



Radiological percutaneous gastrostomy placement for enteral feeding

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Many patients who are unable to swallow have normal intestinal absorption and therefore do not need expensive and potentially problematic parenteral nutrition. Long term nasogastric tubes are unpleasant and interfere with communications, thus a gastrostomy is often felt to be appropriate. Traditionally this has been inserted at laparotomy but recently, other less invasive techniques of insertion such as endoscopy have been used for placement. We describe three patients where a percutaneous gastrostomy was placed by a radiological technique that we feel deserves wider recognition. It is quicker, cheaper and more versatile than the endoscopic method and avoids the unpleasant necessity for intubation by other than a fine-bore nasogastric tube.

Keywords: enteral nutrition; percutaneous gastrostomy; fluoroscopy

Introduction

Long term nutrition often becomes a major problem in patients with gastrointestinal tract dysfunction. Intravenous total parenteral nutrition is expensive and has major complications, thus if the problem lies above the stomach, enteral feeding can be employed to utilise the normal gut absorption. As nasogastric tubes, however soft, are uncomfortable and interfere with speech, a gastrostomy is increasingly used to facilitate enteral feeding. We report a simple and cheap radiological method of establishing a gastrostomy¹⁻⁴ that we used in three patients, one of whom had trouble-free nutrition for 6 months, one for 4 months and the other patient is progressing well after 4 months.

Case 1

A nineteen-year-old girl sustained an atlanto-occipital dislocation and intraventricular and brainstem haemorrhage following a road traffic accident on 8.7.92. She was initially admitted to her local hospital from where she was quickly transferred to a major teaching hospital. She was intubated with a nasotracheal tube and she was able to breathe spontaneously.

A tracheostomy tube was inserted on day 10 in place of the nasotracheal tube. Her nutritional needs were met initially by parenteral and subsequently by nasogastric feeding. Neurologically, she had a bilateral Vth nerve palsy and some impairment of cranial nerves VII and XII. In addition, she had a high cervical incomplete motor tetraplegia. Over the next 2 months her neurological status improved and she was transferred to the National Spinal Injuries Centre at Stoke Mandeville for rehabilitation. Despite improvement in the range and strength of her facial and lingual movements, she had marked fasciculation and some wasting of the tongue and significant impairment of the anterior and posterior movements of the tongue. She had difficulty swallowing her saliva and delay in triggering the swallow reflex. Nine days after admission, a video

contrast radiology study of swallowing demonstrated instant aspiration. A percutaneous gastrostomy was performed on the following day. Following the procedure both the gastrostomy tube and the nasogastric tube were spigoted and after 24 h she was started on feeds at a rate 75 ml h⁻¹ through the gastrostomy. The consistency of the feed was gradually increased until eventually she was able to tolerate her feed entirely through the gastrostomy tube and her nasogastric tube was removed. Over the next few months there was a gradual improvement in the patient's oral movements. A barium swallow performed 3 months after admission demonstrated an improvement in the oral to pharyngeal transit time, slight pooling of contrast around the valleculae but no aspiration of contrast. It was therefore decided to commence the patient on a trial of oral feeding and to meet her remaining energy requirements by means of the gastrostomy tube. Since then she gradually increased her oral intake to the extent that 3 months later, after a total of 6 months feeding, it was possible to remove the gastrostomy tube. She is presently able to tolerate her entire feed orally.

Case 2

A 50-year-old lady sustained haemorrhagic damage to the brainstem following a gunshot injury in the West Indies. After 4 weeks in an intensive care unit she was transferred to a neurosurgical unit in England and thence to the National Spinal Injuries Centre at Stoke Mandeville. At the time of her admission she was tetraplegic and had a left sided facial palsy. She had a severely diminished swallowing reflex with extensive pooling of saliva in the oropharynx.

Prior to her admission she had been fed via a nasogastric tube, but this was causing some discomfort and in order to meet her long term nutritional requirements, and as the gut was functioning normally, a percutaneous gastrostomy was performed under fluoroscopy control. There were no complications and the procedure took approximately 20 min. Over the next 3 days the rate of her feed via the gastrostomy tube was gradually increased from a rate of 50 ml h⁻¹ to 75 ml h⁻¹ without complication. Since then she tolerated

her feed at a rate of 100–125 ml h⁻¹. At 3 months post injury, although her gag reflex was returning, she remained unable to swallow. She improved sufficiently over the next 3 weeks to allow removal of the gastrostomy and resumption of normal feeding.

Case 3

A 69-year-old man developed a C6 complete lesion and dense right hemiplegia following thoracic aortic graft surgery. His confusion and agitation led to the nasogastric tube being pulled out frequently and when the gastrostomy tube was placed in the anaesthetic part of his body, this activity ceased and he has tolerated the tube for 4 months.

Discussion

In many patients with pharyngeal or oesophageal mobility dysfunction where oral feeding is impossible, there is often a dilemma of how to ensure adequate nutrition over the medium term until sufficient function has returned to prevent the risks of aspiration. These patients are often in effect clinically starved in hospital. Feeding is often inadequate and long term nasogastric tubes are generally poorly tolerated so full parenteral nutrition is frequently commenced. However, this is very expensive and not without complications, such as infection, thrombosis, trace element deficiency.

If the patient's problem is in the upper gastrointestinal tract and the stomach and bowel are working normally, a gastrostomy and/or enterostomy can be used to deliver liquid directly into the bowel. Theoretically this could be liquidised 'normal' food but in practice a sterilised prepared balanced diet is used.

The enterostomy has been traditionally performed as an open operation under general or local anaesthesia, but more recently the endoscopic 'push-pull' route has been popularised as less invasive. It does, however, require a gastroscopy procedure which is uncomfortable for the patient, time consuming, relatively expensive and possibly contraindicated or impossible if there are upper tract abnormalities. In general, two operators, (the endoscopist and a surgical assistant) and one or two nursing assistants are required for a 30 min procedure. Most prostheses also have to be removed endoscopically, a further inconvenience for the patient.

We used a percutaneous gastrostomy set that allows placement under local anaesthetic in the X-ray fluoroscopic suite in approximately 20 min with the minimum of discomfort (Figure 1). The indications and contraindications (inability to distend the stomach to reach the anterior abdominal wall, previous upper abdominal surgery, colostomy etc) are similar to those for the endoscopic route.

Technique

The procedure is performed on a fluoroscopy table using full aseptic technique. The stomach is distended with 1–2 litres of air via a nasogastric tube until the gas bubble is seen to be well clear of the ribs. If there is doubt over the position of the liver edge this can be

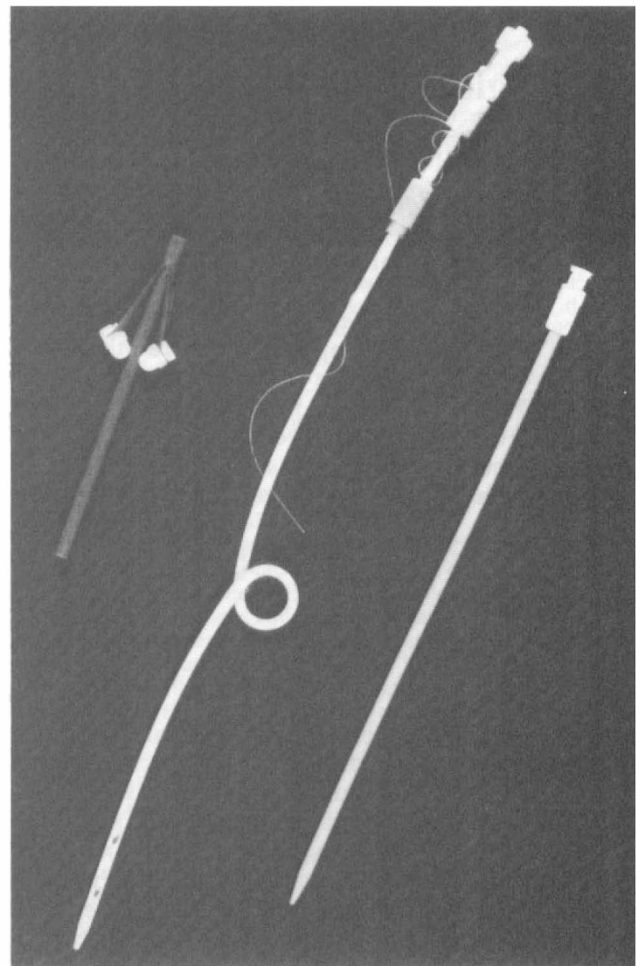


Figure 1 Components of the percutaneous gastrostomy tube

marked with ultrasound. The skin is anaesthetised if appropriate and under screening control a special retaining suture is inserted which allows the anterior stomach wall to be held opposed to the anterior abdominal wall while the 12F gastrostomy tube is inserted into the stomach using a modified Seldinger technique with a peel-away introducer. The technique is very similar to that used for some suprapubic catheterisation techniques. We used the Cope gastrointestinal suture anchor (Cook Inc) and the Tilma percutaneous gastrostomy set (Cook Inc). The procedure takes approximately 20 min for one operator with a single assistant to run for equipment. Some operators use ultrasound alone for the procedure thus it is technically possible to perform the procedure at the bedside.

Conclusion

We believe that enteral feeding is an underused technique because of the perceived need for an operative or endoscopic procedure to establish a gastrostomy. The simple, safe and cheap technique of radiologically guided percutaneous gastrostomy can be

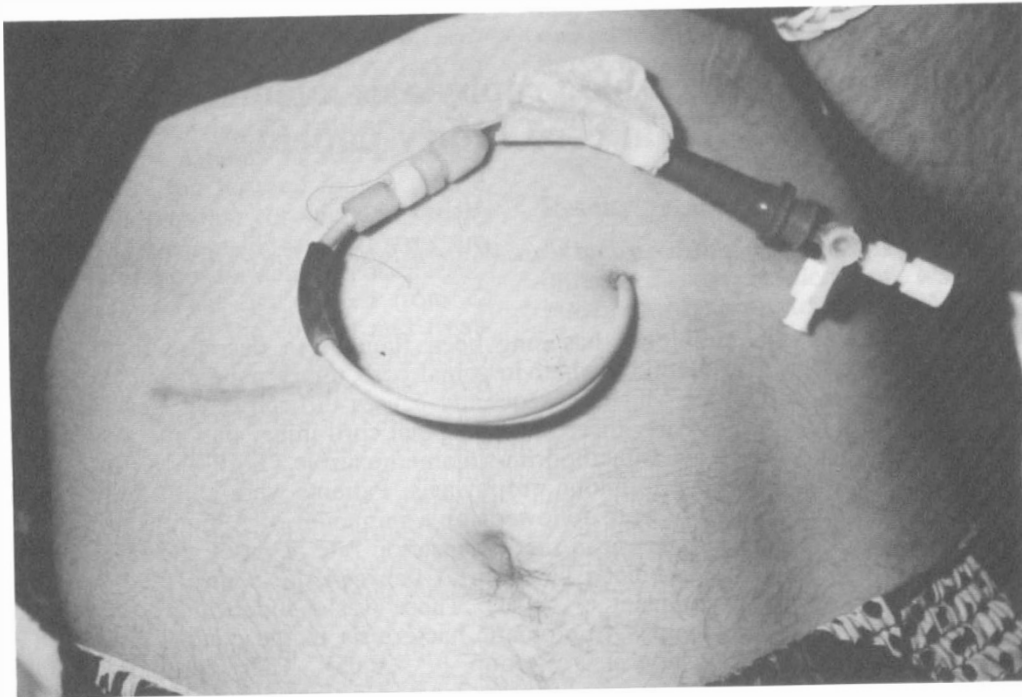


Figure 2 Patient with gastroscopy tube *in situ*

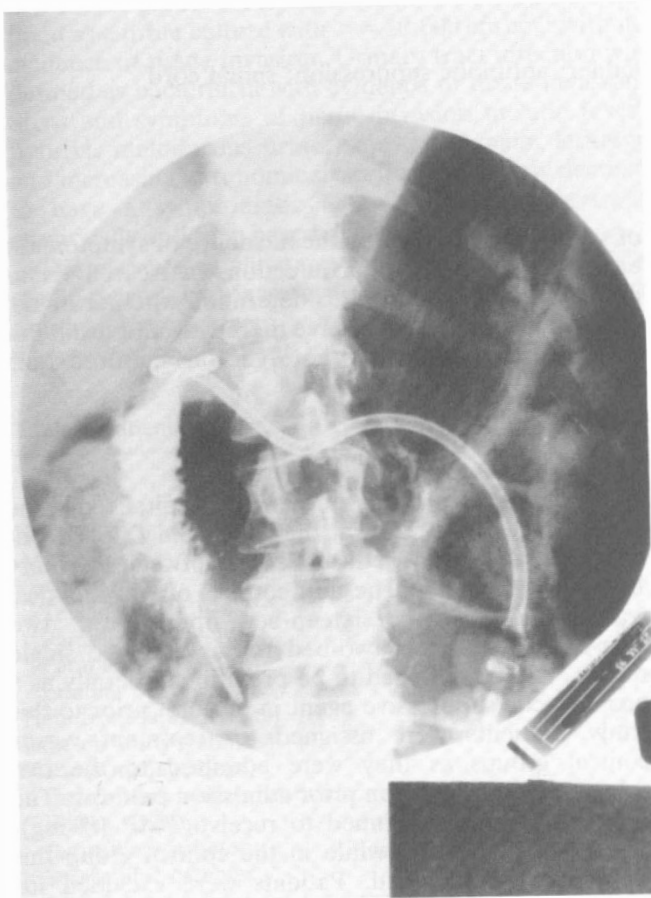


Figure 3 Radiograph of the short tube *in situ*. The loop will later move back to lie at the skin entry point so the tip may fall back into the stomach. A longer tube would be placed so that the tip lay in the distal duodenum

performed in any department of radiology (or, if ultrasound is used, at the patient's bedside) and should be considered in patients with an upper gastrointestinal tract dysfunction but an otherwise normal bowel so that possible undernutrition or complications of nasogastric tubes or parenteral feeding can be avoided.

Acknowledgement

The secretarial assistance of Mrs L Holliday is gratefully acknowledged.

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