9. PERCUTANEOUS ENDOSCOPIC GASTROSTOMY

INTRODUCTION

Percutaneous endoscopic gastrostomy (PEG) for enteral feeding has been used since 1980[1] and it is indicated in those patients where enteral feeding is likely to be needed for more than four to six weeks[2] ; the indications for its use are shown in Table 27. The procedure of inserting a PEG is straightforward for most patients and it has advantages over nasogastric feeding in that it is more comfortable, less unsightly and less prone to becoming displaced. However, it is invasive and may result in complications, and therefore the appropriateness of its use needs careful consideration in every case.

Table 27. Indications for the use of PEG feeding[2]

Indication	Example
Neurological disorders of swallowing	Cerebrovascular accident (CVA), multiple sclerosis, motor neurone disease, Parkinson's disease, cerebral palsy
Cognitive impairment and depressed consciousness	Head injury
Mechanical obstruction to swallowing	Oropharyngeal or oesophageal cancer, radiation enteropathy
Long term partial failure of intestinal function requiring supplemental intake	Short bowel, fistulae, cystic fibrosis

PATIENT PROFILE

Key point

One in five PEG procedures were futile or not indicated.

In this sample 40% (719/1,818) of patients underwent a PEG procedure for enteral feeding, of which 55% (392/719) of patients were male. The age profile of the sample is presented in Figure 9 and shows that 588/719 (82%) patients were aged 70 years or older.

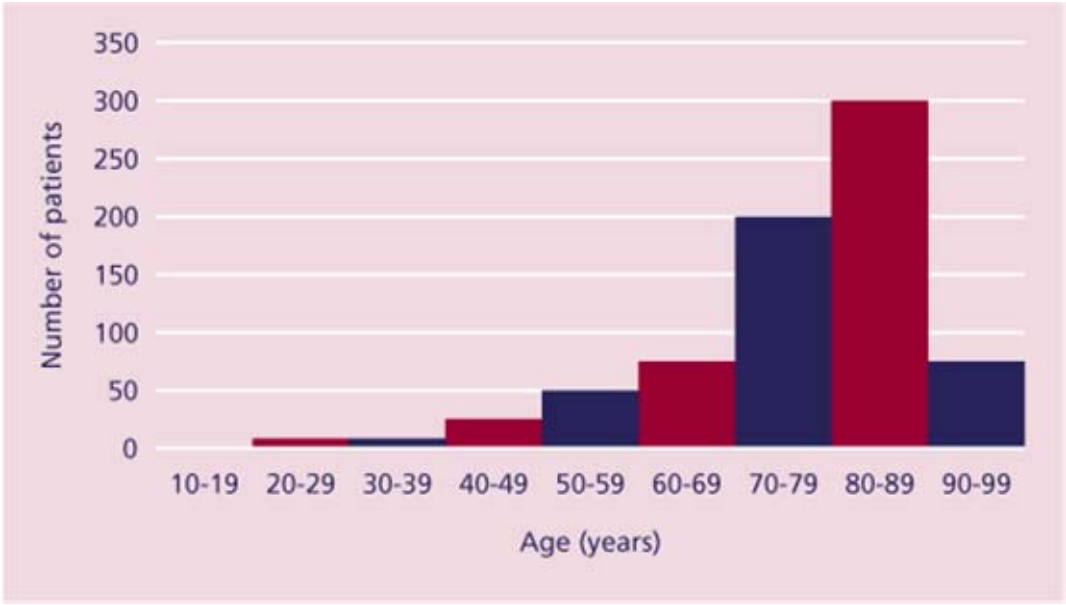

Figure 9. Age profile of patient undergoing PEG procedure

There is little evidence that PEG insertion in older persons can increase survival per se. A meta-analysis by Mitchell and co-workers[3] who used a MEDLINE search of studies between 1980-1998 inclusive found that 19% died within one month, a further 11% within two months and a further 14% died within six months. Only 38% survived for one year. An earlier study of American hospitalised Medicare beneficiaries aged 65 years or older discharged in 1991 found an overall 30-day mortality rate of 24%[4]. None of the five cohort studies reviewed, that compared survival in nursing homes with or without feeding tubes, demonstrated a benefit. Another of the studies reviewed showed increased survival in those patients with amyotrophic lateral sclerosis. With such depressing mortality figures the indications for insertion of PEG in older patients should be strongly influenced by a consideration of its benefit to quality of life as much as for survival. The patient needs to understand this and take part in the decision. It may be appropriate for a study to be undertaken which would further examine who would benefit from this procedure.

Figure 10 shows that 84% (607/719) of patients were ASA 3 or poorer.

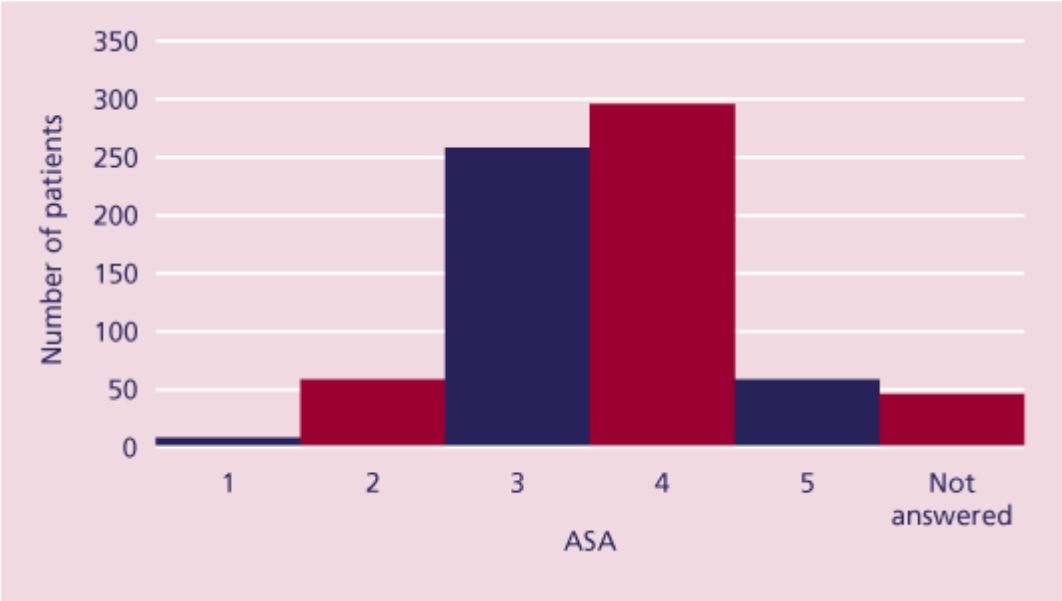

Figure 10. Physical status of patients undergoing PEG procedure

Table 28 lists the medical disorders of the patients.

Table 28. Co-existing medical disorders in patients undergoing PEG procedures (answers may be multiple)	
System involved	**Total *n = 710***
Neurological	695
Respiratory	402
Cardiac	338
Renal	57
Total	**1,492**
Not answered	9

Table 29. Urgency of PEG procedure		
Urgency	Total	*(%)*
Elective/scheduled	641	*(95)*
Urgent	34	*(5)*
Emergency	2	*(<1)*
Sub-total	**677**	
Not answered	42	
Total	**719**	

Predictably, most PEGs were inserted as an elective or scheduled procedure (Table 29). The urgent procedures were likely to be patients with a mechanical obstruction to swallowing where the passing of a nasogastric tube was impractical. However, the advisors were of the opinion that a PEG insertion should never be an urgent procedure and were concerned about the role of PEG feeding in those receiving palliative care. One of the emergencies was for mechanical obstruction. The other case which may have been poorly categorised, received a PEG three weeks after admission.

Table 30. Days between PEG procedure and death

Days between procedure and death	Total	*(%)*
0	14	*(2)*
1-3	126	*(18)*
4-7	156	*(23)*
8-14	183	*(26)*
15-21	112	*(16)*
22-30	101	*(15)*
Sub-total	**692**	
Procedure date unknown	27	
Total	**719**	

There was an alarming association between PEG insertion and early death (Table 30). Out of 692 cases 2% (14/692) of patients died on the day of the procedure, of whom three died in the recovery room, and a further 18% (126/692) died between the first and third post endoscopy day. A total of 43% (296/692) of deaths occurred within one week and a further 26% (183/692) in the second week.

On review of these cases NCEPOD advisors often expressed concern about the timing of the procedure indicating that these procedures were futile or precipitated death. In one case where a patient was over 90 years-of-age an advisor commented, *"The PEG placement was technically OK - but the timing was wrong. The patient was very ill, dehydrated and had pneumonia. They should not have had a PEG at this time and died six days later. There is no information about the last few days of life."*

Early death after PEG procedure is an area where things are going badly wrong. Endoscopists who perform the procedures may not be aware of the patient's outcome following transfer back to the referring clinician.

Clinicians were asked to state the expectation of death (Figure 11). In 22 cases no answer was given and in 6% (42/697) death was expected.

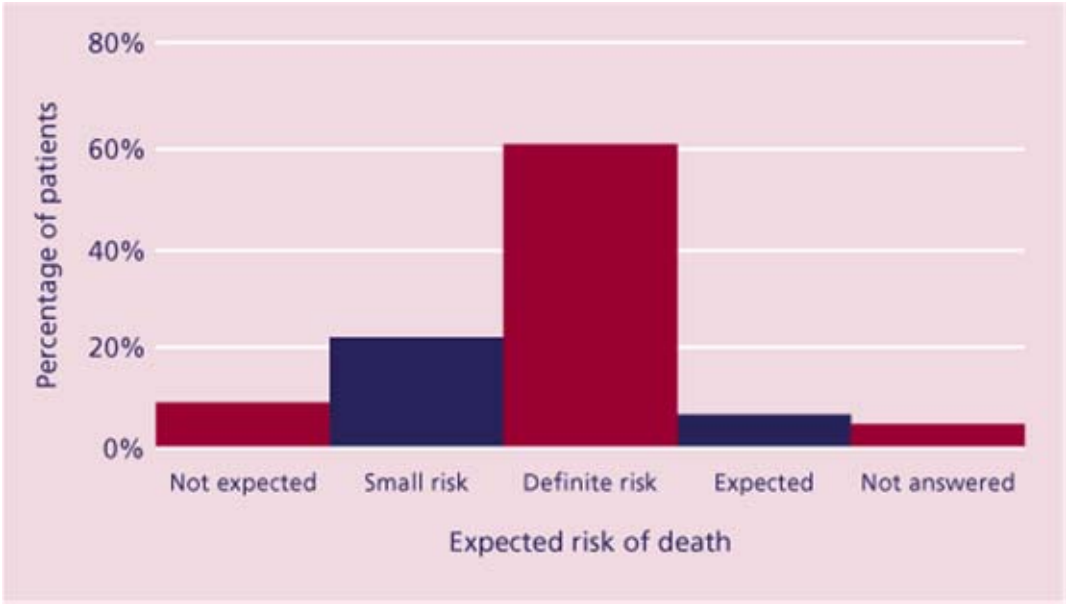

Figure 11. Expectation of death following PEG procedure

Many of these had malignant disease such as oesophageal cancer, and the PEG was to palliate hunger. It was surprising that in 63% (440/697) of cases the patient was classified as having a definite risk of death. On review of the cases NCEPOD advisors were asked to give an opinion on whether the procedure was appropriate for that patient. One in five (19%, 135/719) of PEG procedures were thought to be either futile or no procedure was indicated. For these cases, the quality of information provided to the patient and their relatives must be questioned.

PREOPERATIVE ASSESSMENT AND PREPARATION

Key points

40% of PEG patients had a co-existing diagnosis of acute chest infection.

59% of PEG patients had suffered a stroke or neurological trauma before the insertion of their PEG.

42% of patients had no antibiotic prophylaxis for their PEG insertion.

Pre-existing medical condition

The co-existing conditions leading to the decision for the PEG procedure are presented in Table 31.

Table 31. Indications for PEG procedure (answers may be multiple)	
Indication	**Total** ***n = 706***
Nutritional failure due to non-malignant disease	284
Motor neurone/other degenerative disease	52
Neurological disease – acute (stroke, trauma)	418
Neurological disease – chronic (degenerative neurological disease)	94
Dementia	128
Malignancy – oropharyngeal cancer	27
Malignancy – oesophageal cancer	11
Malignancy – gastric cancer	2
Malignancy – other	40
Total	**1,056**
Not answered	13

NCEPOD did not ask specifically for the primary indication of the procedure. However, the commonest indication for PEG insertion was for feeding problems following an acute neurological disease, mostly a stroke. For a general discussion on patient selection for GI endoscopy see the earlier chapter discussing patient assessment.

Aspiration pneumonia

At the time of PEG insertion, 40% (281/710) of cases, where information was provided, had a co-existing diagnosis of acute chest infection. Many of these had swallowing difficulties, due to comorbidities such as motor neurone disease or following a stroke, and had aspiration pneumonia. There appeared to be a misconception that PEG feeding would prevent aspiration pneumonia as clinicians had indicated on some questionnaires that this was the reason for PEG insertion when in fact aspiration pneumonia is the most common cause of death in these patients. PEG feeding does not prevent aspiration and it offers no protection from aspiration of colonised oral secretions as scintigraphic studies have shown evidence of aspiration of gastric contents in gastrostomy fed patients[5 6].

Dementia

18% (128/706) of patients had a diagnosis of dementia and in many of these the PEG was inserted because patients were feeding poorly. All relevant studies have shown that PEG feeding for those with dementia does not improve outcome[6 7 8 9] and an increasing number of clinicians are of the opinion that dementia is not an indication for PEG feeding[6 8 10]. NCEPOD advisors in their discussions were clear that for those patients with severe dementia and significant comorbidity such as those confined to bed with pressure sores and limb contractures, PEG feeding was unlikely to improve their quality of life and may not be a preferred option. They found the ethical decision on withholding feeding more difficult for those patients with dementia and poor nutrition but no other comorbidity.

The ethical considerations of artificial nutrition and hydration are discussed in the General Medical Council's (GMC) booklet on withholding and withdrawing life-prolonging treatments. In summary, the GMC advises using up-to-date professional advice on the particular clinical consideration and assessing quality of life issues. In addition, it advises wide consultation by seeking other expert opinion and involving the health care team and those close to the patient in decision making[11]. Little evidence was found in the casenotes regarding this type of discussion which either reflects poor record keeping or lack of consultation.

Acute neurological disorder

418/706 (59%) of patients were admitted following a stroke or acute neurological trauma. Patients with a stroke or neurological trauma are most commonly admitted to hospital as an emergency and have PEG feeding established later if required. There is evidence that PEG feeding, compared with nasogastric feeding after a stroke may result in improved nutritional status[12 13]. The time between admission and PEG procedure for those with an acute neurological disorder was examined. 92% (384/418) of patients had their procedure within 60 days of admission and the duration between admission and procedure is shown in Figure 12.

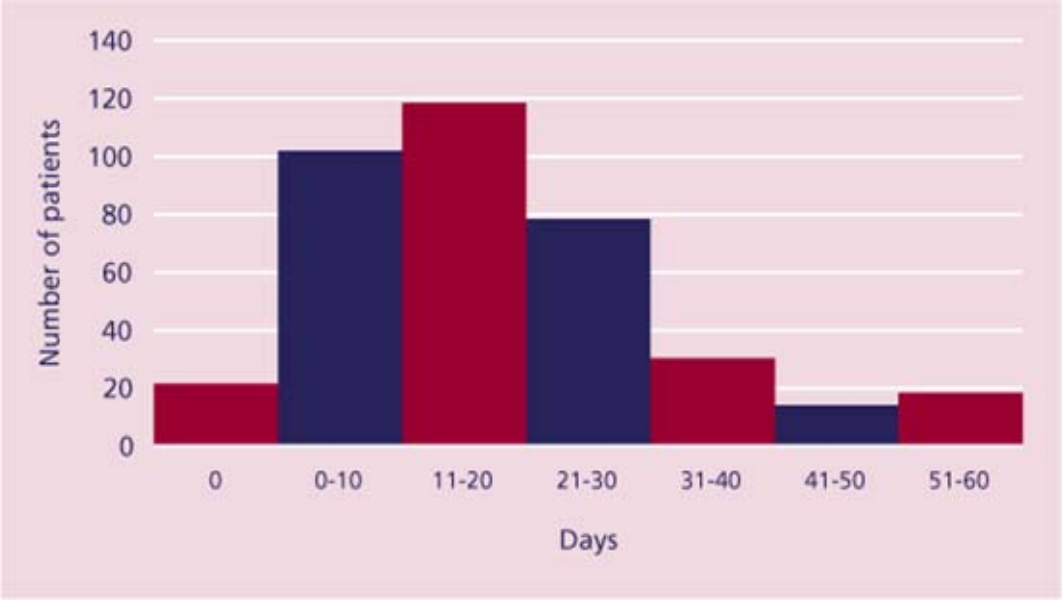

Figure 12. Days between admission and PEG procedure for those with acute neurological disorder

There are few data on the best timing for PEG feeding after a stroke. Historically, it was often deferred for four to six weeks to assess any improvement in dysphagia. However, there is some evidence from a 30 patient study that it should be considered earlier, at 14 days[13] and further trials are ongoing.

An advisor commented about a patient in their late sixties, *"Died two days after PEG insertion from 'inhalation pneumonia', but was admitted nine days before with rigors and a chest infection. It would appear that the PEG was placed too soon after an acute admission with pneumonia".*

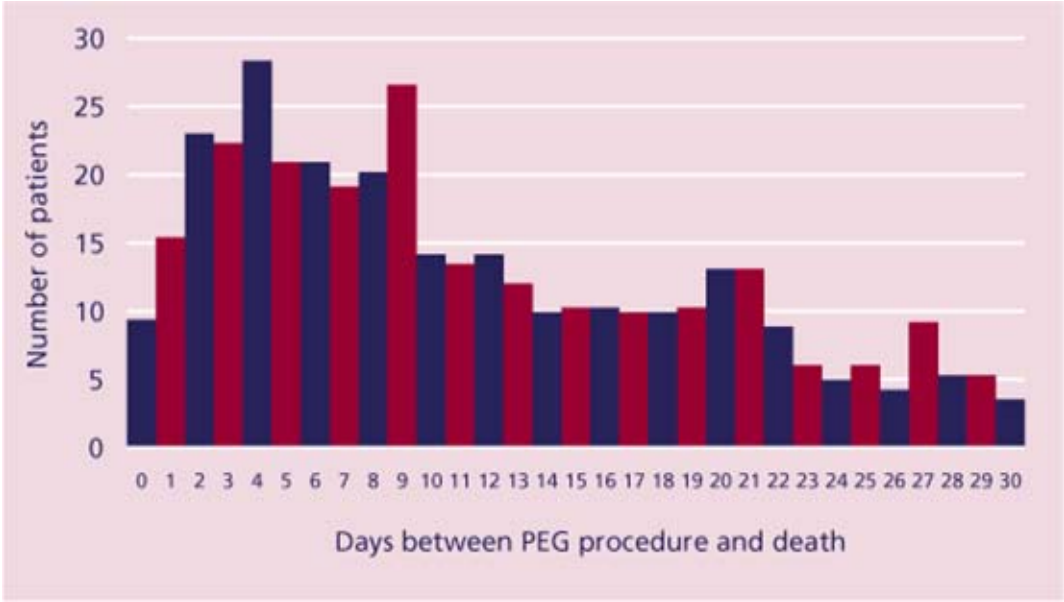

Figure 13. Days between PEG procedure and death for those with acute neurological disorder

Despite PEG feeding for acute neurological disorder being an elective procedure, nine patients died on the day of operation (Figure 13) and 38% (159/418) died on or before postoperative day 7. Why were there so many early deaths? Patient selection must be implicated, but in their discussions advisors were concerned that PEGs may sometimes be inserted to facilitate discharge to community nursing care and, medical considerations that should affect timing may be overlooked, in order to achieve this.

Antibiotic prophylaxis

The British Society of Gastroenterologists (BSG) in their guidelines on antibiotic prophylaxis for GI endoscopy recommends antibiotic prophylaxis for all PEG insertions[14]. There is evidence that antibiotics can reduce peristomal wound infection[15 16], particularly in those with underlying malignancy[17].

Table 32. Antibiotic prophylaxis administered for PEG procedure

	Total	*(%)*
Yes	305	*(58)*
No	220	*(42)*
Sub-total	**525**	
Not answered	194	
Total	**719**	

The data shown in Table 32 do not take account of patients who may have been receiving antibiotics for other reasons. Nevertheless, it would appear that antibiotic prophylaxis is not used universally and this requires urgent review.

OPERATIVE EVENTS

Key points

In 6% of PEG procedures no oxygen was administered.

30% of patients had combined topical anaesthesia and sedation.

9% of patients required reversal of sedation following their PEG insertion.

Table 33. Critical incidents during PEG procedures (answers may be multiple)

Critical incident	Total *n = 660*
Cardiac arrest	1
Hypoxaemia (SpO_2 less than or equal to 90%)	21
Hypotension (systolic less than or equal to 100mm Hg)	2
Tachycardia (greater than or equal to 100 beats/minute)	8
Local haemorrhage	1
Viscus perforation	1
Other	5
Total	**39**
None	622
Not answered	59

Hypoxaemia, the most frequently reported critical event (Table 33), occurred in 3% (21/660) of cases where information was received. However, it is thought that critical events were under-reported as the review of casenotes by advisors revealed several instances of hypoxaemia and perforated viscus which were not acknowledged in the associated questionnaires.

Sedation and monitoring

For further comments on sedation and monitoring during GI endoscopy please refer to the earlier chapter entitled ‘Sedation and Monitoring’.

Table 34. Oxygen administered during PEG procedure		
Oxygen administered	Total	*(%)*
Yes	606	*(94)*
No	41	*(6)*
Sub-total	**647**	
Not answered	72	
Total	**719**	

Oxygen should be given to all patients undergoing a PEG procedure, yet at least 6% (41/647) of patients did not receive it (Table 34).

Table 35. Sedation and analgesia during PEG procedure (answers may be multiple)	
Sedation and analgesia	**Total** ***n = 679***
None	16
Local anaesthesia	245
Intravenous benzodiazepine sedation	542
Intravenous opiod sedation	47
Other intravenous sedation	15
Total	**865**
Not answered	40

Table 35 includes 27 patients who had a GA or were in ICU receiving IPPV. Where local analgesia was used, 6% (42/679) had the procedure done under topical local anaesthesia to the oropharynx alone and 30% (203/679) had topical anaesthesia to the oropharynx combined with some form of sedation.

NCEPOD advisors repeatedly expressed concerns that the use of sedation and local anaesthetic spray to the oropharynx may be implicated in pulmonary aspiration and postoperative respiratory complications. This concern was expressed particularly with regard to patients with dysphagia and a history of aspiration, in whom the supine position of the patient during the PEG procedure might facilitate further contamination to the respiratory tree.

The use of flumazenil and naloxone reversal during PEG procedure is presented in Table 36. The high number of questionnaires not answered may reflect missing data but it is more likely that the patient did not need their sedation reversed. The questionnaire should have made this question clearer.

Table 36. Flumazenil or naloxone administered during PEG procedure		
	Total	*(%)*
Flumazenil	65	*(96)*
Naloxone and Flumazenil	2	*(3)*
Naloxone	1	*(1)*
Sub-total	**68**	
Not answered	651	
Total	**719**	

Reversal of sedation was required in 9% (68/719) of patients. This might reflect that some endoscopists have little awareness of the sensitivity that those with neurological disease have to sedative drugs. Best practice guidelines on sedation for PEG procedure may be helpful.

POSTOPERATIVE OUTCOME

The systems implicated in the cause of death are presented in Table 37.

Table 37. Systems implicated in death following PEG procedures (answers may be multiple)	
Systems implicated in death	**Total** ***n = 670***
Cardiovascular	173
Respiratory	508
Renal	37
Hepatic	9
CNS	35
Total	**762**
Not answered	49

76% (508/670) of patients suffered from respiratory complications after their PEG procedure. It is known that over the long-term, aspiration pneumonia is the most common cause of death for gastrostomy tube-fed patients[5]. However, that patients should die of respiratory complications so early after PEG placement is of concern. Possible reasons for this are patient selection and the timing of the procedure. During the procedure, the supine position of the patient with swallowing problems, perhaps particularly when combined with topical LA and sedation is used, may contribute to aspiration complications. Postoperatively, the position of the patient during and after feeds and the timing and volumes of feed may be contributory factors.

Recommendations

The decision to use a PEG feeding tube requires an in-depth assessment of the potential benefits to the individual. All patients in whom PEG feeding is proposed should be reviewed by a multidisciplinary team.

There is a need for more comprehensive national guidelines for the use of PEG feeding, including issues of patient selection.

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