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Long-term outcome of percutaneous endoscopic gastrostomy feeding in patients with dysphagic stroke

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Abstract

Objective: investigation of length of survival, complications, level of dependence and recovery of swallow in patients who received percutaneous endoscopic gastrostomy (PEG) feeding for dysphagia due to stroke.
Design: a retrospective case note analysis of patients treated between 1991 and 1995 and telephone survey of modified Barthel index in October 1996.
Setting: Cardiff Royal Infirmary and the University Hospital of Wales in Cardiff.
Subjects: 126 patients who had PEG inserted after dysphagic stroke.
Main outcome measures: complications of PEG, length of survival, duration of PEG feeding, recovery of swallow and modified Barthel index score.
Results: median length of follow-up was 31 months (range 4–71). Median duration of PEG use was 127 days (range 1–1372). For patients with PEG inserted within 2 weeks the median duration was 52 days (range 2–1478). At follow up 36 (29%) had had PEG removed, 72 (57%) had died with PEG in use, 10 (8%) still had PEG and were nil by mouth and five (4%) had PEG in use with swallow recovered. The median survival was 305 days. Thirty-five (28%) patients died in hospital. Aspiration pneumonia was the commonest complication. Thirty-three patients were alive in October 1996. The modified Barthel index for nursing home patients was 4 (range 0–13) and for patients at home 11 (range 2–20).
Conclusion: PEG feeding is safe and well tolerated in patients with dysphagic stroke. Early PEG placement (within 2 weeks) is worthwhile with many going on to have long-term feeding. Although overall mortality is high, some patients have a long-term survival and a few attain a reasonable level of function in daily living activities. Late recovery of swallow occurs and patients should have follow-up swallowing assessment.

Keywords: *aspiration pneumonia, dysphagia,percutaneous endoscopic gastrostomy, stroke*

Introduction

Since being described in 1980 [1], percutaneous endoscopic gastrostomy (PEG) has become the preferred method of long-term enteral feeding. PEG tubes are better tolerated than nasogastric tubes and provide better short-term nutrition [2, 3]. They may improve the rehabilitation potential of patients [4]. Dysphagia associated with stroke is the commonest indication for PEG feeding [5–7] and the number of PEG tubes inserted has increased greatly in recent years.

Although the short-term benefits are clear, the long-term outcome of PEG feeding after dysphagic stroke is poorly documented [8, 9]. Many of these patients remain severely disabled and there are considerable resource implications of long-term survival. We investigated the length of survival, complications, level of dependence and recovery of swallow in patients who received PEG feeding after dysphagic stroke.

Methods

A retrospective analysis was undertaken of patients who had a PEG inserted for acute stroke with dysphagia, between 1991 and 1995 at the University Hospital of Wales, Cardiff and the Cardiff Royal Infirmary.

Study subjects were collected by referral to endoscopy unit records and computerized hospital diagnostic and activity data. All had a clinical diagnosis of acute stroke, with or without computed tomography (CT) scan evidence. Patients were selected for PEG insertion on the basis of a speech therapy assessment,

identifying patients at risk of aspiration with oral intake without evidence of recovery of swallow. Consent for insertion of PEG was obtained from patients or on discussion with the patients' relatives. At the Cardiff Royal Infirmary, 103 PEGs were inserted for stroke patients and notes were recoverable in 72 cases. At the University Hospital, notes were available for 54 of 59 cases identified.

Data were collected from hospital notes, nursing home and long-stay hospital records and general practitioners. Some patients were followed up at a PEG clinic at the local day-hospital where records were kept.

Clinical findings at the time of the stroke, timing of PEG insertion, discharge destination, complications of PEG feeding and any subsequent assessment of swallowing were recorded. Surviving patients were contacted by telephone and a modified Barthel index calculated on the response of patients or carers.

Results

A total of 126 patients were assessed, 72 (57%) from Cardiff Royal Infirmary and 54 (43%) from the University Hospital. Three were lost to follow-up, so complete outcome data were not available for these patients. The median age was 80 (range 53-94), with 51% male. The median length of follow-up was 31 months (range 4-71). All had a clinical diagnosis of acute stroke and clinical details are shown in Table 1. Seventy-eight patients (62%) had a CT scan performed; 71 (91%) of these showed changes confirming stroke.

Table 1. Baseline details of 126 patients on whom percutaneous endoscopic gastrostomy was performed

Sign	No.	%
Extent		
Unilateral	88	70
Bilateral	32	25
No long tract signs	4	3
Not documented	2	2
Consciousness		
Normal	54	43
Drowsy	57	45
Coma	8	6
Not documented	7	5
Hemianopia		
Present	21	17
Absent	88	70
Not documented	17	13
Speech		
Normal	52	41
Dysphasia present	66	52
Not documented	8	6

Fifty-two (41%) had had a previous stroke, no data were available for a further nine (7 %). All patients received bedside clinical swallow assessment from a speech and language therapist before PEG insertion. One patient had videofluoroscopy prior to PEG insertion and 19 after PEG insertion.

Prior to PEG insertion, 75 (60%) had nasogastric feeding, one (1%) parenteral nutrition, seven (6%) some oral intake and the remainder intravenous fluids only. The median time from stroke to PEG insertion was 22 days (range 4-189). Three patients accounted for the late insertion of PEG. One initially tolerated pureed diet (116 days) and one patient tolerated nasogastric feeding in a long-stay ward (189 days) and a third patient extended the initial stroke (144 days). As he was still an inpatient, he was included as this was arbitrarily considered to be an extension of his first stroke. Forty-one patients had their PEG inserted within 14 days of the stroke and 74 patients had them within 28 days. In the remaining 52 patients they were inserted more than a month after the stroke.

Most PEG tubes used were Fresenius pull-type gastrostomy inserted endoscopically (Freka PEG Universal gastric set, 15 French).

The median duration of hospital stay after insertion was 22 days (range 1-591). Thirty-five patients (28%) died before discharge, at a median of 17 days after PEG (range 1-113). Three patients died within 3 days of PEG insertion, one developed aspiration pneumonia on the day of insertion and died the next day, the other two patients were critically ill from the stroke and died 1 day and 3 days after PEG insertion. None of the deaths was thought to be due to PEG insertion. No post mortems were held. The survival time after insertion of PEG is shown in Figure 1. The median survival after PEG was 305 days with 77% alive at 1 month, 62.5% alive at 3 months, 54% alive at 6 months and 47% alive at 1 year.

Of the 126 patients, three were lost to follow-up and 10 still had PEG feeds and remained nil by mouth at the time of assessment. The outcome with regard to swallowing was available in 113 patients, as shown in Table 2. Seventy-two patients (57%) died without recovery of swallow. Thirty-six patients (29%) recovered their swallowing and had the PEG removed. A further five patients (4%) recovered swallowing, but still had supplements of fluid or feeds via the PEG. The time course of events is shown in Figure 2.Five patients recovered their swallowing and had the PEG removed before discharge after a median 33 days (range 26-56).

The discharge destination is shown in Table 2. Only 16 patients were discharged directly to their own home. Of these, three already had had the PEG removed and a further eight later recovered their swallow, six having the PEG removed and the other two continuing to have supplements via the PEG tube. In total, 41 patients recovered their swallow (19 after 6 months, 20 before 6 months and two after and

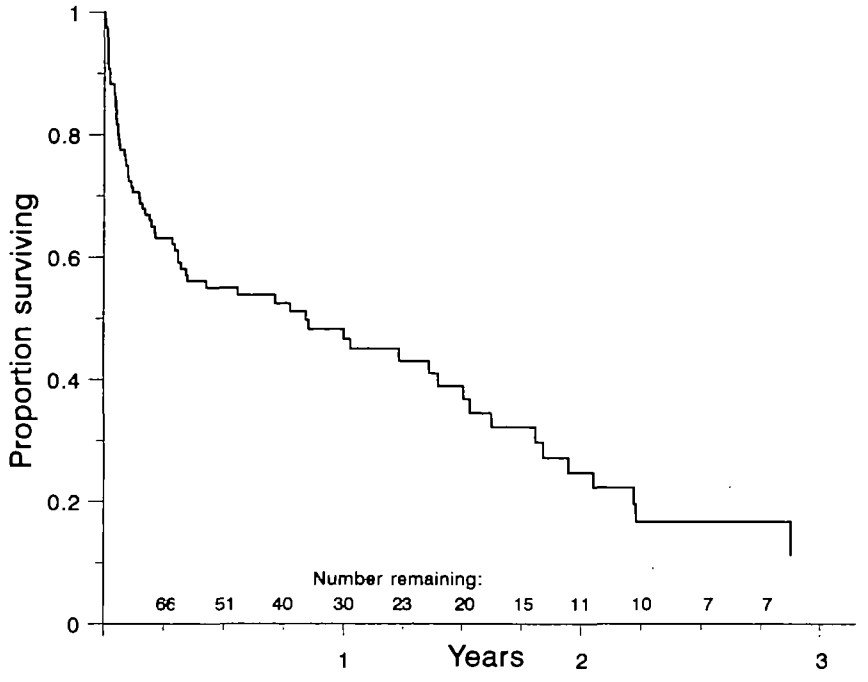

Figure 1. Log rank curve showing time course of survival after percutaneous endoscopic gastrostomy insertion.

unknown period). Two patients whose swallow recovered and had their PEG tubes removed have had recurrent dysphagia requiring further PEG insertion.

The overall duration of PEG feeding (i.e. until recovery of swallow or death) was known in 120 patients and compared in those who had early or late PEG placement after their stroke. For patients who had PEG placed within 2 weeks of stroke, the PEG was in use a median 52 days (range 2-1478 days). In those whose PEG was placed more than 14 days after the stroke, the median duration of PEG use was 127 days (range 1-1372).

Sixty-three complications occurred in 77.4 patient years of PEG feeding (Table 3). The commonest complication was aspiration pneumonia. Four of these patients regained their swallow, two having the PEG removed. The other patients with aspiration remained nil by mouth with PEG feeding. In general the diagnosis of aspiration was a clinical diagnosis of bronchopneumonia, with a suggestion that aspiration of feeds may have been an important factor. Three patients had pneumoperitoneum related to PEG insertion; one developed peritonitis which settled with conservative management; a second patient developed pneumoperitoneum and PEG insertion was abandoned with successful insertion 2 weeks later; a third developed pneumoperitoneum on two consecutive attempts at PEG insertion 2 weeks apart. A successful insertion of PEG occurred 3 weeks later.

Fifty-one patients were known to be alive at the time of assessment of swallowing. In October 1996 these patients or carers (nursing homes, residential homes or

Table 2. Discharge destination and outcome following percutaneous endoscopic gastrostomy (PEG)

	PEG out, swallow recovered	PEG in use				
		Swallow recovered	Nil by mouth	Died	No information	Total
Died as an inpatient	0	0	0	35	0	35 (28%)
Long-stay hospital	11	0	3	17	1	32 (25%)
Nursing home	15	3	5	18	1	42 (33%)
Own home	9	2	2	2	1	16 (13%)
Destination unsure	1	0	0	0	0	1 (1%)
Total	36 (29%)	5 (4%)	10 (8%)	72 (57%)	3 (2%)	126

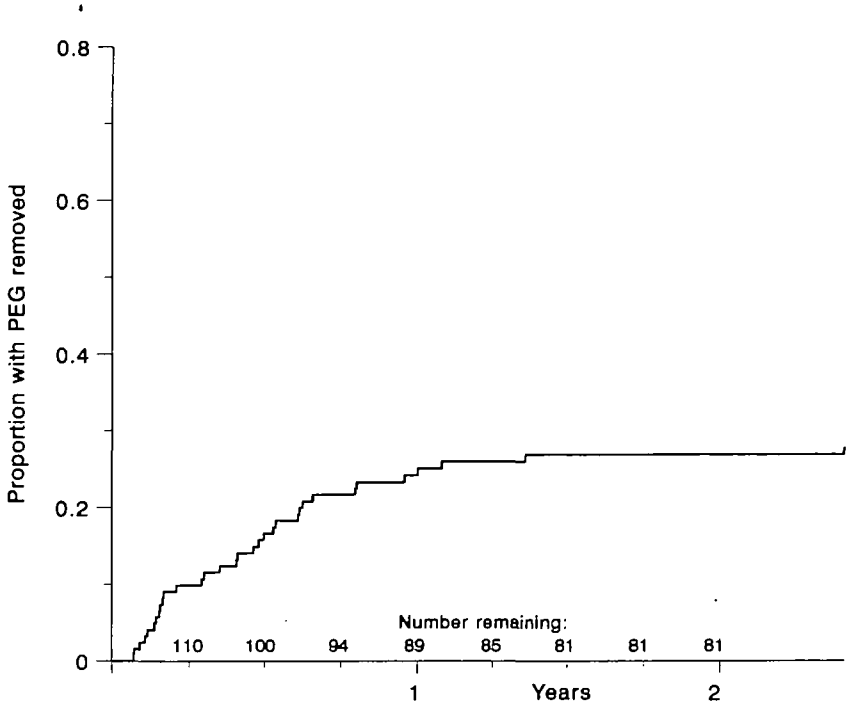

Figure 2. Log rank curve showing time course of percutaneous endoscopic gastrostomy (PEG) removal following swallow recovery.

relatives) were contacted to assess their degree of disability. A further 11 patients had died and seven patients were no longer traceable. Information was collected on 33 patients still alive at a median of 30 months after their stroke (range 19-64 months). Fifteen were at home (six continued with PEG feeding), 16 in nursing homes (eight continued with PEG feeding) and two in residential care (one continued with PEG). The modified Barthel index (maximum 20) was a median of seven (range 0-20). For those in nursing homes, the Barthel score was a median four (range 0-13) and patients at home the median Barthel score was 11 (range 2-20). The two patients in residential care had Barthel scores of 10 and 12.

Table 3. Details of the 64 complications that occurred in a total of 77.4 years of percutaneous endoscopic gastrostomy (PEG) feeding

Complication	No.	%
Aspiration pneumonia	22	18
PEG site infection[a]	21	17
Blocked PEG tube	12	9.5
PEG tube fell out	4	3
Pneumoperitoneum	3	2
Leak around PEG tube	1	1
PEG tube snapped	1	1

[a]Four infections occurred with methicillin-resistant *Staphylococcus aureus*.

Discussion

To our knowledge this is the largest follow-up study of patients with PEG feeding after stroke and gives the long-term survival, disability and swallowing outcome in a large group of patients. Several workers have monitored the long-term follow-up of patients with PEG [5-9], but most evaluate a heterogeneous group of underlying diseases. Only two publications (one in abstract form) [8, 9] look at the outcome of stroke patients and both have small numbers.

The clinical pattern of stroke in our patients (all of whom had dysphagia) was similar to that described in other studies, with 70% having hemiplegia, 51% being drowsy or comatose at presentation and 52% dysphasic [10-12]. Our study confirms others' findings that PEG insertion is safe in these ill patients [2, 5, 7]. The high median age reflects the fact that stroke is more common in the elderly and in our unit there is a policy of active treatment in those patients with dysphagia thought likely to survive.

Dysphagia is a common complication of stroke, occurring in up to 45% of those admitted to hospital [10]. PEG feeding provides more effective nutrition than nasogastric feeding, due to the repeated removal of nasogastric tubes in many patients [2, 3]. Early PEG feeding is clearly desirable, but would not be justified if dysphagia is only temporary or if the patient is likely to die from their stroke. It is unclear how long one should wait before inserting a PEG. Our study was retrospective and we do not therefore have data on those patients with stroke and dysphagia whose swallow

recovered without PEG feeding or who were too ill to have PEGs inserted. We only studied those patients in whom it was considered appropriate to insert a PEG (i.e. patients with no evidence of swallow recovery in whom there is a reasonable prospect of survival).

Of the three patients who died early after PEG insertion, one died of an unpredictable aspiration. In retrospect, the insertion of a PEG may of been inappropriate for the other two patients due to their general state but at the time it was felt necessary for their management. Autopsies were not performed on these patients. Although a relationship to PEG insertion cannot be absolutely ruled out, there was no direct evidence (clinical peritonitis or evidence of perforation) to suggest the deaths were related to a complication of PEG insertion.

It has been policy in Cardiff for many years to use PEG feeding at an early stage and we can make some observations. First, of the 41 patients undergoing PEG insertion within two weeks of stroke, there were more early deaths. Secondly, patients with early PEG placement (within 2 weeks) had PEG feeding for a median of 52 days, implying that patients can be identified early who will not regain their swallow and require PEG feeding making insertion worthwhile. Thirdly, this can be achieved without the need for videofluoroscopy, as all but one patient in this study had simple speech therapy assessment as their only assessment prior to PEG insertion; 87% of patients with stroke-induced dysphagia recover their swallow within 4 weeks [10]. Although a statistical comparison of early and late PEG insertion is not possible in this retrospective survey because of inherent differences in the two groups, our study does show that it is possible to select patients early who will require longer term feeding.

As shown in Figure 2, 19 patients' swallow recovered after more than 6 months and their PEG tubes could be removed. Only a minority of patients (44%) in this study had documentation of swallow assessment after PEG insertion and it is possible that other patients could manage without PEG feeding. There is a clear need for better follow-up of these patients, many of whom are discharged to nursing homes and not followed up in hospital clinics. Community follow-up at 3-6-month intervals by a speech and language therapist could be effective by identifying patients in whom feeding is no longer needed.

Although PEG insertion is generally a safe procedure, there is long-term morbidity and this study highlights the problem of aspiration pneumonia. Pneumonia is very common in stroke patients with dysphagia [8] and aspiration of saliva, food and fluids taken by mouth as well as direct regurgitation of PEG feeds can cause aspiration pneumonia [12]. Gastro-oesophageal reflux of PEG feeds is well documented, especially with bolus feeds in the prone position. Conversion of the PEG to a jejunal feeding tube will reduce this risk.

In conclusion, we feel that with simple clinical assessment and assessment of swallowing by a speech and language therapist, patients can be selected for whom early placement of PEG tubes is worthwhile. Follow-up of all patients with PEG is needed and could identify patients from whom the tube can be removed. There is a high mortality in patients with stroke and PEG in the first few months after insertion, but some patients can survive long-term after PEG and a few attain a reasonable level of function in their daily living activities. More research needs to be undertaken into the prevention of common complications such as aspiration pneumonia.

Key points

- In patients with dysphagic stroke early percutaneous endoscopic gastrostomy placement (within 2 weeks) can be worthwhile.
- Long-term survival can occur and one-third of patients recover their swallow—half of these after more than 6 months.
- The most common complication is aspiration pneumonia.

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