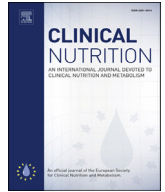




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Original article

## A large prospective audit of morbidity and mortality associated with feeding gastrostomies in the community

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## SUMMARY

**Background & aims:** Morbidity after 30 days and morbidity after 1 year from gastrostomy placement is poorly characterised as patients are discharged into the community. We prospectively recorded morbidity and mortality associated with gastrostomy placement over a five year period.

**Patients and methods:** Community dietitians regularly reviewed all patients with a gastrostomy after hospital discharge, prospectively recording morbidity and mortality between 2008 and 2012. In addition hospital databases and case notes were examined. Recorded morbidity included insertion site infection, leakage, over granulation, haemorrhage and buried bumper.

**Results:** The commonest indication for PEG placement was following an acute cerebral injury. There were no deaths and few complications directly related to gastrostomy insertion in 350 patients. We collected a total of 571 years of gastrostomy data. Mortality within 30 days was predominantly from a respiratory infection. 30 day, 3 and 12 month cumulative mortality (and morbidity) were 8% (2%), 16% (10%) and 35% (15%) respectively. 38% of patients required treatment for an insertion site infection with 70% of these having further infections. Overall there was a site infection every 2.1 years a gastrostomy was *in situ*. Complications such as buried bumpers (5(1.4%)), persistent fistulas (0) and over granulation (7(2%)) were rare. Few gastrostomies required replacement (11%).

**Conclusion:** We have demonstrated reassuringly low rates of gastrostomy-associated morbidity and mortality. There was no direct mortality. The greatest morbidity resulted from gastrostomy-site infection.

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### 1. Introduction

Published data on gastrostomy associated morbidity and mortality has been predominantly retrospective and limited to recording morbidity at 30 days and mortality at one-year post placement. Even in studies where prospective recruitment occurs, the recording of outcomes is taken from hospital notes or databases retrospectively. There is little accurate data available on the incidence and prevalence of gastrostomy related complications such as infections or buried bumpers from patients living in the community.

Percutaneous endoscopic gastrostomies (PEGs) and their radiological equivalent (RIGs) are the methods of choice for long-term enteral nutrition. Placement of these devices, although technically straightforward, has been associated with significant short-term morbidity and mortality of 16–30% [1]. One recent

population-based study has shown high in-hospital mortality (10.8%) post PEG insertion, felt by the authors to represent poor patient selection and demonstrating a need to identify patients for whom PEG insertion is unlikely to derive benefit [2]. Studies have showed comparable outcomes using push and pull techniques for PEG insertion [3].

In a 'land mark' study in patients with a dysphagic stroke, early placement of a PEG feeding tube resulted in worse clinical outcome compared with delayed placement [4]. The UK National confidential enquiry into patient outcome and death (NCPOD) after PEG tube placement identified advanced age, high ASA grade, hypoalbuminaemia, oversedation, inadequate prophylactic antibiotics and dementia as associated with early mortality [5]. Of the patients who died within 30 days of PEG placement, it was felt that placement in 19% of these patients was clinically futile. The authors concluded that selection of patients was paramount to good clinical outcome [5]. As a result of these publications and others many institutions including our own put in processes to ensure appropriateness of gastrostomy placement in patients.

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We present our prospectively collated audit data on the morbidity and mortality of patients for whom a gastrostomy was placed within the Plymouth region between 2008 and 2012 with follow up until the end of 2013.

### 1.1. Patients and methods

All adult patients (16 years or older) in whom a gastrostomy tube was placed at Derriford Hospital, Plymouth between the 1st January 2008 and 31st December 2012 for the long-term (planned durations >6 months and maxillo-facial patients having gastrostomies to cover surgical procedures or chemo/radiotherapy were not included) delivery of enteral nutrition were included in our prospective audit. All patients (none were lost to follow up) were followed up until 31st December 2013. The audit was approved by the hospital's audit department (reference CA 2013/14/2060).

Prior to gastrostomy placement all patients were assessed for suitability by an enteral nutrition 'specialist' nurse or the hospital's nutrition team in line with nationally published guidelines [6]. 17% of referrals were rejected as they were felt to be clinically inappropriate. Where an acute event had occurred e.g. an acute cerebral injury attending physicians were encouraged to feed patients via an NG tube for 1–2 weeks to ensure gastrostomy placement was appropriate. Gastrostomy placement was deferred if patients were actively septic, experiencing acute respiratory distress or medically unstable. The indications for referral were recorded as well as the patient's demographics. Gastrostomy placements were done according to national guidelines with 'minimal sedation' (Midazolam ± Fentanyl) and antibiotic prophylaxis [6]. Sedation requirements were variable and the doses used were at the endoscopist's discretion, but British Society of Gastroenterology guidelines were followed [7,8] Antibiotic prophylaxis was with a single dose of Co-amoxiclav (GSK), or Teicoplanin (Targocid, Sanofi-Aventis) in cases of Penicillin sensitivity. Greater than 96% of PEG tubes placed were Freka 15F (Freka®, Fresenius Kabi) using a pull technique and all of the RIG tubes were 14 F Kimberly-Clarke. Where required, placements were done with appropriate anaesthetic support.

Within a few days of hospital discharge specialist community enteral feeding dietitians visited all patients and continued to follow them up at clinically appropriate intervals. As part of the community enteral feeding dietitians' remit, education of patients and/or carers about gastrostomy care was routine as was the trouble-shooting of complications. Management of complications was protocol driven. For insertion site infections swabs for microbiological culture were taken and oral antibiotics given along with the use of a dry dressing. The specialist dietitians prospectively maintained a spreadsheet (Excel, Microsoft, USA) recording complications (e.g. infections, leakage, buried bumper, granulation tissue, tube removal/replacement and death).

For the purposes of our audit we tabulated the community dietitians' data and additionally examined computerised databases of endoscopy and radiology reports (placements and removals), microbiology results, hospital notes and the hospital admission records (for readmissions).

Data was predominantly descriptive. Statistical examination was with Stata 10.1 (Stata corp, Texas, USA). Data was presented as medians and interquartile ranges or number and percentages. Chi<sup>2</sup> tests were used to compare groups.

## 2. Results

### 2.1. Patient demographics

Four hundred and thirty-three patients were assessed for gastrostomy placement, in seventeen cases placement was deferred, in

sixty-six placement was not advised. The baseline characteristics of the 350 patients are presented in Table 1, with a total of 571 years of gastrostomy tube follow up. The relatively low median age at which gastrostomies were placed reflects the heterogeneity of indications for gastrostomy placement, with cerebrovascular events (median age 76 years (65, 84)) constituting twenty-six percent of the patient population. 81% of gastrostomy tubes were placed as inpatient procedures. The patients having their tubes placed as day cases tended to be suffering from progressive diseases such as MND as opposed to having had an acute insult such as a CVE or head trauma.

### 2.2. Acute complications and mortality

Readmission to hospital within 30 days of patient's first gastrostomy insertion was predominantly for self-limiting pain (Table 1). Few complications were seen as a direct result of gastrostomy placement. No deaths were directly attributed to gastrostomy placement (e.g. bleeding, peritonitis). Mortality within 10 days of gastrostomy placement was predominantly due to pneumonia and respiratory problems (Table 3). There were however 4 deaths from underlying malignancy and liver disease despite patients being stable at the time of gastrostomy insertion.

### 2.3. Mortality

Patient follow up was for a minimum of one year. During the study period over half the patients died (Tables 2 and 3). Mortality within 30 days and at 3 months was 8% and 16% (Fig. 1), with about half the mortality being in patients who had had a CVE or malignancy. Indeed nearly a quarter of CVE patients were dead within 3 months of placement.

Patients in whom gastrostomy placement was to enhance nutritional intake in the presence of a safe swallow had a wide mixture of underlying conditions and universally had a low BMI (<18.5). Mortality (13 (42%) patients) was predominantly from pneumonia and respiratory problems (8) cancer (occult at the time of placement) (2), liver failure (1), renal failure (1), CVE (1).

### 2.4. Gastrostomies removed

Gastrostomies were not replaced routinely only when required. The majority of gastrostomies placed were for use throughout the patient's remaining life, with only 12% removed and not replaced (Table 2). The majority of gastrostomies removed were in patients who had recovered a safe swallow after suffering a cerebrovascular event, acute neurological insult or who had had a safe swallow but had a poor dietary intake. 95% of PEGs were removed endoscopically, the remaining using the 'cut and float' method. No complications of either technique were seen.

**Table 1**

Baseline characteristics median (IQ range) or number (% total patients).

Baseline characteristics	
Number	350
Male:Female	151:199
Age (years)	62 (45, 75)
Residence (H:RH:NH) <sup>a</sup>	187:141:22
RIG:PEG	17:333
Inpatient: day case placement	285: 65
30d procedure related re-admissions (%) <sup>b</sup>	6 (1.7%)
Total tube years	571

<sup>a</sup> Residence at hospital discharge H = patients own home, RH = residential home, NH = nursing home.

<sup>b</sup> 3 pain, 1 pulled out, 1 malaena, 1 perforation of colon.

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