The Royal College of Surgeons of England

Ann R Coll Surg Engl 1999; **81**: 272–276

Technique

Complications of percutaneous gastronomy in patients with head and neck cancer – an analysis of 42 consecutive patients

G.M. Walton

University Department of Oral and Maxillofacial Surgery, Manchester Royal Infirmary, Manchester, UK

A total of 42 patients, who underwent insertion of a percutaneous gastrostomy tube prior to resection for oral squamous cell carcinoma, were investigated to examine the incidence and severity of complications associated with use of this technique. The team performing the procedure and the grade of operator was noted together with any subsequent complications and their outcome. Previously reported complication rates were 2.7–2.8% and 6–7.1% for major and minor complications, respectively, but, in this series, a major complication rate of 22.5% and minor complication rate of 17.5% were identified. The findings of this study have led to the introduction of a further prospective audit of this technique in the maxillofacial unit and a more selective policy of PEG prescription for patients undergoing resection for head and neck cancer.

Key words: Maxillofacial – Gastrostomy – Cancer

Patients undergoing extensive intra-oral resection require nutritional support in the early post-operative period until healing is complete and swallowing is re-established. Normal dietary intake in these patients may be further delayed if a course of postoperative radiotherapy is required.[1] Less commonly these patients fail to regain a normal swallowing pattern preventing them from maintaining their nutritional requirements by oral feeding alone and leaving them at risk to pulmonary aspiration; this group of patients may require a prolonged period of supportive feeding, occasionally for life. A number of techniques have been used in the past to deliver nutritional support for these patients but, over recent years, the role of percutaneous endoscopic gastrostomy (PEG) feeding in patients undergoing surgery for head and neck cancer has become well established.[2–9] This technique has been shown to reduce hospital stay[9] and has been found to be comfortable and easy to use by patients;[10] it can, however, be associated with a

Correspondence to: Mr G.M. Walton, Department of Maxillofacial Surgery, Withington Hospital, Nell Lane, Withington, Manchester, UK. Tel: +44 161 445 8111; Fax: +44 161 291 4171

number of complications, some of which, are potentially life-threatening. This study aimed to examine the incidence of complications as a consequence of PEG feeding in a group of patients undergoing resection for oral carcinoma.

Materials and Methods

The study began as a retrospective review from July 1996 to October 1997 but, because of the importance of the initial findings, the study was continued as a prospective review until May 1998. Patients who underwent resection for oral squamous cell carcinoma and placement of a percutaneous gastrostomy tube during the study period were identified. Most patients underwent placement of the PEG by the 'pull' method, as described by Gauderer and Ponsky.[11] Three different PEG systems were in use during the study period; these were the Corflo (Merk Pharmaceuticals), Mic Pull PEG (Vygon UK Ltd) and Freka (Fresenius Ltd). In patients for whom it was impossible to pass an endoscope, placement was carried out under fluoroscopic control in the radiology department according to the technique of Wills and Oglesby[12] using a Cook-Tilna percutaneous gastrostomy set (Cook UK Ltd).

The grade of the most senior operator and method of PEG placement was recorded. In most instances it was not possible to identify which system was inserted for an individual patient. Complications of the procedure and subsequent complications related to the placement of the gastrostomy were also recorded together with their outcome.

Results

A total of 42 patients were identified as having undergone placement of a percutaneous gastrostomy tube during the study period. The records' department of the hospital were unable to trace the notes of two of these patients but the records of the remaining 40 patients undergoing major head and neck reconstructive surgery were examined. Of these, 38 underwent primary resection and reconstruction for oral malignancy and the remaining two patients underwent major secondary reconstruction following previous ablative tumour surgery. Most patients had their PEG placed one week before surgery but logistically this was not always possible. From Figure 1, it can be seen that 31 patients had their PEG insertion performed by the medical gastroenterology team. A small number of patients (five) had their PEG placed by the general surgical team, two of these were performed on the day of surgery immediately prior to intra-oral resection of the tumour. The remaining four patients had their PEG placed by the radiology department, one of these patients had the PEG inserted under radiological control due to severe trismus and the inability to pass an endoscope, the reasons for the use of this technique in the other three patients was not recorded in the notes. Figure 1 shows that most patients had their procedure performed by junior staff at Registrar grade. Patients who had their gastrostomy inserted in the Radiology department were treated by a consultant.

The complications experienced by patients in the study were divided into major or minor using the

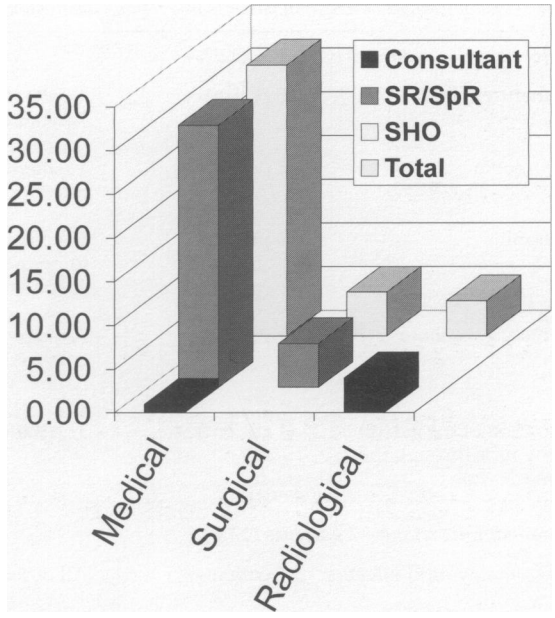

Figure 1 Number of PEG inserted by each team and grade of operator.

Table 1 Complications of percutaneous endoscopic gastrostomy

Major complications	Minor complications
Aspiration	Peristomal wound infection
Peritonitis	Tube obstruction
Premature removal of PEG	Tube fragmentation
Tube migration through gastric wall	Tube migration intosmall bowel
Perforation	Leakage around PEG
Gastrocolocutaneous fistula	
Haemorrhage	
Necrotising fasciitis	
Tumour implantation at stoma site	

From Shapiro and Edmundowicz.[13]

Table 2 Complications observed in patients undergoing gastrostomy insertion

Major complications – 9 patients (22.5%)		
Premature tube removal	(5 patients)	1 patient developed a subphrenic abscess requiring percutaneous drainage. 3 patients required antibiotic therapy alone. 1 patient remained asymptomatic
Pneumonia	(1 patient)	1 patient developed lower lobe pneumonia due to reduced diaphragmatic movements caused by non-specific abdominal pain following PEG insertion
Peritonitis	(1 patient)	In addition to the patients known to have a leak of gastric contents secondary to premature G-tube removal another patient underwent laparotomy for suspected peritonitis but no cause for their symptoms was identified
Pulmonary embolus	(1 patient)	A diagnosis of pulmonary embolus was made following the post PEG insertion collapse of one patient. A V/Q scan did not confirm this diagnosis and the patient was not anticoagulated
Migration of the gastrostomy tube through the stomach wall	(1 patient)	The particular device used for this patient has now been withdrawn in the MRI
Minor complications – 7 patients (17%)		
Peristomal wound infection	(4 patients)	All of these were successfully treated with antibiotics
Leakage around the gastrostomy tube	(2 patients)	Both of these patients were simply managed by tightening the gastrostomy tube against the abdominal wall
Tube fragmentation	(1 patient)	The patient remained asymptomatic as PEG feeding had not been required for a period of time prior to G-tube removal. The tube was noted to have fractured at the time it was removed

classification previously described by Schapiro and Edmundowicz[13] (Table 1) and these are listed in Table 2. Table 3 shows the number and severity of complications occurring in patients treated by the three different teams.

Five patients experienced the potentially serious complication of premature tube removal. One of these patients required prolonged intensive care management postoperatively and was fed via their PEG for a number of days before the tube displacement revealed itself. This patient subsequently developed a subphrenic abscess which required percutaneous drainage using ultrasound control.

Three patients developed signs of local peritonitis following their gastrostomy placement. They were treated promptly with fluid resuscitation and intravenous antibiotics and a tubogram showed displacement of the gastrostomy tube from the stomach. Another of the patients developed persistent signs of intra-abdominal sepsis and it was thought that a leak may have occurred at the site of puncture of the stomach by the gastrostomy tube. They subsequently underwent a laparotomy but no cause for these symptoms could be found and the PEG was noted to be in the correct position. A fifth patient was found to have experienced premature removal of their PEG but remained asymptomatic.

One patient developed severe abdominal pain localised to their PEG site which compromised normal diaphragmatic movements during breathing. They subsequently developed a lower lobe pneumonia which took a protracted course rendering their tumour inoperable.

Discussion

Feeding patients undergoing surgery for head and neck malignancy using the technique of percutaneous endoscopic gastrostomy has been found to be a convenient and acceptable way of maintaining nutrition in

Table 3 Incidence of complications by operating team

	Total gastrostomy inserted	No major complications (%)	No minor complications (%)	Total complications (%)
Gastro team	31	4 (12.9)	5 (16.1)	9 (29)
Surgical team	5	2 (40)	2 (40)	4 (80)
Radiologist	4	3 (75)	0	3 (75)

this group of patients.[10] In addition, this technique allows a feeding tube to remain in place for many months without significant disruption in life-style and is, therefore, particularly useful for patients who require long-term feeding.

As with all procedures, a number of complications have been reported when this technique has been used but, despite this, there is a paucity of prospective data relating to the technique. A recent review of PEG usage and its complications showed that, although complications of the procedure were well documented in the literature, accurate data were hard to find and many reports simply cited specific problems rather than reveal any quantitative data about the nature of complications. It has been suggested that complications be classified as major or minor.[13] A recent series reports rates of 2.7–2.8% for major complications and 6–7.1% for minor complications, respectively.[14] In our series, we have shown a major complication rate of 22.5% and a minor complication rate of 17.5%, values which are much higher than those quoted in the recent literature and, more significantly, many of our patients experienced major complications some of which can be life threatening.

Although the patients who underwent PEG placement by the surgical teams or percutaneous radiological placement of their gastrostomy had a high number of complications both these groups consisted of very few patients and, therefore, accurate interpretation of the complication rates in these groups is difficult. The group of patients treated by the gastroenterology team represents the largest sample of patients in our study and when the complication rate in this group alone is studied we found that there was an incidence of 12.9% of major complications and 16.1% of minor complications, respectively. Whilst minor complication rates of up to 15% have previously been reported, the incidence of major problems should not be more than 3% and we are unable to explain the high incidence of major problems seen in this study. One could speculate that inexperienced operators may attract a higher complication rate from this procedure and, although most of the gastrostomies were inserted by staff of at least registrar grade, due to the partly retrospective nature of this audit it was not possible to ascertain the level of experience of some of the operators. In addition, a variety of PEG systems were used during the study period and some of these may have been associated with a higher rate of complications; however, due to lack of records it was impossible, during this audit, to obtain information about this.

The most common minor complication experienced by patients was that of peristomal wound infection and this is in keeping with other reports in the literature.[13] Whilst only a minor problem, wound infection at the gastrostomy site can be source of troublesome discomfort for patients. Our endoscopy unit did not routinely prescribe antibiotics prior to the insertion of the gastrostomy and this may account for the high incidence of wound infections experienced by patients in our study. However, the evidence that patients benefit from prophylactic antibiotics is conflicting, one randomised trial reported that the infection rate was 30% in both groups,[15] but others have reported that the incidence of wound infection can be reduced from 32% to 7% following prescription of prophylactic cephalosporin preparations.[16] This may be an area for further investigation in the future.

Conclusion

We conclude that whilst the use of PEG feeding for patients undergoing surgery for head and neck malignancy is an undoubtedly useful technique, it is not without potentially life-threatening complications and careful assessment of patients pre-operatively is required to determine who will most benefit from this procedure in order to reduce the risks. Placement of PEGs by dedicated personnel may help in reducing the complication rate from this procedure. In addition, in view of the high complication rates seen in our study a further wholly prospective review is now underway in order that the cause of these problems may be identified and, where possible, corrected.

Acknowledgement

The author wishes to thank Mr B.T. Musgrove and Mr R.E. Lloyd, consultant maxillofacial surgeons, for allowing him to use information relating to patients under their care.

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