Percutaneous Endoscopic Gastrostomy in Patients with Ventriculoperitoneal Shunt

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SUMMARY

Introduction: Percutaneous endoscopic gastrostomy (PEG) placement in patients with ventriculo-peritoneal shunt (VPS) may be associated with complications. This study reports our experience of PEG in patients with VPS.

Materials and Methods: Consecutive patients undergoing PEG insertion in a gastroenterology unit over 18 month's period were retrospectively analyzed. All patients were evaluated by an attending gastroenterologist for fitness for procedure. Instructions were given for routine antibiotic prophylaxes before the procedure and continued for 48 hours. Patients were followed for immediate complications in particular, wound infection, signs of meningitis, deterioration in neurological state and shunt malfunction. Post discharge, patients were given routine follow-up for review.

Results: Of 86 patients who had PEG inserted during the study period, 14 had VPS including 2 of which had VPS after PEG. The main common indications for VPS were intra-cerebral bleed and head trauma and for PEG were requirement of long term enteral feeding. Twelve patients had PEG at a mean interval of 61 days (range 1-187 days) after VPS. Of these, eight received prophylactic antibiotic or were on antibiotic for other indications before PEG. Two patients developed mild PEG site infections within a week of insertions, including one patient who was not given antibiotic prophylaxis, both treated successfully with antibiotics. The latter patient developed worsening hydrocephalus secondary to VPS blockage. At a mean follow-up period was 140 days (range 20-570 days), there were no death or further complications encountered.

Conclusions: Although safe in the majority of patients with VPS, PEG infection can lead to intracranial complications. We recommend antibiotic prophylaxis for VPS patients before PEG.

KEY WORDS:
enteral feeding, complications, sepsis, percutaneous endoscopic gastrostomy, ventriculo-peritoneal shunt

INTRODUCTION

Percutaneous endoscopic gastrostomy (PEG) was first performed in 1980 and is now increasingly used for long term assisted feeding [1]. Given its relative safety profiles, ease of insertion and maintenance as well as potential physiological benefits [2], it has now replace nasogastric tube as the accepted route for long-term enteral nutrition. However, apart from the lack of PEG service provision, many clinicians and patients still prefer nasogastric tube feeding for various reasons; lack of awareness of the benefits, cost, perceived risks of endoscopy and PEG insertion. In such situations, patients are often only referred for PEG if there have experienced recurrent aspirations. Although generally safe, PEG is associated with peri-stomal infection, typically mild in 10-30% of case. Severe infections such as necrotizing fasciitis and death have been reported in <1% [3, 4]. PEG peri-stomal infection is a concern in patients with VPS as secondary peritoneal infection can lead to shunt malfunction and retrograde intracranial infection. Despite these concerns, studies have shown PEG complications in patients with VPS to be infrequent [5-9]. However, most of the studies available in the English literature have been from the West [5-8] and the pediatric population [6, 11-13]. Data from the East remain scarce [9, 14]. This study reports the experience of a referral centre in Southeast Asia in patients with VPS undergoing PEG insertion.

MATERIALS AND METHODS

Setting: Tan Tock Seng Hospital is one of the few major tertiary referral centres in the island state of Singapore with a population of five million. The hospital is situated adjacent to the National Neurology Institute, and as such, the hospital receives referral for PEG placement in patients who have neurological disorders requiring long term nasogastric tube feeding.

Patients: All patients were evaluated by an attending gastroenterologist for fitness for procedure. The VPS tracts and entry points (scars) were routinely checked and PEG insertion postponed if there were signs of inflammation or infection. Instructions were given for routine antibiotic prophylaxes (Cefazolin 1 gm) before the procedure, and continued for 48 hours (twice daily dosing). Patients were followed for immediate complications in particular, wound infection, signs of meningitis or deterioration in neurological state and shunt malfunction was assessed. Post discharge, patients were given routine follow-up for review. PEG replacement were carried out either at six months or earlier if there is any evidence of PEG malfunction.

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Table I: Patients demographic and outcome data

Patient	Gender/Age	Indication for VPS	VPS-PEG interval	Antibiotic	PEG infection	VPS malfunction
1	M/75	No data available	54	Yes	No	No
2	F/63	ICH (Aneurysm rupture)	1	Yes	No	No
3	M/34	ICH (Aneurysm rupture)	6	Yes	No	No
4	M/42	Head Injury + ICH	180	Yes	No	No
5	F/18	Cerebral palsy/arachnoid cyts	16	Yes	No	No
6	M/65	Meningitis	187	Yes	No	No
7	F/68	ICH (Aneurysm rupture)	28	Yes	No	No
8	M/57	Head trauma (RTA)	27	Yes	Yes	No
9	F/18	ICH	56	No	No	No
10	M/40	Head trauma (RTA)	105	No	No	No
11	M/40	ICH (subdural haematoma) Empyema	30	No	No	No
12	M/22	ICH (Aneurysm)	45	No	Yes	Yes

Legend: M (Male); F (Female), VPS (Ventriculoperitoneal shunt), PEG (percutaneous endoscopic gastrostomy), ICH (intracerebral haemorrhage) and RTA (Road traffic accident)

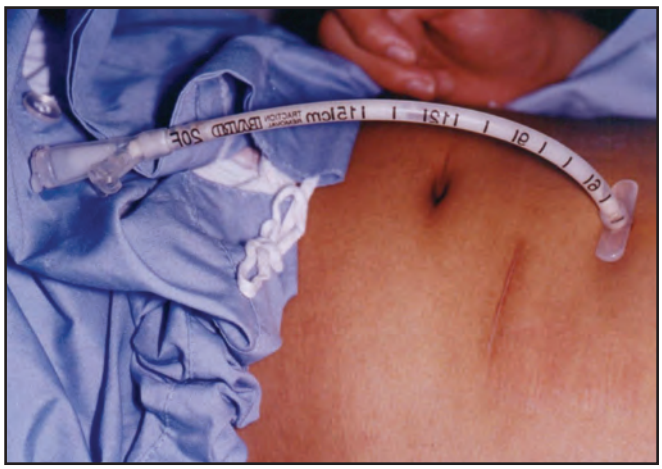

Fig. 1 : PEG placed away from the VPS entry point.

Procedures: All patients were fasted for at least eight hours before the procedure and intravenous antibiotic prophylaxis (cefazolin 1 gm before the procedure and continued for 48 hours) were routinely given. 20F traction removable PEG (Bard®) was used and the insertion was performed by two gastroenterologists using the 'pull' technique [1]. Standard trans-illumination of the abdomen was obtained endoscopically and PEG insertion was performed near the midline, usual slightly to the left away from the VPS abdominal scar in all cases (Figure 1). The positions of the PEG were routinely checked endoscopically.

Post-operation monitoring: All patients received similar post-procedure wound care instruction which include daily wound and PEG anchor inspections and dressing change when required. PEG feeding was commenced one day after the insertion. Development of any fever or deterioration in neurological state and shunt malfunction were documented and evaluated in detail and managed appropriately. Swabs were taken routine for bacterial culture.

RESULTS

Over the study period, PEG was performed on a total of 86 patients. Of the 14 patients with VPS, 12 had PEG inserted after placement of VPS. The mean interval between VPS and PEG insertions was 61 days (range 1-187 days). The main indications for VPS were for hydrocephalus secondary to; intracerebral bleed (n=6, 41.7%) and head trauma (n=3, 33.3%). PEGs were indicated in all patients due to dysphagia and requirement for prolonged enteral feeding.

Eight patients received prophylactic antibiotics or were already on antibiotics for other indications before PEG insertion. Four patients' antibiotic prophylaxes were accidentally missed out. All PEG were inserted without any peri-procedure or immediate post-procedure complications recorded.

Ten patients had uneventful post-procedure follow-up, and did not develop any complications. Two patients (16.7%) including one without antibiotic prophylaxes developed mild PEG peri-stomal infection within one week of insertion. These were easily treated with institution and change of antibiotic. Swab cultures were negative. The patient (22-year-old male) who did not receive antibiotic cover developed neurological deterioration in the second week due to worsening hydrocephalus secondary to VPS blockage despite successful antibiotic treatment of the peri-stomal infection. This patient had a VPS revision.

All patients were alive at a mean follow-up period of 140 days (range 20-570 days) and none develop long-term complications or required further VPS revision, even after scheduled or unscheduled replacement of PEG.

The patients' data is summarised in Table I.

DISCUSSION

The main concerns in patients with VPS undergoing PEG insertions are retrograde infection and shunt malfunction. The PEG insertion procedure itself is usually uncomplicated as long as proper precautions are taken and the sites chosen are located away from the VPS scars. In our practice, we always choose a site to the left of the midline, and as far away from VPS tract and scar to avoid complications such as inadvertent puncture of the VPS or risk causing peristomal infection. Several days before and immediately prior to the procedure, the VPS tract and scar are routinely examined for

signs of inflammation or infection. In the event that any of these findings are present, the procedure is usually postponed and the underlying problem addressed. Presence of active infections and tracheotomy has been shown to be associated with higher risk for infection [14]. Importantly, shunt infection rate has not been shown to be different between surgically or endoscopically placed gastrostomy tubes [10]. Therefore, with the added benefit of lower risk with endoscopy, this should be the preferred option.

Our study showed that PEG after VPS is generally safe, but clinicians need to be aware of the potential complications. In our study, we recorded 16.7% complications which include two peri-stomal infections (16.7%) and one VPS malfunction (8.8%). VPS infections have been reported to range from 0 to 50%, [7-10, 14] higher in the pediatric compared to adult population [11]. Similarly, intra-abdominal surgeries in patients with VPS have also been shown to be safe [15-19].

Among our patients who developed complications, both were peri-stomal infections which responded to treatment. However, one patient proceeded to develop neurological dysfunction from shunt malfunction. He required VPS revision. Unfortunately, this patient was one of the patients whose antibiotic prophylaxis was missed out. Currently, controversies remain the benefit of antibiotic prophylaxis with some studies showing no benefit in patients without VPS undergoing PEG insertion [8]. However, it is very possible that antibiotic prophylaxis might have prevented either the initial infection or subsequent progression to VPS malfunction. Generally, it is a widely accepted practice to give antibiotic prophylaxis to all patients undergoing PEG. Therefore, patients with VPS undergoing PEG insertion should be given antibiotic prophylaxis. Other less common complications reported include a case of VPS extrusion at the previous PEG site [20] and pneumocephalus [21].

Most infective complications of PEG, including those with VPS tend to occur soon after PEG placement. Studies have recommended that PEG should not be inserted within the same admission or within 10 days of VPS shunt insertion to reduce the risk of infection [7, 14]. This is similar to what have been recommended in patients without VPS undergoing PEG insertion where a grace period of 14 days was associated with reduced infective complications. However, other studies have not reported this observation. Even though deferring the procedure is associated with added cost and logistics, it is generally better to allow patient to recover especially if they had infections. In our study, the two patients who had VPS inserted within one week did not experience any complications. Both were given antibiotic prophylaxis.

In patients who are expected to undergo VPS and PEG, it is recommended that the PEG be place after the VPS. One study showed that VPS placement after PEG was associated with increased risk of infective complications. There is also a report which suggested that percutaneous trans-esophageal gastro-tube as an alternative to PEG to avoid complications associated with VPS and PEG [22]. However, this will require further study and is technically more difficult.

A main limitation with our study is that we had only specifically looked at patient who had VPS followed by PEG insertion, which was the main aim of the paper. We excluded patient who had VPS inserted after PEG as the number was small. We did not make comparisons with patients without VPS as this was not the aim of our paper. With the exceptions of the small proportion such as those with dementia, patients with VPS requiring PEG are generally similar to other patients without VPS who require PEG. All our patients had dysphagia. The only difference is that patients with VPS had pathologies that resulted in hydrocephalus and common conditions include intra-cerebral bleed, typically aneurysmal and head trauma from road traffic accidents.

In conclusion, our study showed that PEG is generally safe in the majority of patients with VPS, but peri-stomal infection can lead to shunt malfunction and intracranial complication. Although prophylactic antibiotics in PEG are controversial, its routine use in VPS patients may be warranted in view of the potential serious VPS complication. Clinicians and endoscopists should ensure that this is not missed out.

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