-416) Tage. Das Anlegen erfolgte in 2 Fällen präoperativ, in 2 Fällen während der Operation und 19 mal postoperativ, in zwei Fällen palliativ, ohne die Operations des Halstumors. In 4 Fällen (16%) traten Komplikationen auf. Im Interesse des Ernährungszustandes wird der präoperative Beginn der künstlichen Ernährung empfholen. Bei ausgedehnten Resektionen von Zunge, Zungenwurzel und Mundboden sollte die PEG der erste Schritt des Operatinsprogrammes sein. Vorteile und Nachteile der prä-, intra- und postoperativen PEG werden erörtert. Wesen und Bedeutung der intraoperativen PEG werden erläutert.

APPENDIX 2

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Percutan endoscopos gastrostomia

LUJBER LÁSZLÓ DR.[1] BANHEGYI GYÖRGY DR.[1], GERLINGER IMRE DR.[1]
FÁBIAN GYÖRGY DR.[2] PYTEL JÓZSEF DR.[1]

Pécsi Tudomány Egyetem, Fül Orr-Gégeklinika[1] Pécsi Tudomány Egyetem, II. számú Belgyógyászati Klinika[2]

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Összefoglalás. A szerzők a fej-nyaksebészeti daganatos betegek hosszantartó mesterséges táplálására a percutan endoscopos gastrostomat ajánlják. 1997. január 07–1999. december 31. között 58 sikeres beültetést végeztek, 48 férfi és 9 nőbetegen. A betegek átlagéletkora 57 (40–78) év volt. A táplálási napok számának átlaga 371 (5–1079). 4 praeoperatív, 4 intraoperatív és 44 postoperatív beültetésre került sor. Hat esetben nyaki műtét nélkül, palliatív célból történt a beültetés. Per oralisan, nyaki fistulán át, megnyitott garaton keresztül vagy direct laryngoscopia során vezették a gastroscopot a gyomorba és pull, illetve push technikát alkalmaztak. Tíz esetben (17,2%) észleltek szövődményt. A postoperatív szakban beültetett percutan endoscopos gastrostomás esetekből levont tapasztalatok alapján kiterjedt nyelv, nyelvgyök, szájfenék, lágyszájpad, illetve garat resectiojával járó eseteknél javasolják a percutan endoscopos gastrostoma prae- vagy postoperatív kialakítását.

Kulcsszavak: fej-nyaksebészet, mesterséges táplálás, percutan endoscopos gastrostoma

Percutaneous endoscopic gastrostomy

Summary: The authors recommend the use of the percutaneous endoscopic gastrostomy for the long artificial nutrition of patients with head and neck cancer. 58 successful percutaneous endoscopic gastrostomy tube insertion was performed on 48 male and 9 female patients between the 7th of January, 1997 and 31th of December, 1999. The age of the patients were 57 (40–78) years in average. The mean value of days using gastrostomy feeding tube was 371 (5–1079). Insertions took place 4 times both preoperatively and intraoperatively, and 44 times in the postoperative period. In 6 cases the insertion was part of the palliative therapy with no surgical intervention. Either „pull" or „push" methods were used after inserting the gastroscope into the stomach through the mouth or the fistulae of the neck, or via the resected pharynx or by the help of direct laryngoscope. Complications were detected in 10 (17.2%) cases. As a conclusion from the postoperative cases, the authors recommend either pre- or intraoperative insertion of percutaneous endoscopic gastrostomy feeding tube in case of major surgery involving the tongue, tongue-base, floor of the mouth, the soft palate or the pharynx.

Keywords: artificial nutrition, head and neck surgery, percutaneous endoscopic gastrostomy

Bevezetés

Valamilyen okból táplálkozásra képtelen betegek mesterséges táplálása nemcsak a sebészeti szakmákban, de egyéb diszciplinákban is rendkívül fontos. A táplálтsági állapot befolyásolja a gyógykezelés hatékonyságát, emiatt ennek monitorozására és lehetőség szerinti korrekciójára egyre nagyobb hangsúlyt kell fektetnünk [6]. Kielégítő táplálтsági állapot elengedhetetlenül szükséges a megfelelő kezeléshez, a gyors sebgyógyuláshoz, a műtéti szövődmények kialakulásának csökkenéséhez és ezáltal a beteg mielőbbi rehabilitációjához. Az utóbbi években hazánkban a percutan endoscopos gastrostoma (PEG) egyre nagyobb szerepet tölt be az enteralis mesterséges táplálásban. A fül-orr-gégészeti gyakorlatban a nasogastricus szonda használata a legelterjedtebb, azonban várhatóan 3–4 hétnél tovább szükséges enterális táplálás esetén PEG készítése javasolt.

Gauderer, Ponsky és *Izant* 1980-ban közölték az ambulanter, helyi érzéstelenítésben és laparotomia nélkül elvégezhető percutan endoscopos gastrostomia módszerét ún. „pull back" („visszahúzás") technika szerint [1]. A magyar irodalomban a beültetés menetét *Horváth, Harsányi, Taller* és *Élő* ismertették részletesen 1996-ban [3]. Különböző technikai módosításokról mint például a „push on wire" („vezetődróton történő betolás") (*Sacks, Vine, Palestrant, Ellison, Shropshire* és *Lowe* 1983) [11], a „poke" („átszúrás") (*Russel, Brotman* és *Norris* 1984) [10], illetve a fluoroszkópos módszerről (*Wills* és *Oglesby* 1983) [13] számoltak be. Az intraoperatív percutan endoscopos gastrostomia módszerét hazánkban először *Dubecz, Bodoky* és *Harsányi* ismertették [7]. *Taller, Horváth, Harsányi, Balatoni* és *Iliás* 1997-ben transnasalisan behelyezett PEG-ről számoltak be [14].

Klinikánkon a fej-nyak daganatos betegek mesterséges táplálására 1997 elején vezettük be a percutan endoscopos gastrostomiát. Döntően a postoperatív szakban került sor PEG beültetésére. A fej-nyak tumoros beteganyagunk így jól tükrözi azon kórfolyamatokat, illetve műtéti beavatkozásokat amelyek után várhatóan hosszantartó mesterséges táplálás válik szükségessé. A levont tapasztalatok alapján bátrabban és korábban indikálhatjuk a PEG-et.

Beteganyag és módszer

A pécsi Fül Orr-Gégeklinikán 1997. január 07–1999. december 31. között 57 betegen összesen 58 sikeres PEG beültetést végeztünk. Egy betegen két alkalommal került sor a beavatkozásra (re-PEG). Két fajta PEG szereléket

(Folcare PEG Nutricia és Flexiflo Abbott) használva, Olympus endoscop segítségével a gastrostomiat „pull" illetve „push" technika szerint 43-szor helyi érzéstelenítésben és 15 ször intratrachealis narcosisban készítettük. 52 esetben peroralisan, egyszer Kleinsasser féle direct laryngoscopos asszisztálás mellett, egy alkalommal nyaki fistulán keresztül és négyszer tumorresectiót követően a megnyitott gyomron át be [illegible] endoscopot a gyomorba. A tápszondák 16–20 Ch-esek voltak. A beavatkozás előtti napon a betegnél rendszeres szájobiogetest kezdtunk Phlogosol oldattal, majd a beültetest megelőző órában 2,5 mg Dormicumot és 100 mg Contramalt tartalmazó 0,9% NaCl i.v. infusiót adtunk premedikációként. Percekkel az endoscop levezetése előtt még 2,5 mg Dormicumot adtunk i.v., illetve a szájnyálkahártya érzéstelenítésére 10% Lidocain sprayből 3–4 befújást alkalmaztunk. A hasfal bőrét a beszúrás helye körül Kodan oldattal fertőtlenítettük, majd OpSite (Smith&Nephew) fóliával izoláltunk. 48 férfi- és 9 nőbeteg (egy férfi betegen két alkalommal történt a PEG) átlagéletkora 57 (40–78) év volt. Közülük 21 mesopharynx-, 10 szájüregi-, 11 gége-, 12 hypopharynx- és 4 egyéb régióra kiterjedő tumoros beteg volt. Négy esetben praeoperative, 4-szer intraoperative és 44 alkalommal postoperative zajlott a percutan endoscopos gastrostomia. Hat betegen palliativ terápia részeként került sor PEG beültetésre. Negy betegunk (6,9%) anamnésisében szerepelt korábban végzett hasi műtét (appendectomia, cholecystectomia és hasfali hernia műtét) (1. táblázat).

Eredmények

Három éve vezettük be a percutan endoscopos gastrostomia módszerét klinikánkon. 58 sikeres (100%) PEG beültetést végeztünk. A beavatkozás alatt komplikáció nem lépett fel. 31 betegünk jelenleg is PEG viselő, míg 8 betegből 6 esetben a visszatért normális nyelési funkciók miatt, kétszer szövődmény miatt a PEG eltávolításra került. 20 beteg halt meg az alapbetegségének következtében, közülük egynél a PEG-et korábban már megszüntettük. A szondák eltávolítása 3 alkalommal endoscopos módon történt, háromszor a külső rész levágása után a szonda per vias naturales távozott. Két alkalommal a szondát kézzel közvetlenül a hasfalon át kihúztuk. Kilenc betegnél összesen 11-szer történt PEG csere általában a szonda törése és kicsúszása miatt. Öt alkalommal a még meglevő, de már jelentősen beszűkült gastrostomás nyíláson át helyeztük be az újabb PEG szereléket (Gasrotubus Nutricia), úgy hogy a stomanyílást Rüsch típusú tágító szondasorozattal feltágítottuk. Egyszer a stomanyílás teljes bezáródása miatt stomanyílást kissé eltérő lokalizációban hoztunk létre. Postoperatív szövődményt az összesen 177 szondatáplálást nap alatt 10 esetben (17,2%) észleltunk. Negyszer (6,85%) fordult elő minor komplikáció, a tápszonda körül a has bőrének gyulladása. Major komplikáció 6 (10,35%) esetben volt. Negyszer (6,85%) peritubalis leakage és hasfali tályog és kétszer (3,5%) peritonitis (2. táblázat). Utóbbi két esetben a PEG-et megszüntettük. A PEG-gel összefüggésbe hozható exitus nem volt. Szövődmények jellege és előfordulási aránya jelentősen nem tér el az irodalomban közöltektől (4, 7, 9, 12, 15). A PEG táplálási napok átlaga 371 (5-1079) volt.

Megbeszélés

A fej-nyaki régióra lokalizáló daganatos betegeknél szükségessé váló hosszantartó mesterséges táplálás céljára ma a legmodernebb eljárásnak a percutan endoscopos gastrostoma számít [2]. A fül orr gégészeti gyakorlatban a diagnosis felállítása és a kurativ therápia (műtét, sugár) között optimális esetben legfeljebb 10–14 nap telik el. Ideális lenne a preoperativ szakban beültetni a PEG-et és megkezdeni az enteralis táplálást, azonban a gyakorlatban ez számos ok miatt nem valósulhat meg. Legkorábban és a beteg számára a legkisebb megterheléssel járó módon általában a hystologiai mintavétel miatt diagnosticus célzatból, altatásban végzett direct hypopharyngolaryngoscopia („staging endoscopia") során lehetne a PEG-et beültetni. Ilyenkor azonban a diagnosisunk még nem biztos (nincs szövettani eredmény), a beteg a szóbajövő tehrápiához még nem adta beleegyezését, illetve a sebész is optimista lehet miszerint az ő műtéti beavatkozása után nem lesz szükség hosszantartó táplálásra. A PEG kapcsán fellépő szövődmény késleltetheti a műtéti therápiát. A tumorresectiós műtéttel együlésben intubálás után a resectio előtt, illetve a tumor resectiója után a nyitott garaton át endoscopizálva beültetett PEG szintén nem megterhelő a beteg számára. Korán biztositható hosszútávu táplálás és a seb

1. táblázat

	Esetszám	Helyi érzéstelenítés	Intratrachealis narcosis	Peroralis	Endoscopia módja: Direct laryngoscopia	Nyaki fistulán át	Megnyitott garaton át	Tumor lokalizáció: Mesopharynx	Hypopharynx	Larynx	Cavum oris	Egyéb	Hasi műtét az anamnesisban
Praeoperativ	4	2	2	4	-	-	-	2	1		1	-	1
Intraoperativ	4	-	4	-		-	4	1	3	-			
Postoperativ	44	35	9	42	1	1		14	7	11	8	4	3
Palliativ	6	6	-	6				4	1		1		-
Összesen	58	43	15	52	1	1	4	21	12	11	10	4	4

II. táblázat

	PEG						Szövődmény		Műtéti beavatkozás				
	Sikeres PEG beültetés	Jelenleg is viseli	Kivételre került	Meghalt PEG-gel	Meghalt PEG nélkül	PEG [illegible]	Minor	Major	PMMF	[illegible] szabad lebeny	[illegible] gégeműtét	[illegible]	Egyéb
Praeoperativ	4	3	1					1	3		-		1
Intraoperativ	4	3		1		1			3	1			
Postoperativ	44	24	6	13	1	10	4	4	19	1	12	5	7
Palliativ	6	1		5				1					
Összesen	58	31	7	19	1	11	4	6	25	2	12	5	9

gyogyulási feltételek is jobbak mint a nasogastricus szonda használata esetén. A sebész optimizmusa azonban még mindig akadály lehet. Egyrészről a fent vázoltak miatt található beteganyagunkban túlnyomó többségben postoperatív eset, másrészről az ok az, hogy a Társadalom Biztosító kizárólag a postoperatív beültetéseket finanszírozza. A prae-, intra- és postoperatív beültetések előnyeivel és hátrányaival kapcsolatban hivatkozunk az irodalomra [8, 15]. A postoperatív csoport jól rámutat arra, hogy milyen műtéti megoldások után várható leggyakrabban hosszantartó rágási vagy nyelési nehézség. Ebben a csoportban 19 esetben a tumorexcisiot követően kialakult szövethiányt pectoralis major myocutan lebennyel és egy alkalommal pedig alkar radiális szabad lebennyel pótoltuk. A lebenyeket általában a garattal, nyelv, nyelvgyök, szájfenék, illetve lágyszájpad pótlására használtuk. Partialis gégeműtétet 12-szer, kiterjedt nyelvgyök, illetve hypopharynx fal resectiót pótlás nélkül 5-ször, míg egyéb műtéti beavatkozást 7 alkalommal végeztünk. Megállapítható tehát, hogy kiterjedt nyelv, nyelvgyök, szájfenék lágyszájpad, illetve hypopharynx fal resectiók során valamint főként idősebb korban végzett gégecsonkolás esetén a rágási, illetve a nyelési functio hosszú ideig korlátozott lehet emiatt mérlegelendő ilyen esetekben a percutan endoscopos gastrostoma minél korábbi elkészítése.

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Levelezési cím: Dr. Lujber László
PTE Fül-Orr-Gégeklinika
H-7621 Pécs, Munkácsy M. u. 2.
Tel.: 72/507388
E-mail: Lujber@ENT.POTE.HU

APPENDIX 3

A perkután endoszkópos gastrostoma szerepe a fül-orr-gégészetben

LUJBER LÁSZLÓ és SÁROSSY KATALIN

A fej-nyak-daganatos betegek testsúlycsökkenésének hátterében számos tényező áll. A csökkent tápanyagbevitel, a daganatos sejtek korlátlan tápanyag-, illetve energiafelhasználása és az előtérbe kerülő katabolikus folyamatok hatására fokozatosan alakul ki a fehérje-, illetve kalória-alultápláltság állapota. A fej–nyak területén elhelyezkedő daganatos elváltozások és az ilyen betegek műtéti-, illetve sugárkezelése kapcsán fellépő, átmeneti vagy végleges rágási és nyelési nehézség a táplálékbevitel csökkenését okozza. A posztoperatív szakaszban és az irradiációs vagy citosztatikus terápia során fokozott tápanyagbevitel szükséges.

Kielégítő tápláltsági állapot elengedhetetlenül szükséges a megfelelő kezeléshez, a gyors sebgyógyuláshoz, a szövődmények kialakulásának csökkenéséhez és ezáltal a beteg mielőbbi rehabilitációjához.

A mesterséges táplálás módjai

I. Parenteralis
II. Enteralis
  1. oralis
  2. nasogastricus-nasojejunalis szonda
  3. pharyngostoma
  4. oesophagostoma
  5. gastrostoma
     - hagyományos sebészi
     - PEG (perkután endoszkópos gastrostoma)
     - LG (laparaszkópos gastrostoma)
  6. jejunostoma
     - hagyományos sebészi
     - TKJ (tűkatéter jejunostoma)
     - PEJ (perkután endoszkópos jejunostoma)
     - LJ (laparaszkópos jejunostoma)

A fej-nyak daganatos betegek jelentős részének a per orális fokozott tápanyag-bevitel éppen a betegség lényegéből adódóan nem lehetséges. Fül-orr-gégészeti gyakorlatban mesterséges táplálás céljaira leggyakrabban nasogastricus szondát alkalmazunk. Előnye, hogy gyorsan non-invasiv módon levezethető és olcsó. Szondán át a megfelelő minőségű és mennyiségű táplálék biztosítható. Tartós, 2–3 hétnél hosszabb használata azonban nem javallt a várható szövődmények kialakulása miatt (torzdeformitás, rhino-sinusitis, orr-, garatnyálkahártya kifekélyesedése, -felfutó fertőződése, savas reflux). Másrészről a szonda a műtéti területen halad át és veszélyezteti a zavartalan sebgyógyulást. Várhatóan 4 hétnél tovább szükséges enterális táplálás esetén PEG képzése javasolt. Jól ismert hagyományos sebészi gastrostoma mellett ma a legmodernebb eljárásnak a perkután endoszkópos gastrostomát tartjuk. Pharyngo-, illetve oesophagostomát kivételes esetekben alkalmazunk. Jejunostoma készítésére fül-orr-gégészeti gyakorlatban ritkán van szükség.

A PEG indikációját, a beültetés módját és szövődményeit már korábban tárgyalták. Jelen fejezet csak a fül-orr-gégészeti vonatkozásokat emeli ki.

A PEG-beültetés technikái

1. „pull" technika
2. „push" technika
3. „poke" technika

A három különböző technika gégészeti vonatkozása az, hogy míg az első két módszernél a gasztroszkópot általában két alkalommal vezetjük le és a tápszonda a tumoros vagy már operált tápcsatorna szakasszal érintkezve jut a gyomorba (Gauderer et al. 1980; Sacks et al. 1983), addig a harmadik kissé ugyan bonyolultabb „poke" technikánál (Russel et al. 1984), ami tulajdonképpen egy Seldinger módszer, gasztroszkópia csak egyszer történik és a tápszonda közvetlenül a hasfal bőrének átszúrásával kerül a gyomorba, így nem érintkezik az operált vagy tumoros tápcsatorna-szakasszal.

A PEG-beültetés időpontja

1. praeoperatív beültetés
2. intraoperatív beültetés
3. postoperatív beültetés

Prae-, intra vagy postoperatív beültetés előnyeit, illetve hátrányait az *1. táblázat*-ba foglaltuk össze (Lujber et al. 1999).

1. táblázat

Praeoperatív PEG előnye	Praeoperatív PEG hátránya	Intraoperatív PEG előnye	Intraoperatív PEG hátránya	Postoperatív PEG előnye	Postoperatív PEG hátránya
korán elkezdhető enterális táplálás	kiterjedt tu. gasztroszkópos akadályt jelent	nincs akadálya a gasztroszkóp levezetésének	bonyolultabb műtéti izolálás	könnyebben felállítható az indikáció	késon kezdhető enterális táplálás a PEG-en át
ITN-ben, staging endoszkópia során elvégezhető	tumor sejt transzplantáció lehetősége	nincs tumor sejt transzplantáció	nehezebb a megfelelő sterilitás elérése		plusz megterhelés a betegnek
	suffocatio kialakulhat	nincs suffocatio	műtét idejének növekedése		
	szövődmény kitolja a műtét tervezett idejét	nem terheli a műtéti területet			
	nehezebben állítható fel az indikáció				

Rövidítések: ITN : intratrachealis narcosis
PEG : perkután endoszkópos gastrostomia
tu. : tumor

A *praeoperatív* beültetéssel korán megkezdhető táplálás miatt jobb tápláltsági állapotú beteg kerül műtétre. A beavatkozás elvégezhető altatásban a fej-nyak daganatoknál gyakran szükséges „staging" endoszkópia során, ami így nem jelent külön megterhelést a beteg számára. A beteg tápláltsági állapota javítható amíg a szövettani eredményre várunk (6–8 nap). Előfordulhat azonban, hogy PEG kapcsán szövődmény alakul ki, mely a tervezett műtét időpontját kitolva, rontja a beteg gyógyulási esélyeit. További hátránya a műtét előtti PEG készítésnek, hogy a gasztroszkóp, illetve a tápszonda levezetése tumoros környezetben történik, ami a suffocatio kialakulásának (Riley et al. 1992) és a tumor transzplantálódásának (Schneider et al. 1997) esélyét növeli. Ritkán, de előfordul, hogy fej-nyak daganatos betegeknél PEG beültetést követően bőrmetasztázis alakul ki a készített gyomorsípoly körül. Az indikáció helyes felállítása a praeoperatív csoportban a legnehezebb.

Szájzárat okozó tumorok esetén az endoszkópot, illetve a tápszondát transnasalisan is levezethetjük (Taller et al. 1997). Kiterjedt tumorok esetén, amikor az endoszkóp levezetése nehézségbe ütközik, altatásban Kleinsasser laringoszkópon át szemkontroll mellett segíthetjük az endoszkópot a nyelőcsőbemenetbe (Horváth et al. 1996). Az endoszkópiát teljesen lehetetlenné tevő tumor esetén az *intraoperatív* beültetés (Dubecz et al. 1996) jelenthet megoldást. A tumor excisiója követő intraoperatív perkután endoszkópos gastrostomia könnyen, akadálytalanul elvégezhető, és a tumor transzplantálódásától sem kell tartanunk.

A műtet alatti levezetés hátránya, hogy a műtéti terület izolálására és a sterilitásra nagyobb gondot kell fordítani, valamint a műtét ideje is megnő (kb. 20 perccel).

A *postoperatív* beültetésnek talán egyetlen előnye, hogy valóban csak azoknak a betegeknek kerül a PEG beültetésre, akiknél erre igazán szükség van.

A fent vázolt hátrányok az egyes csoportokon belül csupán a beültetés időpontjából fakadnak, nem pedig a módszer hibájából.

A PEG-beültetés módjai

1. helyi érzéstelenítés (általában postoperatív beültetés)
2. narcosis (általában prae- vagy intraoperatív beültetés)
   - 2.1. staging endoszkópia részeként
   - 2.2. kiterjedt tumorok esetén (fájdalom)
   - 2.3. transnasalis levezetés
   - 2.4. laringoszkóppal asszisztált levezetés
   - 2.5. intraoperatív beültetés

A PEG beültetés ambulanter helyi érzéstelenítésben könnyen elvégezhető. Narkózisban történik a PEG készítése, ha a staging endoszkópia részét képezi. Kiterjedt daganatos elváltozás során megfelelő érzéstelenítés ellenére az endoszkóp, illetve a tápszonda levezetése fájdalommal jár. Transnasalis, laringoszkóppal asszisztált, valamint intraoperatív beültetést is altatásban végezzük.

Speciális fej–nyak sebészeti indicatiók

Minden műtét alapvető célja, hogy a legmesszemenőbb onkológiai radikalitás mellett megfelelő funkcionális eredményt érjen el. Cél az, hogy a táplálékbevitel, a rágás és a nyelés természetes módon történjen. Elsősorban kiterjedt daganatok radikális műtéti kezelését követően a sebész minden igyekezete ellenére átmeneti vagy tartós rágási-nyelési diszfunkciók maradhatnak vissza.

Alábbiakban foglaltam össze azokat az eseteket, ahol a szükséges reszekció miatt tartós funkciókiesés várható.

I. Szájüregi tumorok

1. Nyelv-, nyelvgyök-, szájfenék vagy lágyszájpad kiterjedt reszekciója (tartós nyelési panasz)
2. Lebennyel végzett rekonstrukciók (hosszantartó sebgyógyulás)
3. Mandibulotomia, illetve reszekció (rágási nehézség)

II. Meso- és hypopharynx tumorok

1. Garat-, illetve nyelőcső kiterjedt reszekciója
2. Garat-, illetve nyelőcsőpótlás egyes formái

III. Gégetumorok

1. Partialis gégereszekciók válogatott esetekben (idős beteg, kiterjesztett reszekciók).

Beteganyag és módszer

A pécsi Fül-Orr-Gégeklinikán 1997. január 07. és 1999. április 30. között 43 betegen összesen 47 sikeres PEG beültetést végeztünk.

Az insertio „pull"- vagy „push"-technika szerint történt. A gastrostomiát 34-szer helyi érzéstelenítésben és 13-szor intratrachealis narkózisban végeztük. A beavatkozás előtti napon a betegnél rendszeres szájöblögetést kezdtünk Phlogosol oldattal, majd a beültetést megelőző órában 2,5 mg Dormicumot és 100 mg Contramalt tartalmazó 0,9% NaCl i.v. infúziót adtunk premedikációként. Helyi érzéstelenítés esetén percekkel az endoszkóp levezetése előtt még 2,5 mg Dormicumot adtunk i.v., illetve a szájnyálkahártya érzéstelenítésére 10% Lidocain spray-ből 3–4 befújást alkalmaztunk.

A beavatkozást 43 férfi- és 4 nőbetegen végeztük, átlagéletkoruk 57 (40–78) év volt. Közülük 25 szájüregi, 12 garat-, 9 gége- és 1 egyéb tumoros beteg volt. Két esetben praeoperatíve, 4-szer intraoperatíve és 33 alkalommal postoperatíve zajlott a perkután endoszkópos gastrostomia. Nyolc betegen palliatív kezelés részeként került sor a PEG-beültetésre. 22 esetben a tumorexcisiót követően kialakult szövethiányt pectoralis major myocutan lebennyel, 2 alkalommal alkari radialis szabad lebennyel pótoltuk. 12 esetben végeztünk gégereszekciót. 11 betegen történt pre- vagy postoperatív telecobalt irradiáció.

Eredmények

A PEG beültetése minden betegnél sikeres volt. A beavatkozás alatt komplikáció nem lépett fel. Major komplikációt nem észleltünk. Minor komplikációt 8 esetben (17%) tapasztaltunk. A 3–6. napon a stoma körüli bőr gyulladása, majd ún. „peritubalis leakage" alakult ki. Az említett szövődmény miatt két esetben kényszerültünk a PEG idő előtti eltávolítására. A nyelési funkció helyreállása miatt a gastrostomát két betegnél szüntettük meg. A tápszondát kicsúszása, illetve törése miatt 3 alkalommal perkután endoszkópos gastrostomás szondára, 2-szer Folic katéterre cseréltük. A PEG táplálási napok száma összesen 13458, átlag 305 (5–806) nap volt.

Összegzés

A PEG a nasogastricus szondával szemben a műtéti területet nem terheli, így gyorsabb a sebgyógyulás és kevesebb a nyaki fistula (Gibson és Wenig 1992). A PEG esztétikailag jobb és könnyebben tolerálható.

A hagyományos sebészi gastrostomával szemben olcsóbb, kevésbé invasív, ambulanter elvégezhető, valamint kisebb a szövődmény kialakulásának lehetősége.

Egyes műtétek indikációja kiszélesíthető.

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APPENDIX 4

[illegible]

Inserting a Percutaneous Endoscopic Gastrostomy Tube via a Cervical Fistula Formed After Major Surgery on a Patient With a Head and Neck Tumor

Laszlo Lujber, MD, Gyorgy Fabian, MD, and Jozsef Pytel, PhD

Summary: Several percutaneous endoscopic gastrostomy techniques have been devised so far to provide enteral nutrition for patients with head and neck cancer. Because no single technique is adequate for all [illegible] [illegible] [illegible] gastroscopy. Transnasal, laryngoscopically guided, or intraoperative gastroscopic procedures are useful technical methods for percutaneous endoscopic gastrostomy placement. [illegible] [illegible] the pharyngeal lumen often is insufficient for peroral gastroscopy. However, coexisting cervical pharyngocutaneous fistula can provide an approach and route for percutaneous endoscopic gastrostomy. The procedure was carried out successfully with no complications. **Key Words:** [illegible] endoscopic gastrostomy.

Patients with head and neck tumors often experience impaired mastication or deglutition as a result of tumor extension, surgery, or irradiation. The morbidity and mortality of surgery can be reduced by proper long-term enteral nutrition and nutritional supplementation (1). Since the introduction of percutaneous endoscopic gastrostomy (PEG) by Gauderer and Ponsky (2) in 1980, the method has become widely accepted. In addition to the originally described pull-back technique, several other methods have been reported. Push-on wire (3), poke (4), fluoroscopic (5,6), and ultrasound-guided (7,8) techniques of PEG insertion all seem to be useful modifications. Not only the technique, but also the route of introducing the gastroscope into the stomach, has changed in many aspects. Most often, gastroscopy is performed through the mouth of the patient. However, peroral gastroscopy cannot be performed in the presence of trismus or in pharyngeal obstruction caused by tumor mass. Insertion of the gastroscope through the nose (transnasal PEG) (9) or via the opened pharynx after tumor resection (intraoperative PEG) may be a useful alternative in such circumstances. Sometimes laryngoscopic assistance (10) is needed to help the passage of the gastroscope. In addition, careful assessment is necessary for correct timing of PEG (11). In our report, we present a new method of introducing the gastroscope that may provide the only method in certain circumstances of performing PEG. Inserting PEG through a fistula in the neck has not been reported so far in the literature.

CASE REPORT

A 59-year-old man sought treatment for a 3-month history of dysphagia and a sore throat. He had been a heavy drinker and smoked 30–35 cigarettes daily. Squamous cell carcinoma of the left piriform sinus was diagnosed. The patient was treated with radiotherapy to a total volume dose of 6000 cGy. Approximately 7 months after the end of the radiation therapy, his symptoms

[illegible]

From the Departments of Otorhinolaryngology (L.L., J.P.) and Internal Medicine (G.F.), Pecs University Faculty of Medicine, Pecs, Hungary.
Address correspondence and reprint requests to Dr. Laszlo Lujber, [illegible]

[illegible]. Magnetic resonance imaging scans revealed pathologic lymph nodes in the left upper jugular region (level 2) and tumor mass in the left piriform sinus. After panendoscopy was performed, the patient's tumor was staged as T4, N2, M0, moderately well-differentiated keratinizing squamous cell hypopharyngeal carcinoma involving the left piriform sinus, the retrocricoid [illegible] [illegible] to the midline. The tumor also infiltrated the left pharyngoepiglottic fold, the [illegible] and [illegible] of the tongue base. The [illegible] [illegible] was [illegible]. Total laryngectomy [illegible] [illegible] pharyngectomy, partial resection of the tongue base, radical neck dissection (level 1–5), and left sided thyroid lobectomy were performed. The opened pharyngeal wall was closed primarily. A standard nasogastric feeding tube was used for the postoperative feeding. Two weeks after the operation, formation of fistula began in the neck. Despite careful local treatment, there was no improvement. Biopsy samples taken at different times from the fistulae showed no evidence of tumor. Eventually, three fistula openings were visible in the neck. Two were adjacent to each other in the midline at the level of the carotid notch, and the third was on the left side of the stoma (Fig. 1). We decided to exchange the nasogastric feeding tube for PEG and to close the fistulae surgically.

MATERIALS AND METHODS

With the patient under general anesthesia, traditional peroral gastroscopy was attempted. However, because of extensive irradiation-induced fibrosis and the narrow lumen of the remaining hypopharynx caused by surgery, introduction of the gastroscope was impossible even with the help of a laryngoscope. The opening of the fistulae on the neck seemed to be wide enough for gastroscopy and PEG insertion (Fig. 2). We were able to perform a complete gastroscopic examination (Olympus Optical Co. GmbH, Budapest, Hungary) and a pull-back PEG (18 Ch Inverta PEG, Abbott Laboratories Inc., Columbus, OH, U.S.A.) insertion through the orifice of one of the upper fistulae. In the second phase of the operation, a pectoralis major myocutaneous flap was harvested (12). Cutting only its skin layer into two, we used one side to close the fistulae and to enlarge the inner circumference of the pharynx. The other side of the flap was used for the reconstruction to close the skin defect in the neck.

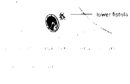

FIG. 1. [illegible]

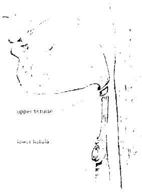

FIG. 2. [illegible]

RESULTS

The insertion of the gastroscope and the feeding tube via the cervical fistulae was carried out easily. No major or minor complications (13–16) occurred during or after surgery. The wound healed well. The inner skin layer of the pectoralis major myocutaneous flap integrated well into the mucosa of the pharynx, thus forming a wide and continuous lumen of the alimentary canal. Esophagography performed 3 months after the surgery showed appropriate passage and no luminal narrowing. The outer

FIG. 3. Anterior view of the patient's neck 2 months after surgery. [illegible]

skin layer also healed properly (Fig. 3). No recurrence of cervical fistula was seen during the next 2 years. The patient's swallowing problems diminished, and PEG was removed 4 months later. The patient has had no tumor recurrence or other problems as of this writing during the 24 month follow up period.

DISCUSSION

Numerous techniques are available for achieving percutaneous endoscopic gastrostomy. The route of introducing the gastroscope into the stomach is one of the crucial points of the procedure. In most cases, peroral gastroscopy and PEG placement is easy and safe.

However, in the presence of trismus, tumor extension, or anatomic changes, the transnasal approach, laryngoscopic guidance, radiologic methods, or intraoperative procedures must be considered to insert PEG successfully. In our case, the entrance of the hypopharynx was extremely narrow because of irradiation-induced fibrosis and postoperative anatomic changes, thus impeding normal swallowing and probably causing the formation of fistulae. None of the above-mentioned endoscopic procedures were thought to be appropriate for percutaneous gastrostomy. Nonendoscopic, radiologically controlled procedures could have been the method of choice; however, they usually require a different medical team, instrumentation, and timing than the endoscopic interventions. Gastrostomy seemed to be adequate for the long term nutritional supplementation and for help in eliminating the cervical fistulae. Gastroscopy and PEG placement were easy and quick via the fistula in the neck. There were no complications or difficulties. Because cervical fistulae are a quite common complication of head and neck tumor surgery, especially when preoperative [illegible] provide a [illegible] for [illegible] back PEG insertion when anatomic changes hinder other traditional gastroscopic techniques.

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APPENDIX 5

SECOND LOOK ENDOSCOPY DURING PERCUTANEOUS ENDOSCOPIC GASTROSTOMY BY PASSING A LARYNGOFIBERSCOPE THROUGH THE INSERTED FEEDING TUBE.

[redacted]

Summary

Background and Study Aims The most commonly used techniques for percutaneous endoscopic gastrostomy (PEG) require two passes of the gastroscope. The aim of this study was to clarify whether the second per oral gastroscopy can be replaced by passing a laryngo-fiberscope through the previously inserted PEG feeding tube.

Patients and Methods Twelve patients with head and neck cancer undergoing "pull through" PEG procedures were included in this prospective study. Instead of the second per oral pass of the gastro-intestinal fiberscope, a laryngo-fiberscope was passed through the inserted feeding tube in order to assess the correct position of the PEG internal disc. To gain more deflection to the tip of the instrument a string was led through the instrument channel and was brought back to the hand of the examiner outside the instrument. Pulling the string provided a bigger angulation to the end of the scope and thus a good view.

Results In all twelve patients the "trans tubal" endoscopy was successful and provided a good second look to judge the position PEG internal disc. The procedure caused no discomfort for the patient.

Conclusions "Trans tubal" endoscopy is a simple, safe and painless procedure to assess the position of the PEG feeding tube without having to pass the gastro-intestinal fiberscope a second time.

Introduction

The use of percutaneous endoscopic gastrostomy (PEG) to provide nutritional support for patients with dysphagia has been widely accepted since its first introduction by Gauderer and Ponsky in 1980. Most techniques require the introduction of the gastroscope twice during the same procedure. The second pass of the gastro-intestinal fiberscope checks the proper position of the tube and excludes complications. Gastroscopy is a routine procedure in experienced hands but it may be difficult in patients with large tumours or anatomical changes caused by surgery or irradiation. In addition it is unpleasant for the patient if done under local anaesthesia. Nevertheless the second pass of the gastroscope duplicates the risks and complications of the procedure such as contaminating the feeding tube with oropharyngeal bacteria and causing stomal tumour cell seeding in patients with head and neck cancer. Several methods and modifications have been devised so far to reduce the number of complications, to overcome the difficulties of per oral gastroscopy in obstructive cases and to minimise the discomfort for the patient. We describe a technique that can replace the second per oral gastroscopy, reduce the frequency of procedure-related complications and reduce the discomfort for the patient. Yet provides a good assessment of the internal disc of the PEG feeding tube.

Patients and Methods

Twelve head and neck cancer patients (12 men, aged 46–78 years) required percutaneous endoscopic gastrostomy to provide long-term nutritional support. In all cases "pull back" technique was carried out under local anaesthesia. No antibiotic prophylaxis was used. Prior to the start of the procedure, a 0-Vicryl thread was led through the instrument channel of a Karl Storz laryngo-fiberscope (11003 BC, Karl Storz GmbH & Co. KG) with one end fixed to the instrument channel port and the other end brought back outside the instrument to the hand of the examiner. In the first part of the procedure "pull back" type PEG (Nutricia, Flocare PEG set, size: Ch 18) was performed as usual, using an Olympus gastro-intestinal fiberscope (Olympus GIF type F). Care was taken to have an insufflated stomach at the end of the insertion. This was achieved by filling up the stomach with air before the removal of the gastroscope and by closing the lumen of the inserted feeding tube while preparing for the "trans-tubal" endoscopy. The feeding tube was cut to a length of approximately 20 cm to allow good access for the 40 cm long laryngo-fiberscope. After placing the instrument into the orifice of the feeding tube Lignocaine gel was applied around the scope to provide good lubrication and to prevent air leakage. Then the laryngo-fiberscope (outer diameter of 2.5 mm) was passed through the previously inserted PEG feeding tube (4 mm inner diameter) to perform gastroscopy and to provide an option for second look (figure 1). The tip of the scope was manoeuvered as usual with the hand piece but in addition we could gain more deflection to the tip by pulling the string mounted to the scope. This not only provided bigger angulations than that of the original 170° but also ensured that the end of the scope turned towards the bumper of the feeding tube, which was our main site of interest (figure 2).
In the first 4 cases the second per oral gastroscopy was also carried out in order to have a visual control of our "trans tubal" endoscopy.

Figure 1.
"Trans tubal" endoscopy. A laryngo-fiberscope is passed through the PEG feeding tube. The instrument can be manoeuvered both by the hand-piece of the scope and by the string attached to its tip.

Figure 2.
Visual control of the correct position of the PEG bumper in the gastric cavity. Pulling the string mounted to the scope provides an additional bending to the tip of the instrument.

Results

In all twelve patients the "trans tubal" endoscopy could be carried out and allowed a good second look to assess the position of the feeding tube and to control the site of placement in the stomach. The necessary adjustments of the internal disc could be made in order to achieve optimal approximation of the gastric and abdominal walls. The procedure caused no pain or discomfort for the patient. The introduction and the manoeuvring of the laryngo-fiberscope through the feeding tube was easy. No complications were observed during or after the procedure. There was no need to carry out per oral gastroscopy for the second time as part of the usual PEG procedures.

Discussion

"Pull-through" and the "push-on-wire" techniques are the most commonly used procedures for PEG. The need for a second per oral gastroscopy in these methods increases the procedure-related risks and complications such as oropharyngeal bacterial contamination and tumour cell seeding at the site of the feeding tube in head and neck cancer patients. In addition large tumour mass and anatomical changes as the consequence of surgery or radiotherapy can cause difficulties in passing the gastroscope to the stomach, along with the usual discomfort for the patient, if done under local anaesthesia. Thus the second pass of the gastroscope duplicates the risks and problems.
The present study describes a technique of single per oral gastroscopy, which also provides an option for a second look. Our aim was to clarify whether the second per oral gastroscopy can be replaced by an endoscopic examination through the inserted feeding tube to judge the position of the internal disc. In order to manoeuvre the scope through the feeding tube and to visualise the internal disc we needed an endoscope thin in circumference with deflection of its tip more than 180 degree. As none of the laryngo-fiberscopes available on the market meet both these criteria at the same time, we increased the flexibility of our scope by using a string led through the instrument channel which allowed the examiner to bend the tip further. In all cases we were able to visually control the site of the PEG internal disc. There was no need for second per oral gastroscopy.
Numerous techniques have been devised so far to minimize the risks and discomfort for the patients during PEG. Introducer technique is one that allows single pass of the gastroscope but this is a time consuming and more complicated procedure carrying the risk of some major complications related to the technique. Some authors suggest omitting the control gastroscopy in order to reduce the drawbacks associated with the second pass of the gastroscope, but this lacks the option for second look. The advantage of our method is that it requires single per oral gastroscopy, provides an option for second look and reduces the discomfort caused for the patient by the control gastroscopy. In addition it is easier to pass the scope into the stomach in cases of obstructed and narrow alimentary tract. Although it has not been studied in the present paper, this technique is likely to reduce the chances of bacterial contamination and tumour cell seeding. The need for an extra scope is certainly a disadvantage, however a laryngo-fiberscope is considered to be a basic instrument nowadays in most of the ENT endoscopic units dealing with PEG.

APPENDIX 6

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Second Look Endoscopy by a Laryngo-Fiberoscope Passed Via the Feeding Tube of the Percutaneous Endoscopic Gastrostomy

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László Lujber and J. Pytel

Summary: The most commonly used techniques for percutaneous endoscopic gastrostomy (PEG) require two passes of the gastroscope. The aim of this study was to clarify whether the second per oral gastroscopy can be replaced by passing a laryngo-fiberscope through the previously inserted PEG feeding tube. Twelve patients with head and neck cancer undergoing "pull through" PEG procedures were included in this prospective study. Instead of the second per oral pass of the gastro-intestinal fiberscope, a laryngo-fiberscope was passed through the inserted feeding tube to assess the correct position of the PEG internal disc. To gain more deflection to the tip of the instrument a string was led through the instrument channel and was brought back to the hand of the examiner outside the instrument. Pulling the string provided a bigger angulation to the end of the scope and thus a good view. In all twelve patients the "trans tubal" endoscopy was successful and provided a good second look to judge the position PEG internal disc. The procedure caused no inconvenience for the patient. "Trans tubal" endoscopy is a simple, safe and painless procedure to assess the position of the PEG feeding tube without having to pass the gastro-intestinal fiberscope a second time. **Key Words:** PEG—Laryngo-fiberscope—Second look—Via feeding tube.

INTRODUCTION

The use of percutaneous endoscopic gastrostomy (PEG) to provide nutritional support for patients with dysphagia has been widely accepted since its first introduction by Gauderer and Ponsky in 1980 (1). Most techniques require the introduction of the gastroscope twice during the same procedure (1,2,3). The second pass of the gastro-intestinal fiberscope checks the proper position of the tube and excludes complications. Gastroscopy is a routine procedure in experienced hands, but it may be difficult in patients with large tumors or anatomic changes caused by surgery or irradiation. In addition it is unpleasant for the patient if done under local anesthesia. Nevertheless the second pass of the gastroscope might increase the risks and complications of the procedure such as contaminating the feeding tube with oropharyngeal bacteria (4,5) and causing stomal tumor cell seeding in patients with head and neck cancer (6,7,8). Several methods and modifications have been devised so far to reduce the number of complications, to overcome the difficulties of per oral gastroscopy in obstructive cases and to minimize the discomfort for the patient (9–15). We describe a technique that can replace the second per oral gastroscopy, might reduce the frequency of procedure-related complications and reduces the discomfort for the patient, yet provides a good assessment of the internal disc of the PEG feeding tube.

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From the Department of Otorhinolaryngology, Faculty of Medicine, Pécs University, Pécs, Hungary.
Address for correspondence and reprint requests to Dr. László Lujber, Tawam Hospital, PO Box 15258, Al-Ain, Abu Dhabi, UAE. Address electronic mail to: lujber@hotmail.com.

MATERIALS AND METHODS

Twelve head and neck cancer patients (12 men, aged 46–78 years) required percutaneous endoscopic gastrostomy to provide long-term nutritional support. The patients were selected randomly and there were no any specific inclusion or exclusion criteria set up. In all cases "pull back" technique was carried out under local anes

thesia. No antibiotic prophylaxis was used. Prior to the start of the procedure, a 0-Vycril thread was led through the instrument channel of a Karl Storz laryngo fiberscope (11003 BC, Karl Storz GmbH & Co. KG) with one end fixed to the instrument channel port and the other end brought back outside the instrument to the hand of the examiner. In the first part of the procedure, pull back" type PEG (Nutricia, Flocare PEG set, size: Ch 18) was performed as usual, using an Olympus gastrointestinal fiberscope (Olympus GIF type F). Care was taken to have an insufflated stomach at the end of the insertion. This was achieved by filling up the stomach with air before the removal of the gastroscope and by closing the lumen of the inserted feeding tube while preparing for the "trans-tubal" endoscopy. The external retention disc was applied and the feeding tube was cut to a length of approximately 20 cm to allow good access for the 40 cm long laryngo-fiberscope. After placing the instrument into the orifice of the feeding tube Lignocain gel was applied around the scope to provide good lubrication and to prevent air leakage. Then the laryngo fiberscope (outer diameter of 2.5 mm) was passed through the previously inserted PEG feeding tube (4 mm inner diameter) to perform gastroscopy and to provide an option for second look. The tip of the scope was maneuvered as usual with the hand piece but in addition we could gain more deflection to the tip by pulling the string mounted to the scope. This not only provided bigger deflection than that of the original 170°, but also ensured that the end of the scope turned toward the bumper of the feeding tube, which was our main site of interest (Fig. 1).

In the first 4 cases the second per oral gastroscopy was also carried out to have also a visual control of our "trans tubal" endoscopy.

FIG. 1.

RESULTS

In all twelve patients the "trans tubal" endoscopy could be carried out and allowed a good second look to assess the position of the feeding tube and to control the site of placement in the stomach. We observed no tendency of dislocating the feeding tube with the "trans-tubal" fiberscopy in the first 4 cases when per oral gastroscopy was also performed additionally for extra visual control. Adjustments of the internal disc could be made to achieve optimal approximation of the gastric and abdominal walls. In three cases the original fixation seemed to be too tight, so it had to be loosened. The procedure caused no pain or discomfort for the patient. The introduction and the maneuvering of the laryngo-fiberscope through the feeding tube was easy. No complications were observed during or after the procedure. There was no need to carry out a second per oral gastroscopy as part of the usual PEG procedures for controlling the position of the feeding tube.

DISCUSSION

"Pull-through" and the "push-on-wire" techniques are the most commonly used procedures for PEG. The need for a second per oral gastroscopy in these methods increases the likelihood of procedure-related risks and complications such as oro pharyngeal bacterial contamination and tumor cell seeding at the site of the feeding tube in head and neck cancer patients. In addition large tumor mass and anatomic changes as the consequence of surgery or radiotherapy, can cause difficulties in passing the gastroscope to the stomach, along with the usual discomfort for the patient, if done under local anesthesia.

The present study describes a technique of single per oral gastroscopy, which also provides an option for a second look. Our aim was to clarify whether the second per oral gastroscopy can be replaced by an endoscopic examination through the inserted feeding tube to judge the position of the internal disc. To maneuver the scope through the feeding tube and to visualize the internal disc we needed an endoscope thin in circumference with deflection of its tip more than 180 degree. As none of the laryngo-fiberscopes available on the market meet both these criteria at the same time, we increased the flexibility of our scope by using a string led through the instrument channel which allowed the examiner to bend the tip further. For the smooth pass of the scope a PEG device featuring a central hole in line with the axis of the tube was selected. In all cases we were able to visually control the site of the PEG internal disc by "trans tubal" endoscopy. There was no need for second per oral gastroscopy

except the first 4 cases where we used the per oral gastroscope to follow and document our procedure. Numerous techniques have been devised so far to minimize the risks and discomfort for the patients during PEG. Introducer technique (16) is one that allows single pass of the gastroscope but this is a time consuming and more complicated procedure carrying the risk of some major complications related to the technique (3,4,17). Some authors suggest omitting the control gastroscopy to reduce the drawbacks associated with the second pass of the gastroscope (18), but this lacks the option for second look. The advantage of our method is that it requires single per oral gastroscopy, provides an option for second look and reduces the discomfort caused for the patient by the control gastroscopy. In addition it is easier to pass the scope into the stomach in cases of obstructed and narrow alimentary tract. Although it has not been studied in the present paper, this technique is likely to reduce the chances of bacterial contamination and tumor cell seeding. The need for an extra scope is certainly a disadvantage, however a laryngo-fiberoscope is considered to be a basic instrument nowadays in most of the ENT endoscopic units dealing with PEG.

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APPENDIX 7

Second-Look Endoscopy During Percutaneous Endoscopic Gastrostomy by Passing a Laryngofiberscope Through the Inserted Feeding Tube

Percutaneous endoscopic gastrostomy (PEG) [1] has been widely accepted as a means of providing nutritional support for patients with head and neck cancer. Most techniques require a second look gastroscopy to check that the feeding tube has been correctly positioned and to exclude complications [2], and many endoscopists carry these out. However peroral gastroscopy may be difficult in patients with large tumors or anatomical changes caused by surgery or irradiation. In addition, the procedure is unpleasant for the patient when it is done under local anesthesia, and also every pass of the gastroscope can increase the incidence of some procedure-related risks and complications, such as contamination of the feeding tube with oropharyngeal bacteria [3], and stomal tumor cell seeding [4,5].

In order to minimize these problems, a laryngofiberscope (11003 BC; Karl Storz, Tuttlingen, Germany) was passed via the PEG feeding tube to obtain a second look, instead of a second peroral gastroscopy (Figure 1). To provide a greater deflection at the tip of the scope, a line was led through the instrument channel with one end fixed to the channel port and the other end brought back outside the instrument to the hand of the examiner. Thus the scope could be maneuvered using both the hand-piece of the instrument and the line, enabling the scope to be turned easily towards the internal disc of the PEG for a visual check. After traditional "pull-back" PEG with local anesthesia, we have kept the stomach insufflated, and in 12 instances we have passed the laryngofiberscope via the inserted feeding tube, after applying some lignocaine gel for lubrication. In all cases we were able to visualize the internal disc. This method avoids the discomfort for the patient of a second peroral gastroscopy, provides an alternative route for gastroscopy when the peroral approach is difficult, and reduces the possibility of some complications.

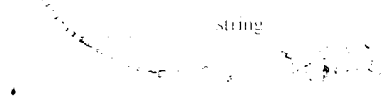

Figure 1 "Trans-tubal" endoscopy. A laryngofiberscope is passed through the percutaneous endoscopic gastrostomy (PEG) feeding tube. The instrument can be maneuvered by both the hand-piece of the scope and by the line attached to its tip.

L. Lujber, J. Pytel
Department of Otorhinolaryngology, Faculty of Medicine, Pécs University, Pécs, Hungary.

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Corresponding Author

L. Lujber, M.D.
Tawam Hospital
PO Box 15258 Al-Ain
Abu Dhabi
United Arab Emirates
Fax: +971-3-7072133
E-mail: Lujber@hotmail.com

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