

Nutrition Team Handbook

www.nhsggc.org.uk/nutritionteam

*This handbook describes how to manage enteral and
parenteral nutrition in a hospital setting*

Nutrition Team Handbook, Second Edition 2007

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Nutrition Team Contact Information: see inside back cover

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SECTION 1 INTRODUCTION

This handbook provides the necessary information on how to arrange specialist nutritional support.

Main Concepts

Nutritional Support

Nutritional support is the provision of an adequate nutritional intake by means other than normal meals. It includes food appropriate to individual needs (modified meals, therapeutic diets) and also enteral and parenteral nutrition.

Nutrition Team

The Nutrition Team is a multidisciplinary team formed to promote safe and effective nutritional support for patients. The team deals with enteral nutrition and provides the parenteral nutrition service. The latter includes prescription and management of parenteral nutrition for the Western Infirmary (WIG) and Gartnavel General Hospital (GGH).

Nutritional Assessment

Nutritional assessment is the necessary baseline for nutritional support. Medical and nursing staff should document current and recent changes in patient's nutritional status such as weight loss, appetite change, nausea, vomiting and persistent diarrhoea. In the nursing documentation, the admission forms contain a section on nutrition to complete as part of the patient's assessment. In order to identify patients at risk of malnutrition, a nutrition risk score should be completed for each patient within 24 hours of admission (Figure 1).

Malnourished person

A person who needs to be considered for nutritional support is defined by any of the following (NICE 2006 recommendations):

- body mass index (BMI) < 18.5 kg/m²;
- unintentional weight loss greater than 10% within the last 3-6

- months;
- a BMI <20 kg/m² and unintentional weight loss greater than 5% within the last 3-6 month.

A person at risk for malnutrition who needs to be considered for nutritional support is also defined by the following (NICE 2006):

- those who have eaten little or nothing for more than 5 days and /or are likely to eat little or nothing for 5 days or longer;
- those with poor absorptive capacity and or high nutrient losses and/or increased nutritional needs from causes such as catabolism.

Patients likely to benefit from nutritional support

Various patient groups are at risk of malnutrition; the list below is not comprehensive:

- pre- and post-operative states (especially GI surgery);
- malignancy;
- neurological disorders causing dysphagia, (e.g. MS, CVA, motor neuron disease, parkinsonism);
- gastrointestinal disorders;
- acute pancreatitis;
- sepsis;
- trauma;
- renal failure.

In order to identify patients at risk of malnutrition, a nutrition risk score should be completed for each patient within 24 hours of admission. (Figure 1 and 2). It is advisable to use food as the first line of nutritional support. Such support includes assistance with meals and the provision of therapeutic diets such as the high protein/ high calorie diet. Also,

The ward dietitian can advise and arrange appropriate nutrient supplies. oral supplements are preferred if the patient is conscious and willing/ able to improve his/her nutritional intake orally. These are available as fortified drinks and should supplement food intake rather than replace it. The ward dietitian can advise and arrange appropriate supplies. Indications for enteral and parenteral nutrition are outlined in Figure 3.

<div style="border: 1px solid black; width: 100%; height: 100%; display: flex; align-items: center; justify-content: center;"> PATIENT ID LABEL </div>	North Glasgow University Hospitals Division NUTRITION SCREENING TOOL Weight [Kgs]: Height [metres]: B.M.I.:
--	--

Please circle only one score in each section	RESCORE				
Date					
BODY WEIGHT					
• Normal [no recent weight changes]	0	0	0	0	0
• Recent unintentional weight loss [<6Kgs]	3	3	3	3	3
• Underweight / weight loss >6Kgs	5	5	5	5	5
APPETITE					
• Good – finishing three meals per day	0	0	0	0	0
• Reduced – leaving quarter meals and fluids	2	2	2	2	2
• Poor – leaving half meals and fluids	3	3	3	3	3
• Little or no appetite, refusing or unable to eat/drink	5	5	5	5	5
ABILITY TO EAT AND DRINK					
• No difficulties, eating and drinking independently	0	0	0	0	0
• Requires assistance with eating and drinking	2	2	2	2	2
• Difficulty swallowing and/or chewing	5	5	5	5	5
SKIN CONDITION					
• Healthy	0	0	0	0	0
• Some red pressure areas	2	2	2	2	2
• Superficial breaks in pressure areas	4	4	4	4	4
• Multiple deep pressure sores	5	5	5	5	5
GUT FUNCTION					
• Normal	0	0	0	0	0
• Persistent Nausea	2	2	2	2	2
• Nausea + / or occasional vomiting + / or some diarrhoea / constipation	3	3	3	3	3
• Diarrhoea > 3 per day / unable to keep food or fluids down	5	5	5	5	5
MEDICAL CONDITION					
• No impairment to food intake	0	0	0	0	0
• Minor surgery / mild infection	2	2	2	2	2
• Major surgery [Esp. G.I. Tract] / G.I. Disease / CVA / Chronic illness	4	4	4	4	4
• Severe infection / Sepsis / Cancer / Burns > 15% / Multiple injuries	5	5	5	5	5
Total					
TOTAL [REFER TO ACTION PLAN]					
IF YOU FEEL THAT YOUR PATIENT REQUIRES DIETETIC INTERVENTION DESPITE THE SCORE, PLEASE CONTACT THE DIETITIAN TO DISCUSS.					

Figure 1.

Indications for Nutritional Support

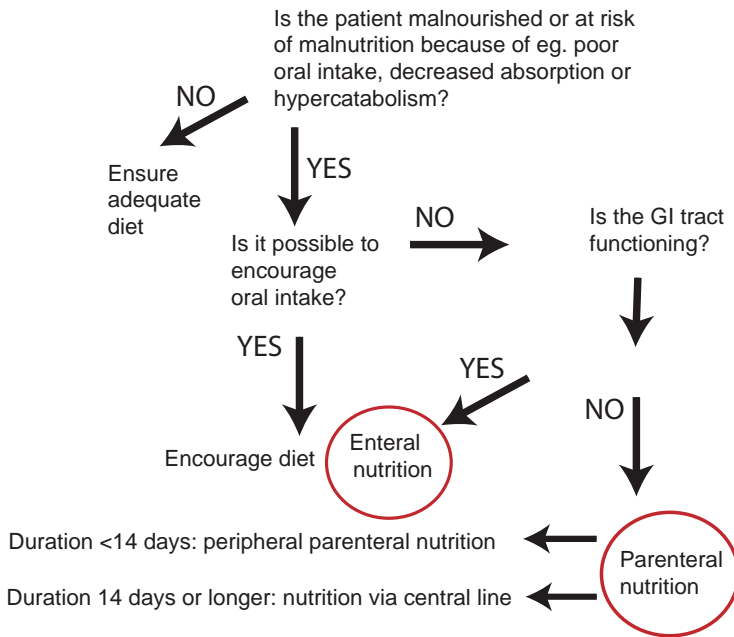


Figure 3.

SECTION 2

ENTERAL NUTRITION

ENTERAL NUTRITION is for patients who are unconscious or sedated, or those with medical conditions that cause an eating or swallowing disorder which makes it impractical or impossible to meet nutritional requirements orally. Enteral nutrition is a preferred option if a patient has an adequately functioning gastrointestinal tract.

2.1 Indications for enteral nutrition

- Partial nutritional support used to supplement diet if oral intake is inadequate (conditions such as swallowing impairment due to e.g. stroke, Parkinson's disease, motor neuron disease, severe weight loss, anorexia, and nausea).
- Total nutritional support in eating/swallowing disorders and in unconscious/sedated/ventilated patient.

2.2 Contraindications for enteral nutrition

(parenteral nutrition may be indicated):

- prolonged ileus;
- severe diarrhoea or vomiting;
- enterocutaneous fistula.

2.3. Short-term (up to 4 weeks) enteral nutrition

2.3.1 Nasogastric tubes

A fine bore tube e.g. Vygon Fr. 8 nasogastric tube (a PVC tube without guide wire) is recommended when enteral nutrition is required for less than 2 weeks or if a new tube needs to be passed every night. Where the duration of feeding is over 2 weeks, a fine bore tube e.g. Flocare Fr. 8 (a polyurethane tube with a guide wire, Figure 4) is used (it is more comfortable). The nasogastric feeding tube should be replaced every 6 weeks if gastrostomy is not indicated (see below). Flocare Fr. 8 is wide enough for all types of feed and is comfortable for most patients. It is supplied by the hospital Dressings and Sundries Store.

2.3.2 Naso-jejunal tubes

Flocare or Corflo Merck feeding tubes are used as naso-jejunal tubes. They are usually inserted by a radiologist or endoscopist. Corflo Merck weighted-ended naso-jejunal tubes can be attempted to be inserted at ward level with the patient x-rayed after 24 hours to see if peristalsis has allowed the feeding tubes to pass from the stomach into the jejunum. Patients who have e.g. gastroparesis, may benefit from naso-jejunal feeding.

2.4 Long-term (longer than 4 weeks) enteral nutrition.

2.4.1 Gastrostomy tube feeding

Gastrostomy tube insertion should normally be considered if it is anticipated that the enteral feeding will be required beyond 4 weeks. It should also be considered where it is difficult to pass a nasogastric tube due to obstruction, and where nasogastric tubes are having to be re-passed frequently.

Advantages of a gastrostomy tube:

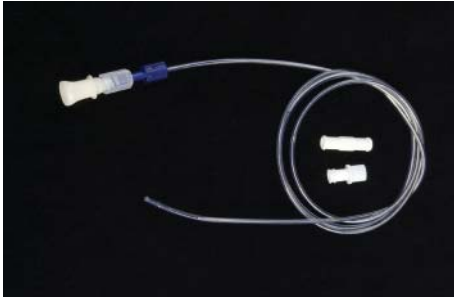
- can be placed without a general anaesthetic;
- is less likely to be dislodged than a nasogastric tubes;
- provides improved comfort for the patient;
- is cosmetically more acceptable than nasogastric tubes;
- is useful for long-term feeding (some tubes last up to 12 months).

Contraindications for gastrostomy tube placement

- non-functioning GI tract;
- aspiration pneumonia;
- gross ascites;
- blood coagulation disorders;
- oesophageal varices;
- enlarged liver or spleen;
- extensive previous gastric surgery;
- patients treated with CAPD with abdominal scarring.

2.4.2 Types of gastrostomy tubes (Figure 5, 6 and 7)

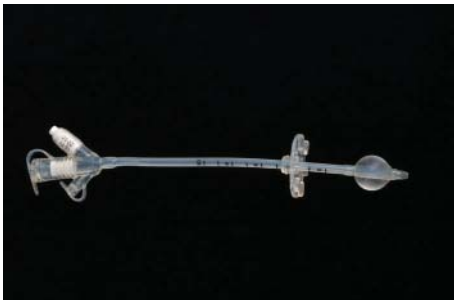
Percutaneous endoscopic gastrostomy (PEG) tube is inserted



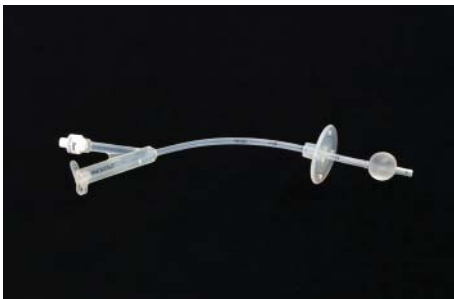
*Figure 4. Nasogastric tube.
A Flocare feeding tube, a
polyurethane tube with guide wire.*



*Figure 5. A Corflo-Merck feeding
tube. A gastrostomy tube which can
be used as a PEG or PIGG tube.*



*Figure 6.
A balloon-held gastrostomy tube
(used as replacement tube).*



*Figure 7.
A balloon-held gastrostomy tube
used in radiologically -inserted
gastrostomies.*

endoscopically and held in place with an internal retention dome. A change of tube is recommended after 1 year. They can be removed by traction.

Radiologically inserted gastrostomy (RIG) tube is inserted radiologically and is held in place with an internal retention balloon. It can last for 4-6 months. The balloon-type gastrostomy tube is also used as a replacement. It is indicated for patients who have obstructing lesions in the upper GI tract, which prohibit the passage of an endoscope, or where tumour seeding is a risk. If an obstruction to passing the endoscope is anticipated, or if a PEG insertion fails, then RIG is the preferred method of insertion. These tubes are inserted in the Radiology Department and can be removed by the Nutritional Support Sister or trained nursing staff.

Table 1. Gastrostomy tubes

TYPE	INSERTION
PEG tubes (primary tubes) CORFLO MERCK – 20FG	Inserted in the Endoscopy Suite, GGH
RIG tubes (primary tubes) Medicina, balloon-held gastrostomy tubes 14FG	Inserted in the Radiology Department, GGH
Per-oral imaging-guided gastrostomy tubes (PIGG; primary tubes) CORFLO MERCK 20FG	Inserted in the Radiology Department, GGH
PEG and RIG/PIGG replacement tubes MIC Vygon – 12FG – 20FG or Medicina replacement tubes 12FG-14FG	Can be inserted by the Nutritional Support Sister.

Per-oral imaging-guided gastrostomy (PIGG) tube is inserted radiologically and is held in place with an internal retention dome. A change of tube is recommended after 1 year. They can be removed by traction.

2.4.3 Jejunostomy

An open surgical gastrostomy/jejunostomy should be anticipated during the primary surgical procedure. In exceptional circumstances this is required as a primary procedure. This tube can be inserted during surgery, or by a radiologist or endoscopist in patients such as these with a history of gastro-oesophageal reflux.

Contact Nutrition Support Sister if there is difficulty with insertion of nasogastric feeding tubes. Assistance can also be obtained from the special X-ray Department at Gartnavel General Hospital (ext. 50038) or Western Infirmary (ext. 52763) if insertion at ward level is unsuccessful.

2.5 Procedure for the insertion of gastrostomy tubes

(see also Nursing Procedures below)

2.5.1 Patient preparation

- Patients should be kept hydrated using IV fluids or subcutaneous fluids if necessary while awaiting insertion of gastrostomy or jejunostomy tubes. If at all possible, nasogastric feeding tube insertion should be considered. Sometimes peripheral parenteral nutrition is required until a date for gastrostomy is obtained.
- Obtain consent from patient/guardian/relative (in accordance with the provisions of the Incapacity Act).
- Fast for at least 6 hours.
- Full blood count and coagulation screen.
- IV cannula in situ prior to procedure.
- Nasogastric tube to be inserted prior to RIG/PIGG insertions.

2.5.2 Post-insertion care

2.5.2.1 Immediate care

The main objective is prevention of peritonitis. The assessment and observation of the following is essential:

- abdominal pain;
- bowel sounds;
- temperature;
- general appearance at site (bleeding);
- overall patient condition.

2.5.2.2 Long –term care

(See also Care of Gastrostomies in the Nursing Procedures Section).

2.6 Commencing or re-commencing gastrostomy feeding

immediately following primary (surgical, radiological or endoscopic) insertion:

- a member of medical staff needs to confirm that the feeding tube is in the correct position;
- give nil through the tube and nil orally for the first 6 hours;
- give 50 mL sterile water per hour for the next 6 hours. Medication and oral fluids are now permitted;
- start feed regimen as prescribed by Dietitian, taking into consideration patient’s nutritional requirements, or local protocol (e.g. in Intensive Care Units).

Immediately following replacement:

- once tube is confirmed as being positioned in the stomach, commence on previous regimen tolerated by patient. The aim is to restart feeding within 24 hours.

2.7 Types of enteral feeds

Pre-prepared sterile feeds are used where possible. These are available in 500 mL, 1000 mL and 1500 mL volumes and come in “ready to hang” presentation. These sterile feeds can hang for a maximum of 24 hours. If the feed has to be decanted, avoid hanging times of more than 4 hours.

Powdered feeds, which require reconstitution are prepared in the diet kitchen and should be used immediately or stored in the fridge (they should be brought back to room temperature before use). They should be used within 24 hours of mixing.

Diets with novel substrates. A number of specialised feeds are now

available. They contain substrates such as L-glutamine, L-arginine, ornithine, α -ketoglutarate or n-3 fatty acids. These may play a role in regulating immune function and, in the case of glutamine, in preservation of gut mucosa in stressed patients. Example: Perative (arginine).

2.8 Enteral feeding equipment

2.8.1 Enteral feeding pumps

Enteral feeding pumps are used to control the administration of feeds. The Abbott Patrol pump is suitable in most areas. It can be used on mains electricity or on the integral rechargeable battery. Wards are asked to clean the pumps with detergent wipes after use. Maintenance is carried out by Medical Physics Department.

A supply of pumps for enteral feeding is available from the Dietetic Department

A supply of pumps is available from the Dietetic Department. In evenings and at weekends, spare pumps are available in the Clinical Coordinator's Office.

2.8.2 Giving sets

Giving sets for the Abbott Patrol pump are for single use only, should be changed every 24 hours and should be replaced every day at the commencement of the first feed.

Good practice is to document at top of fluid balance chart that change has been made. The giving sets are supplied by the hospital stores. If a patient treated with enteral feeding is discharged, the ward should issue 7 days supply of giving sets and catheter tip syringes, or syringes of an appropriate size for flushing the tube.

2.8.3 Flexitainers

These are not usually required because ready-to-hang feeds are used where possible. Where decanting is required, 500 ml containers should be used. Decanted feeds should not hang for more than 4 hours. These flexitainers are also supplied by the hospital Stores.

2.8.4 Syringes

Catheter tip syringes should be used for flushing the feeding tube and

are for single use only. This should be carried out using 30–50 mL sterile water given before and after feed. If drugs are being given via enteral feeding tube, flush before and after drug administration. When several drugs are being administered, the feeding tube needs to be flushed between each drug with 20 mL sterile water. N.B. The same syringe can be used to administer each drug

2.9 Monitoring enterally fed patients (Table 2)

2.9.1 Before commencing

- record height, weight and body mass index (BMI);
- document the reason for initiating enteral feeding (total nutritional support or supplemental feeding);
- check urea and electrolytes (U&E), glucose, liver function tests (LFT) bone profile, magnesium, and inflammatory markers before commencing feeding;
- assess the patient for risk of refeeding syndrome.

2.10 Complications of enteral feeding

The most common problems:

- diarrhoea;
- constipation;
- nausea and vomiting;
- nasopharyngeal irritation;
- electrolyte disturbance;
- misuse of ports;
- feeding tube complications;
- gastrostomy stoma infection / abscesses;
- overgranulation at insertion site;
- enlargement of stoma.

Major rare complications:

- jaw dislocation or fracture resulting from difficult insertion of endoscope;
- oesophageal /gastric tear/perforation;
- aspiration;
- peritonitis;
- haematoma / haemorrhage.

Table 2 Monitoring patients who are fed enterally.**A. Feeding duration up to 3 weeks:**

Daily:	Fluid balance chart and food record charts as appropriate.
Twice weekly:	Urea & electrolytes (U&E) and blood glucose.
Weekly:	LFT, calcium, phosphate, magnesium, full blood count.
Weekly:	Weight.

B. Feeding duration over 3 weeks:

Daily:	Fluid balance chart and food record charts as appropriate.
Weekly:	U&E and blood glucose. Weight.
Fortnightly:	LFT, calcium, phosphate, magnesium.
3-Monthly:	Micronutrient screen.

2.11 Preventing and managing complications of enteral feeding***Diarrhoea***

Establish first that this is not overflow diarrhoea. It could be due to a change in bowel habit related to refeeding/tumour. It could be infective diarrhoea, obstruction, or potassium deficiency, which should warrant further investigation. Send a stool sample immediately, for organism

culture and sensitivity, and for *Clostridium difficile*.

a. **Medication as a cause of diarrhoea.** Antibiotics and/or proton pump inhibitors (PPIs) can cause diarrhoea. If medications contain sorbitol this can also have a laxative effect. Check if laxatives are being used for a patient who has previously been constipated. Seek advice from the Pharmacy.

b. **Other factors which could be causing the diarrhoea.** Check the feed is in date. Cold feed can cause diarrhoea. Chemotherapy, radiotherapy and GI surgery can affect bowel function. It could be that the patient is experiencing malabsorption, which would warrant further investigation. Check the correct feed is being administered at the correct rate. Contact the Dietitian: the type of feed may need to be changed. The patient may require an anti-diarrhoeal agent e.g. Imodium or codeine phosphate if there is no infection.

Constipation

a. **Medication as a cause of constipation.** Pain control drugs e.g. morphine or codeine can cause constipation - regular use of laxatives is often the only solution. Iron supplements can also be problematic. Check if the patient has been previously prescribed anti-diarrhoeal agents such as codeine or Imodium.

b. **Severity of constipation.** Immobile patients or bed-bound patients are more likely to become constipated. The patient may be dehydrated due to lack of fluids (either by the tube or orally), if pyrexial or if there are fluid losses e.g. through ileostomy. In the unlikely event that the patient has a bowel obstruction, stop the feed and investigate.

Should the feed be changed? If the patient is taking Osmolite feed, it may be worth trying to gradually introduce a fibre feed such as Jevity:- some patients benefit from a small amount of a fibre feed or some of each. Contact the Dietitian for further advice.

Nausea and vomiting

a. **Medication as a cause of nausea and vomiting.** Check if patient is taking antibiotics, iron supplements, morphine, all of which can cause nausea and vomiting. Chemotherapy and radiotherapy can also cause problems; if the symptoms are related to diagnosis or treatment, anti-emetics may help.

b. Other factors that could cause nausea and vomiting. The patient may have developed an infection, gastro-enteritis and may require further investigation. Delayed gastric emptying can be a cause. Patient can feel uncomfortable or full if they have been changed on to a fibre feed too quickly; some do not tolerate fibre feeds at all. Check the feed is being administered at a correct rate.

Nausea & vomiting during enteral nutrition: contact the Dietitian for further advice

Management: should feeding be stopped? Reducing the rate of administering the feed may help in the short-term, but if symptoms persist, contact the Dietitian for further advice.

If gastric emptying is delayed, consider prescribing pro-kinetics such as Metoclopramide or Domperidone. It is very important to replace fluids lost through vomiting.

If the nasogastric tube becomes dislodged due to vomiting, do not attempt to re-pass a tube when the patient is experiencing frequent vomiting. Stop enteral feeding.

Aspiration. The patient lying flat is at risk of aspiration. The patient should lie at 30° angle during and for one hour after feed to prevent aspiration. Another cause could be the nasogastric feeding tube becoming displaced either through vomiting, coughing, or accidentally by a restless patient. Correct insertion and position must be confirmed prior to starting feed. When there is any doubt, do not start feeding. Consider gastrostomy tube or jejunostomy insertion if this is a recurring problem. Aspiration could also be attributed to a deterioration in swallowing ability. In this instance, refer the patient to Speech and Language Therapy.

Electrolyte imbalance

It is important to administer the feed at the advised rate and to ensure that the prescribed total 24-hour volume is achieved. This is particularly important for patients at risk of refeeding syndrome – see below.

Misuse of ports

Over-inflating the balloon on a gastrostomy tube is a common cause of a balloon bursting. You do not need to fill the balloon to capacity: a volume of 8 mL for 10 mL balloon, and 4 mL for 5 mL balloon is sufficient. Use only sterile water or saline to inflate. Do not use air,

as this will migrate out over several hours. Beware that damage can result through inadvertently administering the feed through the retention balloon valve, or by attaching the giving set/catheter tip syringe to the feeding port too tightly. This may cause the port to tear.

Practice point: inflating balloons on gastrostomy tubes

Flushing the tube. Regular flushing before and after each feed/medications with 30-50 mL sterile water in a 50 mL catheter tip syringe is essential. Also, medications should be in a liquid/dispersible form whenever possible.

If several medicines are being administered through the tube, flush between each medicine with 20ml sterile water. See procedures for unblocking the tube in the nursing section.

Unblocking the tube. If the tube becomes blocked, try the following by syringe (in this order):

- 30-50 mL warm sterile water;
- 30-50 mL carbonated water e.g. soda water, cola etc;
- 30-50 mL pineapple juice;
- Pancrex - V Enzyme Powder (dissolve 1 tsp in 30 mL sterile water) and leave for 30 minutes in the tube. Repeat procedure if required.

If all of the above fails, the tube may require replacement: contact Nutritional Support Sister for advice.

Preventing wound infection. This can be prevented if the gastrostomy entry site is cleansed for the first 48 hours following insertion with Betadine antiseptic solution. Thereafter, the site should be cleaned daily with soap and water. If there is suspicion of an infection, take a swab from the site and send to the Bacteriology Department for organism culture and antibiotic sensitivity. Inadine dressings to the site can be helpful; the patient may well need an antibiotic.

Preventing overgranulation at insertion site. This can be prevented by rotating the gastrostomy tube through a 360° angle every day following insertion. If there should be granulation tissue present, applying Hydrocortisone 1% cream should help to clear this.

Stomal abscess. Stomal abscess will require a course of antibiotics and possibly surgical incision. See Nursing Procedures section for good practice and preventive measures.

Enlargement of stoma. This results from the movement of the gastrostomy at the entry site. Patients should be discouraged from excessive handling of the tube. **If enlargement occurs contact Nutritional Support Sister.**

If gastrostomy tube falls out do not insert anything into the stoma during the first seven days after the primary insertion. **Seek advice from the on-call radiologist or surgeon.** After the first week it is very important that a Foley catheter (same size as gastrostomy tube that has come out) is inserted gently into the stoma as soon as possible (otherwise the stoma will close over in a matter of hours). **Contact Nutritional Support Sister as soon as possible to arrange a replacement gastrostomy tube.** If this happens at the weekend and staff are unable to insert a Foley catheter into the stoma, contact the on-call radiologist or surgeon for advice (see also Nursing Procedures Section).

*Enlargement
of stoma:
contact
Nutritional
Support
Sister*

Administering drugs via enteral feeding tubes. Care should be taken when attempting to administer drugs via enteral feeding tube. Pharmacy should be contacted for advice.

Medication during enteral feeding. Never add the drug directly to the enteral feed. Consider other non-oral routes e.g. parenteral, topical, rectal or buccal. Oral liquid medications are optimal and where available should be used in preference to solid dosage forms. If there are no liquid preparations readily available, The Pharmacy may be able to formulate a product.

- If liquid preparations are unavailable, tablets and capsules need to be used with care and after discussion with the Pharmacist.
- Always flush the tube before and after with 30-50 mL sterile water, and in between each medication with 20 mL of sterile water.
- For drugs requiring administration on an empty stomach stop the feed 30 minutes before the scheduled drug administration. Restart the feed after the drug has been administered.
- For certain drugs that are incompatible with enteral feeding (e.g. Phenytoin) the period of stopping the feed prior to and after administering the drug may need to be longer.

*Practice
point: never
add drugs
directly to the
enteral feed*

2.12 Discontinuing enteral nutrition

The Dietitian will assess and advise on reduction and cessation of feeding. If the tube is still in place, but is not being used for enteral feeding, flush it 8-hourly with 30-50 mL sterile water to keep it patent. Both nasogastric tubes and balloon-held gastrostomy tubes can be removed by nursing staff. Balloon in the balloon-held gastrostomy tubes must be deflated before removal. PEG tubes and PIGG tubes can be removed by traction. **Contact Nutritional Support Sister for advice and information on removing tubes.**

*Contact
Nutritional
Support Sister
for advice on
removing tubes*

2.13 Discharge and follow-up from Nutrition & Dietetics Service

Advice on patient's discharge. The Dietitian will provide the patient with written dietary information, which includes a contact telephone number. The Dietitian can also arrange to advise the patient's relatives/carers on any nutritional or dietary treatment, which is to continue at home.

Outpatient clinic appointment. Dietetic Clinics are held weekly. On-call and combined Dietetic Services are also available in some clinical areas. Appointments can be arranged for patients who require follow-up. We may also consider contacting patient's Community Dietitian to provide continuing care.

Nutritional products available on prescription. If it is necessary for the patient to continue at home with nutritional products that they have been receiving during their admission, a 7-day supply will be given on discharge by the Dietitian. A letter will also be given to the patient or sent directly to their GP requesting further prescription (a standard letter is in use throughout Glasgow). The letter also outlines the follow-up arrangements.

2.14 Home enteral nutrition. Discharging a patient who needs to continue enteral feeding at home

When such a patient is about to be discharged home, at least 2 working days' notice must be given to the Dietitian to make necessary arrangements. Their GP and District Nurse will be contacted by

telephone and sent written information to confirm the patient's requirements. The Community Dietitian will also be informed if follow-up is required. On discharge the patient will require:

- a new home loan pump – provided by the Dietetic Department;
 - seven days supply of enteral feed – provided by the Dietetic Department;
 - seven days supply of giving sets and syringes – provided by the ward;
 - a box of Merck pH indicator strips.
- Note: two working days' notice is*

The Dietitian will contact the patient's GP, District Nurse and Community Dietitian regarding patient's requirements. Abbott Hospital to Home Company provide the entire system for use at home, including the pump feeds sundries, and access to a 24-hour helpline. The Dietitian will refer the patient.

Education of the patient and their carers in the care of the feeding tube will be carried out in the ward by the nursing staff and nutritional support sister. The Abbott Company nurse will educate the patient and their carers in the use of the patrol pump and will also assist in the education for care of nasogastric feeding tubes.

2.15 **ENTERAL NUTRITION**

NURSING PROCEDURES

(NEN 1). PASSING A FINE BORE NASOGASTRIC TUBE

A fine bore nasogastric feeding tube should only be passed by a qualified, competent practitioner (nurse or doctor).

PREPARATION

- Clean trolley with general purpose neutral detergent and hot water, rinse and dry. Wipe over with 70% alcohol impregnated wipe.

REQUIREMENTS

- Plastic apron.
- Disposable gloves.
- Drape.
- Fine bore nasogastric tube.
- Alcohol hand gel.
- KY Jelly.
- Mefix tape.
- Scissors.
- 30 mL syringe.
- Stethoscope.
- pH indicator strip.
- Protection for patient and bed.
- Sick bowl.
- Paper wipes.
- Glass of water and straw if patient is NOT “nil by mouth”.

PROCEDURE

1. Explain the procedure to the patient and offer reassurance.
Screen the bed.
2. Sit patient as upright as possible, remove any dentures, get patient to blow their nose or clean nostrils gently. Ask patients if they have had any breaks/operations to their nose as this may affect the passage of the nasogastric tube.
3. Protect the patient’s clothing and bed linen.
4. Wash hands thoroughly with antiseptic hand-wash and put on plastic apron.
5. Empty out the required materials onto drape on trolley.
6. Apply disposable gloves.
7. Apply alcohol hand gel.

8. Measure, with the tube, the length from xiphisternum to earlobe, and from earlobe to the tip of the nose. This gives required length of tube to be passed. There are guide marks on the nasogastric tube to use.
9. Lubricate nasogastric tube with KY jelly and insert into nostril.
10. Pass tube slowly into naso-pharynx, a short distance at a time.
11. If the patient is able to cooperate, request that when the tip of the tube is felt in the oro-pharynx (back of throat), they should swallow, tilting the chin down slightly at the same time. The process may also be aided by sipping water through a straw.
12. Continue passing the nasogastric tube, observing the patient during the procedure. Check that nasogastric tube is not coiled in the pharynx by inspecting patient's throat.
13. Continue to pass nasogastric tube until the guide mark is reached.
14. Secure nasogastric tube to nose with Mefix tape.
15. Check tube position. See guidelines.
16. Remove gloves and apron and discard as clinical waste, carry out basic hand wash.
17. Secure nasogastric tube to patient's cheek with transparent dressing, e.g. Tegederm.
18. Document the procedure in Nursing Profile, stating the make of tube and level to what nasogastric tube has been passed. Also state if gastric contents have been aspirated and if enteral feeding can commence. Alternatively, say whether nasogastric tube position needs to be confirmed by X-ray.

NOTE: NASOGASTRIC TUBES SHOULD BE CHANGED PERIODICALLY

Fine bore PVC tube (Vygon) – change every 10 days.

Fine bore Polyurethane tube (Flocare) – change every 6 weeks.

Wide bore PVC tube - change every 10 days.

(NEN 2). CHECKING POSITION OF A NEWLY PASSED NASOGASTRIC TUBE

Aspirate some gastric contents with a 30 mL syringe and test with pH indicator strip. The indicator strip will record 5.5 or below according to the acidity of gastric contents. If this should happen, then the guide wire can be withdrawn gently from tube (if a Flocare nasogastric tube is passed) and enteral feeding can be commenced as per Dietitian's instructions.

If no gastric aspirate is obtained and if in any doubt about position of a nasogastric tube, always get an X-ray carried out to confirm tube's position before enteral feeding is commenced. If a Flocare tube is used, leave guide wire in situ until an X-ray is carried out.

(NEN 3). PROCEDURE TO BE CARRIED OUT PRIOR TO STARTING EACH ENTERAL FEED

Before carrying out the steps described below, carry out a basic hand wash, then don disposable gloves and disposable apron. Once intervention has been carried out, remove gloves and apron and discard as clinical waste, and carry out a basic hand wash.

Check the position of marking on nasogastric tube. The position should be the same as when tube was passed and confirmed that it was in the stomach. Alternatively, a small piece of tape can be stuck around tube to serve as a marker.

Always aspirate gastric contents and test with pH indicator strip. The strip will record a pH 5.5 or below in the presence of gastric juice.

Once you have confirmed that the nasogastric tube is still in the stomach, flush tube with 30-50 mL sterile water prior to commencement of feed.

(NEN 4). CONTINUOUS ENTERAL FEEDING

REQUIREMENTS

- Disposable gloves
- Clean plastic apron.
- Feed as prescribed by Dietitian.
- Giving set.
- Patrol/Companion Pump.

PROCEDURE

Gloves should be worn when connecting the feed to the patient. Hand hygiene must be carried out when gloves and apron are removed.

1. Explain procedure to the patient, elevate head of bed or sit patient up.
2. Wash hands thoroughly with antiseptic hand-wash and put on plastic apron and gloves.
3. Check type of feed prescribed by Dietitian. This will be documented on Feeding Regimen Chart.
4. Check that seal is intact and check the expiry date on bottle.
5. Attach giving set to the bottle containing feed. Note that giving sets have a self-piercing mechanism.
On no account pierce foil with scissors.
6. Prime the giving set.
7. Place giving set in the pump.
8. Check position of nasogastric tube - see guidelines. If feeding through gastrostomy, check Secur-Loc disc level.
9. Check the flow rate as per feeding regimen and commence feed.
10. Record the time the feed commenced on the fluid balance chart.
11. To reduce the risk of aspiration, maintain patient in elevated position at 30° tilt during feeding and for one hour after feeding.

Note: Prior to each feed change, and again on completion of the feed, always flush the tube with 30-50 mL of sterile water. Syringes are for single use only. Giving sets are for single use only. They must be changed at least every 24 hours and should be replaced at the

commencement of the first feed each day. Good practice is to document the change of giving set on the fluid balance chart. Nasogastric tubes must be changed according to manufacturers' instructions.

(NEN 5). GRAVITY ENTERAL FEEDING**REQUIREMENTS**

- Disposable gloves.
- Clean plastic apron.
- Feed as prescribed by Dietitian.
- Flexiflo giving set.

PROCEDURE

Gloves should be worn when connecting the feed to the patient. Hand hygiene must be carried out when gloves and apron are removed.

1. Explain procedure to the patient, elevate head of bed or sit patient up.
2. Wash hands thoroughly with antiseptic hand-wash with antiseptic hand-wash and put on plastic apron and gloves.
3. Check type of prescribed feed, on a Feeding Regimen Chart from the Dietitian.
4. Check that seal is intact, and check expiry date on bottle.
5. Attach giving set to bottle of feed. Note: giving sets have a self-piercing mechanism; **on no account pierce foil with scissors.**
6. Prime the giving set.
7. Hang the bottle of feed on a drip stand.
8. Check position of nasogastric tube - see guidelines. If feeding through gastrostomy, check SECUR-LOC disc level.
9. Check flow rate as per feeding regimen and commence feed.

Comparison of pump rate and gravity rate

<u>Pump Rate</u>	<u>Gravity Rate Equivalent</u>
50 mL/hour	14 drops per minute
75 mL/hour	21 drops per minute
100 mL/hour	28 drops per minute

10. Record the time feed commenced on fluid balance chart.

11. To reduce the risk of aspiration, maintain patient's head in elevated position during feeding and for one hour after feeding.
12. To ensure the rate is being maintained, check the feeding rate periodically (at least every hour).

Note: Prior to each feed change, and again on completion of the feed, always flush tube with 30-50 mL of sterile water. Syringes are for single use only. Giving sets are for single use only. They must be changed at least every 24 hours and should be re-placed at the commencement of the first feed each day.

(NEN 6). BOLUS FEEDING VIA GASTROSTOMY TUBE

Bolus feeding is only indicated in more stable patients and should be discussed with the Dietitian.

REQUIREMENTS

- Disposable gloves.
- Clean plastic apron.
- Prescribed feed; preferably in 500 mL bottles.
- Sterile foil bowl x 2.
- Sterile water for irrigation.
- 50 mL catheter - tip syringe x 2.

PROCEDURE

Gloves should be worn when connecting the feed to the patient. Hand hygiene must be carried out when gloves and apron are removed.

1. Explain procedure to patient, elevate head of bed or sit patient up.
2. Wash hands thoroughly with antiseptic hand-wash and put on plastic apron and gloves.
3. Check type of feed required against Feeding Regimen Chart issued by Dietitian.
4. Check expiry date on bottle.
5. Decant sterile water into another foil bowl.
6. Draw up 30-50 mL sterile water into syringe and flush gastrostomy tube. Remove syringe and replace feeding port cap.
7. Withdraw feed from bottle in 50 mL syringe or, if preferred, decant feed into foil bowl and draw up required amount.
8. Attach syringe with feed to gastrostomy tube and administer the feed at a slow steady rate by gently squeezing the plunger of the syringe until the syringe is empty.
9. Repeat until the full required volume is administered. This can take approximately 15-20 minutes.
10. Flush gastrostomy tube with 30-50 mL sterile water.

11. Replace feeding port cap.
12. Record the time feed commenced on the fluid balance chart.
13. To reduce the risk of aspiration, maintain patient in an elevated position at 30° tilt during feeding and for one hour after feeding.

(NEN 7). KEY POINTS TO GOOD PRACTICE FOR THE CARE OF NASOGASTRIC FEEDING TUBES.

- The use of non-sterile gloves and disposable plastic apron as well as hand hygiene are important.
- Before a feed is commenced **always** check that the nasogastric tube is still in patient's stomach by
 - a) Noting the position of the tube where it comes out of the patient's nose. Flo-care tubes have graduated marks from 20 – 100 cm. Alternatively a small piece of tape can be placed around the tube as a marker guide. If the mark is further out than usual, the tube may no longer be in the correct position.
 - b) Aspirating some gastric contents with a 50 mL syringe and test with pH indicator strip. pH indicator strip will record 5.5 or below in the presence of gastric juices.
- Flush the nasogastric tube before and after feeds with 30–50 mL of sterile water and likewise if giving medicines via this route. Medicines must be in liquid form. If several medicines are to go down the tube, flush in between each with 20 mL of sterile water.
- Elevate head of bed at least 30 degrees during and for one hour after feed, to prevent aspiration.
- If the nasogastric tube becomes blocked, try flushing with 30-50 mL of warm water, soda water, Coke, pineapple juice or Pancrex V powder (1 teaspoon dissolved in 30 mL of sterile water and put into nasogastric tube for 30 minutes). If this fails a new tube will be required.
- Always ensure nasogastric tube is well secured.
- Always ensure patient's nostrils are kept clean and well lubricated.

GUIDE TO WHEN NASOGASTRIC TUBES SHOULD BE CHANGED

- Fine bore PVC tube (Vygon) - every 10 days.
- Fine bore Polyurethane (Flocare) - every 6 weeks.
- Wide bore PVC - every 10 days.

ASSISTANCE: In case of any problems with nasogastric tubes, please contact Joan Dimmick, Nutritional Support Sister on ext. 51014 or page 4059.

(NEN 8). KEY POINTS TO GOOD PRACTICE FOR THE CARE OF P.E.G. TUBES

(Those held in position with an internal retention dome and inserted at endoscopy)

- Use of non-sterile gloves and disposable plastic apron as well as hand hygiene are important.
- Inspect site daily - observe for any pain, swelling, redness or leakage.
- For the first 48 hours after insertion clean site with Betadine and leave site exposed where possible, thereafter clean daily with soap and water paying particular attention to area under disc, dry thoroughly and leave exposed.
- Rotate PEG tube 360 degrees daily, this helps to prevent the build up of scar tissue inside the stoma and makes cleaning easier and also ensures that the internal retention dome is not too tight against gastric mucosa.
- Prior to starting each feed, check that the level of the bumper on the PEG tube remains at the same centimeter level as at the time of insertion.
- Flush tube before and after feeds with 30-50 mL of sterile water and likewise if giving medicines via this route. Medicines must be in liquid form. If several medicines are to go down the tube, flush in between each with 20 mL of sterile water. Gloves and apron should be worn and hand hygiene should be carried out when these are removed.
- Elevate head of bed at least 30 degrees during and for 1 hour after feed to prevent aspiration.
- If the tube becomes blocked, try flushing with 30-50 mL warm water, soda water, Coke, pineapple juice or Pancrex V powder (1 teaspoon dissolved in 30 mL of sterile water and put into PEG tube for 30 minutes).
- No baths for 3 weeks after gastrostomy insertion. Shower only to allow stoma site to fully heal.

- If PEG tube falls out or is accidentally pulled out in the first 7 days after the primary insertion, **Do not insert a Foley catheter into stoma but seek advice from the on-call surgeon.** After 7 days it is safe to carefully insert a Foley catheter into stoma until a replacement gastrostomy tube can be inserted. NB. Foley catheter needs to be inserted straight away or stoma site will close in a few hours.

ASSISTANCE: In case of problems with PEG tubes, please contact Joan Dimmick, Nutritional Support Sister on ext. 51014 or page 4059.

(NEN 9). KEY POINTS TO GOOD PRACTICE FOR THE CARE OF BALLOON-HELD GASTROSTOMY TUBES

(Those held in position with an internal retention balloon and inserted radiologically or as a replacement).

- Use of non-sterile gloves and disposable plastic apron as well as hand hygiene are important.
- Inspect site daily - observe for any pain, swelling, redness or leakage.
- For the first 48 hours after insertion clean site with Betadine and leave site exposed where possible, thereafter clean daily with soap and water paying particular attention to area under disc, dry thoroughly and leave exposed.
- Rotate gastrostomy tube 360 degrees daily. This helps to prevent the build up of scar tissue inside the stoma and makes cleaning easier and also ensures that the internal retention balloon is not too tight against the gastric mucosa.
- Every 7 days check and renew the volume of sterile water in the gastrostomy balloon and top up if necessary to the required volume. The maximum volume required will be clearly written on the tube: you do not need to fill to maximum volume – 4 mL for a 5 mL balloon and 8 mL for a 10 mL balloon. Document in nursing profile how much water used.
- Prior to starting each feed, check that the level of the disc on the gastrostomy tube remains at the same centimeter level as at time of insertion.
- Flush tube before and after feeds with 30-50 mL of sterile water and likewise if giving medicines via this route, medicines must be in liquid form. If several medicines are to go down the tube, flush in between each with 20 mL of sterile water. Gloves and apron should be worn and hand hygiene should be carried out when these are removed.
- Elevate head of bed at least 30 degrees during and for 1 hour after feed to prevent aspiration.

- If the tube becomes blocked, flush with 30-50 mL warm water, soda water, Coke, pineapple juice or Pancrex V powder (1 teaspoon dissolved in 30 mL of sterile water and put into gastrostomy tube for 30 minutes).
- No baths for 3 weeks after gastrostomy insertion, shower only to allow stoma site to fully heal.
- The green sutures at stoma site will normally dissolve but if still visible at 4 weeks post insertion, it is safe to trim them to skin level. By this stage a firm tract will have formed between stomach and abdominal wall.
- If gastrostomy tube falls out or is accidentally pulled out in the first 7 days after the primary insertion,

Do not insert a Foley catheter into stoma but seek advice from the on-call radiologist (24 hour service).

After 7 days it is safe to carefully insert a Foley catheter into stoma until a replacement gastrostomy tube can be inserted. NB. Foley catheter needs to be inserted straight away or stoma site will close in a few hours.

ASSISTANCE: In case of problems with gastrostomy tubes, please contact Joan Dimmick, Nutritional Support Sister on ext 51014 or page 4059.

(NEN 10). KEY POINTS TO GOOD PRACTICE FOR THE CARE OF PIGG TUBES

(Per-oral imaging-guided gastrostomy; these tubes are held in position with an internal retention dome and are inserted at the Radiology Department).

- Use of non-sterile gloves and disposable plastic apron as well as hand hygiene are important.
- Inspect site daily: observe for any pain, swelling, redness or leakage.
- For the first 48 hours after insertion clean site with Betadine and leave site exposed where possible, thereafter clean daily with soap and water paying particular attention to area under disc, dry thoroughly and leave exposed.
- Rotate PIGG tube 360 degrees daily, this helps to prevent the build up of scar tissue inside the stoma and makes cleaning easier and also ensures that the internal retention dome is not too tight against gastric mucosa.
- Prior to starting each feed, check that the level of the bumper on the PIGG tube remains at the same centimeter level as at the time of insertion.
- Flush tube before and after feeds with 30-50 mL of sterile water and likewise if giving medicines via this route. Medicines must be in liquid form. If several medicines are to go down the tube, flush in between each with 20 mL of sterile water. Gloves and apron should be worn and hand hygiene should be carried out when these are removed.
- Elevate head of bed at least 30 degrees during and for 1 hour after feed to prevent aspiration.
- If the tube becomes blocked, try flushing with 30-50 mL warm water, soda water, Coke, pineapple juice or Pancrex V powder (1 teaspoon dissolved in 30 mL of sterile water and put into PIGG tube for 30 minutes).
- No baths for 3 weeks after gastrostomy insertion. Shower only to

allow stoma site to fully heal.

- If PIGG tube falls out or is accidentally pulled out in the first 7 days after the primary insertion,

Do not insert a Foley catheter into stoma but seek advice from the on-call radiologist.

After 7 days it is safe to carefully insert a Foley catheter into stoma until a replacement gastrostomy tube can be inserted. NB. Foley catheter needs to be inserted straight away or stoma site will close in a few hours.

ASSISTANCE: In case of problems with PIGG tubes, please contact Joan Dimmick, Nutritional Support Sister on ext. 51014 or page 4059.

(NEN 11). KEY POINTS TO GOOD PRACTICE FOR THE CARE OF JEJUNOSTOMY FEEDING TUBES

- Use of non-sterile gloves and disposable plastic apron as well as hand hygiene is important.
- Inspect site daily, observe for any pain, swelling, redness or leakage.
- For the first 48 hours after insertion, clean site with Betadine antiseptic solution and leave site exposed where possible. Thereafter clean daily with soap and water, dry thoroughly and leave exposed.
- Flush jejunostomy tube before and after feeds with 30-50 mL of sterile water, and likewise if giving medicines via this route. Medicines must be in liquid form. If several medicines are to go down the tube, flush in between each with 20 mL of sterile water.
- If the tube becomes blocked, try flushing with 30–50 mL of warm sterile water. If this fails try Pancrex V powder (1 teaspoon dissolved in 30 mL of sterile water and put into jejunostomy tube for 30 minutes). Alternatively seek advice from Nutritional Support Sister.
- **No baths** for 3 weeks after jejunostomy insertion to allow stoma site to fully heal.

If jejunostomy tube falls out or is accidentally pulled out at any time after the primary insertion: **do not insert a Foley catheter into stoma but seek advice from the on-call radiologist or surgeon.**

ASSISTANCE: In the case of problems with jejunostomy tubes please contact Joan Dimmick, Nutritional Support Sister on ext. 51014 or page 4059.

(NEN 12). PROCEDURE FOR INSERTION OF FOLEY CATHETER INTO SITE UNTIL GASTROSTOMY TUBE INSERTION CAN BE CARRIED OUT

GENERAL NOTES

- If gastrostomy tube comes out within the first week of primary insertion do not insert Foley catheter into stoma, but seek advice from on-call Radiologist or Surgeon.
- The primary tube must be in position for at least 1 week before a replacement tube can be gently inserted by the nursing staff. The replacement tube should be the same size as the primary tube. If any difficulty is experienced in inserting the tube, try the next size down, i.e. if 16FG tube does not fit reduce size to 14FG.
- After 7 days temporary Foley catheter must be placed into gastrostomy site within a few hours of primary gastrostomy tube coming out or site will close over.

Contact Nutritional Support Sister as soon as possible who will insert a replacement tube. If this happens at a weekend and ward staff are unable to insert a Foley catheter, contact the on-call Radiologist or surgeon for advice.

PREPARATION

- Clean trolley with general purpose neutral detergent and hot water, rinse and dry. Wipe over with 70% alcohol impregnated wipe.

REQUIREMENTS

- Foley catheter same size as primary gastrostomy tube.
- Syringe with sterile water (appropriate volume in relation to replacement tube).
- Clean plastic apron.
- Disposable gloves x 1 pair.
- Dressing pack.
- Steripod (saline).
- Disposal bag.
- pH indicator strip.

- Spigot.
- Catheter tip syringe.
- Alcohol hand rub.
- KY jelly.

PROCEDURE

1. Explain procedure to patient. Screen the bed. Have patient lying as flat as his/her condition allows.
2. Wash hands with antiseptic hand-wash and dry thoroughly.
3. Put on plastic apron.
4. Set out dressing pack with required materials.
5. Apply alcohol hand rub.
6. Put on gloves.
7. Remove existing gastrostomy tube, if required, and discard.
8. Cleanse gastrostomy site with saline.
9. Lubricate the Foley catheter tip with KY jelly.
10. Insert tube at a 90° angle into stoma tract.
11. Fill the retention balloon with sterile water.
12. Gently withdraw the Foley catheter until balloon is resting against the internal wall of stomach.
13. Check position in stomach by aspirating some gastric contents with a catheter tip syringe and testing with pH indicator strip. Gastric contents will record 5.5 or below on the pH indicator strip.
14. Tape the Foley catheter to abdominal wall.
15. Dispose of equipment safely.
16. Remove gloves and apron and discard as clinical waste.
17. Wash hands with antiseptic hand-wash.
18. Document procedure in the Nursing Profile.

(NEN 13). PROCEDURE FOR INSERTION OF REPLACEMENT GASTROSTOMY TUBE

PREPARATION

- Clean trolley with general purpose neutral detergent and hot water, rinse and dry. Wipe over with 70% alcohol impregnated wipe.

REQUIREMENTS

- Replacement gastrostomy tube same size and make as the tube, which was dislodged.
- Syringe x 2 depending on balloon volume of gastrostomy tube and Foley catheter being removed.
- Sterile water.
- Green needle.
- Clean plastic apron.
- Sterile gloves x 1 pair.
- Dressing pack.
- Steripod (saline).
- Disposal bag.
- Stethoscope.
- Gallipot.
- pH indicator strip.
- Spigot.
- Catheter tip syringe.
- Alcohol hand rub.
- KY jelly.

PROCEDURE

Explain procedure to patient. Screen the bed. Have patient lying as flat as condition allows.

1. Wash hands with antiseptic hand wash and dry thoroughly.
2. Put on plastic apron.
3. Set out dressing pack with requirements.

4. Check that Secur-Loc disc moves satisfactorily up and down the new gastrostomy tube and also check that retention balloon on gastrostomy inflates and there are no leaks. Withdraw sterile water from balloon.
5. Apply alcohol hand rub.
6. Put on sterile gloves.
7. Withdraw sterile water from balloon of temporary Foley catheter (if present) and remove tube.
8. Cleanse site with Steripod contents.
9. Lubricate end of gastrostomy tube with KY jelly and insert into stoma tract at a 90° angle. Insert up to approximately 6-8 cm level. Inflate retention balloon with sterile water, 4 mL for a 5 mL balloon capacity or 8 ml for a 10 mL balloon.
10. Gently withdraw the gastrostomy tube until balloon is resting against the internal wall of stomach.
11. Dry stoma site.
12. Lower Secur-Loc disc until resting about 3 mm above skin surface. Gastrostomy tube should be able to rotate easily 360 degrees.
13. Check position in the stomach by aspirating some gastric contents with a catheter tip syringe and testing with pH indicator strip. Gastric contents will record 5.5 or below on pH indicator strip.
14. Flush tube with 30-50 mL of sterile water. Enteral feeding (as per Dietitian's regimen) can be commenced if tube is confirmed to be in stomach.
15. Leave patient comfortable.
16. Dispose of equipment safely.
17. Remove gloves and apron and discard as clinical waste.
18. Wash hands with antiseptic hand wash.
19. Document procedure in patient's Nursing Profile, noting the make and size, of the gastrostomy tube, the amount of sterile water put into retention balloon, and the level of Secur-Loc disc.

(

NEN 14). MOUTH CARE

Even if the patient is not eating and drinking, mouth and teeth must continue to be kept clean. It is recommended that patients who have their own teeth brush as usual twice daily. Artificial saliva or an appropriate mouthwash can be used to freshen up the mouth for those who are not eating or do not have their own teeth. A lip balm can also be used if necessary.

(NEN 15). DISCHARGE INFORMATION FOR PATIENT AND CARERS

(NEN 15a). PATIENT AND CARERS INFORMATION. CARE OF YOUR NASOGASTRIC FEEDING TUBE

Always wash your hands before and after attending to your nasogastric tube.

Before any feed is started it is very important to check that your tube is still in your stomach. There are a few ways in which you can do this:

- Mark the position of the tube where it comes out of your nose; you can either do this with a piece of tape or mark the tube itself with a pen. If the mark is further out than usual when you look at the tube before starting your feed, the tube may no longer be in the right place.
- Aspirate (suck up) some of the stomach juices through your tube with a 50mL catheter tip syringe. Stomach juices are acid and will record 5.5 or below on pH indicator strip. If this happens you know your tube is in the right place.

If your tube feels uncomfortable or you see it coiled in your throat it is probably not in the right place.

IF YOU HAVE ANY DOUBTS AS TO THE POSITION OF YOUR TUBE DO NOT START ANY FEED. CONTACT YOUR COMMUNITY NURSE AS SOON AS POSSIBLE.

- The time when a tube is most likely to have moved out of the stomach is during vomiting or violent coughing. If this happens to you, it will be especially important to check the position of the tube.
- Preventing your tube getting blocked. It is important to flush it with 30-50 mL of water before and after feed. If you are giving yourself medication through your tube, it must be in liquid form and you must remember to flush your tube before and after with water. If several medicines are to go down the tube, flush in between each with 20 mL of water. For flushing your tube it is advisable to use boiled water that has cooled.

- If the tube becomes blocked, try flushing with 30-50 mL of cooled boiled water, soda water, pineapple juice or Coke. If this fails to unblock the tube, contact your Community Nurse.

TO STOP YOUR TUBE FALLING OUT ALWAYS ENSURE IT IS
TAPED SECURELY IN POSITION.

If you have any problems regarding your nasogastric tube please contact
your

Community Nurse: _____

Tel: _____

or Nutritional Support Sister, Gartnavel General Hospital, or your ward
nursing staff. Telephone 0141 211 1014 or 0141 211 3000 and ask the
Hospital Switchboard Operator to page 4059 during working hours.

Type of tube inserted and date _____

Method of insertion _____

(NEN 15b). PATIENT AND CARERS INFORMATION.**CARE OF YOUR GASTROSTOMY FEEDING TUBE**

Always wash your hands before and after attending to your gastrostomy

- Inspect gastrostomy site daily - if you notice any pain, swelling, redness or leakage, please contact your Community Nurse or GP.
- Clean around the site of your gastrostomy daily with liquid soap and water, paying particular attention to the area under disc or bumper. Dry thoroughly. You do not need to apply talc or a dressing.
- Rotate the gastrostomy tube in a full circle daily when you are cleaning it. This helps to prevent the tube adhering to the entry site and makes cleaning easier.
- It is important to flush your gastrostomy tube with 30-50 mL of water in a syringe before you start the feed, and again when feed is finished. This will prevent the gastrostomy tube from becoming blocked. If you are giving yourself medication via your gastrostomy always ensure they are in liquid form, and remember to flush your tube before and after with 30 mL water. If several medicines are to go down the tube, flush in between each with 20 mL of water. For flushing your tube, it is advisable to use boiled water that has cooled.
- If your gastrostomy tube becomes blocked, try putting some fizzy juice down the tube - soda water or Coke usually works well, as does pineapple juice (use 30-50 mL in syringe). If that fails, inform your Community Nurse or GP.
- While your feeding is in progress keep yourself semi-upright to allow feed to flow into your stomach. You might be sick if you lie flat.
- Your gastrostomy may be held in position in your stomach with a balloon. If this is the case, your Community Nurse will check the volume of sterile water in the balloon weekly.
- No baths are allowed for three weeks after your gastrostomy insertion. Shower only to allow stoma site to fully heal.

- Should your gastrostomy tube accidentally come out, do not panic. Contact your Community Nurse or GP as soon as possible, so that arrangements can be made to replace the tube.

If you have any worries relating to your gastrostomy tube or feeding, please contact-

Your Community Nurse: _____

Tel: _____

Your GP: _____

Tel: _____

Your Dietitian

Tel: _____

or Nutritional Support Sister at the Gartnavel General Hospital or your ward nursing staff. Telephone 0141 211 1014 or 0141 211 3000 and ask the Hospital Switchboard Operator to page 4059 during working hours.

Type of tube inserted and date _____

(NEN 15c). PATIENTS AND CARERS INFORMATION.

CARE OF YOUR JEJUNOSTOMY FEEDING TUBE

Always wash your hands before and after attending to your jejunostomy tube.

- Inspect your jejunostomy site daily. If you notice any pain, swelling, redness or leakage, please contact your Community Nurse or GP.
- Clean around the site of your jejunostomy daily with soap and water. Rinse and dry thoroughly. There is no need to apply talc or a dressing
- It is important to flush your jejunostomy tube with 30-50 mL of cooled boiled water in a syringe before you start the feed and again when the feed is finished. This will prevent the tube from becoming blocked. If you are giving yourself medication through your jejunostomy, always ensure they are in liquid form and remember to flush your tube before and after with boiled water that has cooled. If several medicines are to go down the tube, flush in between each with 20 mL boiled water that has cooled.
- If your jejunostomy tube becomes blocked, try flushing with 30-50mL of cooled boiled water. If you are unable to unblock tube, seek advice from your Community Nurse.
- No baths are allowed for 3 weeks after your jejunostomy insertion. Shower only, to allow stoma site to fully heal.
- Should your jejunostomy tube accidentally come out, do not panic. Contact your Community Nurse or GP as soon as possible, so that arrangements can be made to replace the tube.

If you have any worries relating to your jejunostomy tube or feeding,
please contact your
Community Nurse. _____
Tel: _____
Your GP _____
Tel: _____

Nutritional Support Sister at the Gartnavel General Hospital or your
ward nursing staff. Telephone 0141-211-1014 or 0141-211-3000 and
ask the Hospital Switchboard Operator to page 4059 during working
hours.

Type of tube inserted and date _____
Method of insertion _____

(NEN 16). AFTER-CARE FOLLOWING THE REMOVAL OF GASTROSTOMY TUBE

No food orally is permitted for 6 hours after gastrostomy removal. Sips of water allowed.

Dressing over stoma site is required until the stoma heals.

Balloon-held gastrostomy tubes: having deflated the balloon, remove the tube at night before bedtime. This allows stoma to seal over during the night.

Endoscopically inserted PEG tube: PEG tube can be removed by traction. Contact Nutritional Support Sister for advice.

Per oral imaging guided gastrostomy tubes (PIGG). PIGG tube can be removed by traction. Contact Nutritional Support Sister for advice.

SECTION 3

PARENTERAL NUTRITION

3.1 Appropriate use of parenteral nutrition

Parenteral nutrition provides means of nutrition for patients who are unable to eat, and who cannot be treated with enteral nutrition. It needs to be kept in mind that it is an invasive procedure, which is associated with risk of complications, particularly line infection. Therefore, parenteral nutrition needs to be used judiciously, and only after risk and benefit of such treatment has been carefully balanced.

3.2 Indications for parenteral nutrition

Contact the Nutrition Team when you wish to treat a patient with parenteral nutrition

Although most of the patients who are unable to eat, or are nutritionally compromised, can be managed using the enteral route, a small proportion of those with gastrointestinal disease or post-surgery require parenteral nutrition. This may be carried out using either a peripheral or a central line according to the period of the required nutritional support. In general, parenteral nutrition may be considered when the gastro-intestinal tract is either unavailable or is malfunctioning (Table 3A and 3B).

Before initiating parenteral nutrition, a member of the Nutrition Team should be contacted for assessment, prescription and monitoring of the patient,

3.3 Contraindications to parenteral nutrition

Contraindications include functioning gut and lack of adequate vascular access. With regard to overall patient prognosis decision to institute parenteral nutrition is based on the balance of risk and benefit in each individual case (Table 3C).

3.4 Available parenteral nutrition regimens.

PN provides complete nutrition to the patient. The main components of feeding bags are proteins, lipids and a concentrated solution of glucose. In addition, standard nutritional regimens include supplements of vitamins and trace metals. The Nutrition Team uses several standard bags. The so-called **Central Bags** need to be given through a central line, and have volume ranging from 1.5 litre (the **Low-Volume Bag**) to 2.5 L. The nitrogen content of these bags varies from 9 g to 14 g and they usually contain 40-60 mmol of potassium. Their caloric content is 1300-2500 Kcal.

The **Peripheral Bag** has similar components but is isosmotic and therefore can be given through the peripheral vein. Normally peripheral PN should not be maintained for longer than two weeks.

Practice point: Central bags have high osmolality and therefore cannot be given by peripheral route. However, the reverse is possible: peripheral bags can be given centrally.

Normally the Nutrition Team would adjust the bag content of main electrolytes such as potassium, magnesium, phosphate or calcium according to the clinical state of the patient and recent laboratory results. The most commonly adjusted electrolytes are potassium, phosphate and magnesium. Such adjustment often eliminates the need for separate supplementation of electrolytes and minimizes the volume of fluids given to the patient.

3.5 Arranging parenteral nutrition.

- Arrange blood samples for baseline laboratory tests on the day you wish to start PN: mark the form 'Patient on TPN'.
- Contact a medical member of the Nutrition Team to discuss your requirements. Give the name of the patient, date of birth and hospital number.
- Send the standard parenteral nutrition request form to the Pharmacy, specifying whether you require central or peripheral PN. *Inform the Pharmacy ASAP if you wish to stop parenteral nutrition*
- The Nutrition Team will formulate the details of the prescription based on patient's condition and

Table 3A.**The use of parenteral nutrition (NICE recommendations 2006)**

Indications. The NICE Guidelines 2006 recommend considering parenteral nutrition in people who are malnourished or at risk of malnutrition and :

- a. have a non-functional, non-accessible or perforated (leaking) gastrointestinal tract and/or
- b. have inadequate or unsafe oral and/or enteral intake.

These criteria may be met in the following conditions:

- a. Conditions characterized by inability to absorb nutrients via the GI tract: i.e. extensive small bowel resection (short bowel syndrome), diseases of the small intestine and radiation enteritis.
- b. Enteric cutaneous fistulae.
- c. Inflammatory diseases such as Crohn's disease. Inflammatory adhesions with small bowel obstruction.
- d. Chronic intestinal pseudo-obstruction syndromes.
- e. Motility disorders such as scleroderma or sclerosing peritonitis.
- f. Severe diarrhoea or intractable vomiting.
- g. Treatment with high-dose chemotherapy, radiation and bone marrow transplant.
- h. Moderate to severe pancreatitis, where bowel rest is anticipated beyond 5-7 days.
- i. Moderate malnutrition in patients who require intensive medical or surgical intervention.
- j. Patients on intensive cancer chemotherapy.

Table 3B.**Time-frame for instituting parenteral nutrition
(NICE recommendations 2006)**

- a. In severe malnutrition and non-functioning GI tract, parenteral nutrition should be established within 1-3 days. This also holds for severely catabolic patients, independently of the state of nutrition, if it is expected that the GI tract will not be usable for 5-7 days.
- b. In normally nourished patients PN should be established if the recovery is not expected within 5-7 days.
- c. After major surgery or moderate stress PN can be considered if resumption of adequate diet is not expected within 7-10 days

Table 3C**Conditions where PN is not appropriate
(NICE recommendations 2006)**

- a. Patients with a functional and useable GI tract, capable to absorb adequate nutrients.
- b. When dependence on PN is anticipated to be less than 5 days.
- c. Patients whose prognosis does not warrant aggressive nutritional support.
- d. When the risks of PN exceed the potential benefits.

laboratory results.

- All PN infusions will be clearly labeled; contents, expiry date and specifying the route of administration will be all stated on the label **Inform Pharmacy as soon as possible after the ward round if PN should be stopped.**

Deadlines for arranging PN

PN needs to be ordered before 12 noon. Friday 12 noon is a deadline for requests of PN to run on weekends. PN bags will be delivered to the ward by 5 pm every day, apart from Saturday and Sunday (for the Western Infirmary) when they will be delivered early on Saturday morning.

*Important:
deadlines for
arranging PN*

3.6 Nutrition Team ward-rounds.

Each patient treated with parenteral nutrition will be seen regularly by the Nutrition Team. You can always contact a Nutrition Team member, to discuss current issues or to see the patient (see contact information on the inside of the cover).

3.7 PN on weekends

Nutrition Team prescribes PN daily during the week. Friday's prescription incorporates Saturday and Sunday. **Ensure adequate laboratory monitoring at weekends.**

3.8 Monitoring of patients treated with parenteral nutrition.

3.8.1 Baseline data

Table 4 lists the required baseline data for patients treated with PN.

3.8.2 Laboratory tests

Table 5 lists the laboratory tests required for the monitoring of patients treated with PN. **Note: the risk of complications increases if these data are not available.**

3.9 Short-term parenteral nutrition by peripheral line

Peripheral PN (PPN) should be used in patients where:

- it is not yet known whether longer-term parenteral nutrition will be required;
- as an interim measure before establishing central venous access under full sterile conditions;
- if a line infection is suspected and feeding by central route is interrupted.

PPN should be only used for up to 14 days. A low osmolality peripheral PN bag is used. PN of longer duration is best managed via a central line.

Practical points for peripheral parenteral nutrition

- PPN is best administered via a pink Venflon, (size 20G), inserted by ward medical staff or nursing staff trained in this procedure, using an aseptic technique. Re-site the Venflon at the earliest sign of thrombophlebitis.
- A GTN skin patch, 5 mg, placed over the vein distal to the infusion site assists in keeping the vein patent. The skin patch should be changed every 72 hours.
- Venflon should be routinely replaced and the site rotated every 96 hours.

3.10 Long-term parenteral nutrition by central line

3.10.1 Catheter selection

Catheters for long-term use are made from silicone coated plastic, as these are much less likely to crack than PVC catheters. For PN longer than 14 days a single lumen Hickman catheter (Figure 8) should be inserted. Venous access is always established as a separate procedure in a sterile environment (i.e. operating theatre or special X-ray room), usually under local anaesthetic. In all cases a length of the catheter should be tunelled so that the exit from the vein is some distance from the exit to the skin surface. This reduces septic complications and allows exit site to be dressed more easily. Lines should be sited in the patient's non-dominant side if possible. PVC multi-lumen catheters may be used

Requests for Hickman line insertion should be made to the Hickman Line Insertion Service (see Section 5).

in intensive care units where the duration of catheterisation is more limited and feeding is only one of the requirements of venous access. One catheter lumen must be dedicated for PN solution. When a central line catheter is removed, an exit site swab should be taken and the tip should be sent to the Bacteriology Department, if infection is suspected **Requests for Hickman line insertion should be made to the Hickman Line Insertion Service (see Section 5 of this Handbook).**

3. 11 Equipment for parenteral nutrition

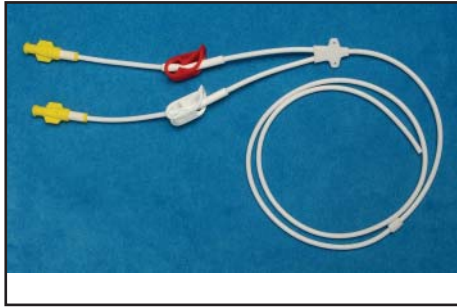


Figure 8.
A Hickman catheter used in parenteral nutrition.

Table 4. Baseline data and daily checks

<p>Baseline data (applies to enteral and parenteral nutrition)</p>	<p>Age, weight, height, cardiovascular status. Temperature, blood pressure. Renal function, hydration status and water/electrolyte balance.</p>
<p>Daily checks of line status, fluid balance and oral intake (applies to enteral and parenteral nutrition)</p>	<p>Presence of diarrhoea, constipation, abdominal distension. Checks of nasogastric /enteral tubes: position, fixation, blockages. Checks of stoma site and PEG tube position. Status of the central line entry site/Venflon. Type of connectors used; is catheter lumen dedicated to PN? Current oral intake (solid foods and fluids). Fluid balance, particularly in patients remaining on other fluid therapy. PN involves considerable fluid volume. It is essential to adjust the volume of other fluids given in patients treated with PN. A fluid balance chart is essential.</p>

3.11.1 Infusion pumps.

Note: infusion pumps are maintained by the Medical Physics Department.

Central or peripheral parenteral nutrition must be delivered to the patient using a volumetric infusion pump e.g. Baxter Flogard, which accurately delivers the PN at a pre-determined hourly rate, over a set period of time. Volumetric infusion pumps also sense occlusion and air bubbles, providing a read-out stating the cause of machine alarm. Infusion pumps are maintained by the Medical Physics Department.

3.11.2 Giving sets

Strict aseptic precautions must be taken to minimise the risk of catheter sepsis. Lines and connections should only be handled by trained staff, using full aseptic technique. The feeding line should not be used for the administration of drugs, blood or other intravenous solutions, nor for the measurement of central venous pressure. A single lumen catheter is preferred to reduce the risk of introducing infections during handling. Double-lumen or triple-lumen lines should only be used where absolutely necessary, and one lumen must be designated for PN administration.

3.12 Storage of parenteral nutrition solutions

If the bag is damaged or leaking please notify the Pharmacy immediately and send the bag back

All parenteral nutrition bags must be stored in the drug fridge or fridge designated for PN at a temperature between 2 and 8°C. The expiry date is stated on the labels. Pharmacy should be notified of any unused bags. They should be discarded in clinical waste. Parenteral nutrition bags should be removed from the fridge at least ½ hour prior to use, to allow fluid to reach room temperature. If the bag is in any way damaged or

leaking please **notify the Pharmacy Department immediately and send the bag back** so that the cause can be determined. If a problem occurs out of hours, contact hospital Pharmacy.

3.13 Discontinuation of parenteral nutrition

When the patient can re-commence oral nutrition, it is a wise precaution to leave central feeding line *in situ* for a few days. This is in case the patient has to revert back to PN. The Dietitian will advise on appropriate foods to suit patient's requirements. When it is decided that central line

Table 5 Laboratory monitoring of patients treated with PN

Test	Frequency	Colour-coded Sample tubes	Comments/details
Biochemistry profile	Daily. Frequency may decrease in stable patients: Nutrition Team will advise	1 orange tube	U&E, (including bicarbonate), CRP, calcium and phosphate, magnesium, LFT, albumin. Nonfasting triglycerides.
Haematology profile	Daily. Frequency may decrease in stable patients: Nutrition Team will advise	1 purple tube	FBC
Glucose	Daily or more often at first. Frequency may decrease in stable patients: Nutrition Team will advise	1 grey tube	Glucose
Iron and Ferritin	Baseline. Then every 3-6 months.	1 orange tube (iron)	
Nutrition screen	A full nutritional screen should be performed if patient has been treated with parenteral nutrition for longer than 7 days, and on all malnourished patients at baseline. Fortnightly thereafter.	1 green tube 1 dark blue (trace metals) tube	Micronutrient screen: Vitamin A, E, B ₁ , B ₆ C Selenium and copper Zinc, glutathione peroxidase. Manganese
Folate, Vitamin B12	Baseline. Then every 2 weeks. Frequency may decrease in stable patients: Nutrition Team will advise		
25-OH Vit D	6 monthly during long-term support		
Bone densitometry	Baseline and every 2 years during treatment with home parenteral nutrition		

Write on the request form that the patient is treated with PN. Take the samples as early in the morning as possible, so that the results are available by the time the pharmacy needs to prepare the solutions.

is no longer required, it can be removed using aseptic technique. The catheter tip has to be sent to the Bacteriology Department for organism culture and sensitivity testing. The enteral route can also be considered when weaning a patient off PN. It is possible to provide PN and enteral feed simultaneously, with reduced volume PN.

-

3.14 Discharge planning of patients treated with parenteral nutrition. Home parenteral nutrition

Note: 2 weeks' notice required When it is anticipated that a patient is to be discharged home on PN, a notice of at least 2 weeks must be given to the Nutrition Team, so that the necessary arrangements can be made.

3.15 Prevention and management of complications of parenteral nutrition

3.15.1 Complications associated with catheter insertion.

Once the catheter has been positioned, a chest X-ray is mandatory prior to commencing feeding. This should confirm the absence of pneumothorax and correct siting of the catheter and must be examined by the operator.

The following problems have been associated with catheter insertion:

- bleeding;
- pneumothorax;
- air embolism;
- malposition of the catheter;
- puncture of the subclavian artery;
- nerve injuries;
- central venous thrombosis;
- dysrhythmias.

Line infection and sepsis. Prevention of line infection and sepsis is an essential part of PN. Close and timely monitoring, strict aseptic technique in handling lines and PN bags, and the use of right equipment are required. Catheter sepsis is usually related to mishandling of the feeding line.

Handling of the line must be by strict aseptic technique.

Single lumen PN catheters should not be used for routine blood

sampling, drug administration and blood transfusion.

Infection at the exit site results in tenderness and inflammation around the site and usually responds to systemic antibiotics, provided the cuff is not involved. Biopatch dressing is useful. Biopatch is a 2% chlorhexidine-impregnated slow-release dressing.

Handling of the line must be by strict aseptic technique.

Catheter-related septicaemia is the most serious when it causes pyrexia and rigors during PN infusion. It is important to exclude other sources of infection, e.g. chest and urinary infection. Depending on the organism cultured, it may be possible to avoid removal of the line.

Tunnel infection results in pain and tenderness along the tunnel. This usually requires the line to be removed.

Central vein thrombosis. Subclavian vein thrombosis may be silent but commonly presents with a swollen, painful arm. The diagnosis is confirmed using Doppler ultrasound or upper limb venography. The catheter must be removed and the patient treated with fibrinolytic drugs. Catheter occlusion may occur due to fibrin deposits. Fibrin occlusion may respond to a urokinase lock (see protocol). Catheter fracture may occur either at the lower tip or along the length of the catheter itself. **The catheter should be clamped on the patient side of the fracture to prevent bleeding or air embolism and medical assistance sought urgently.** For Hickman lines, a catheter repair kit can be obtained from the hospital stores. Seek advice from the Hickman Line Insertion Service.

3.15.2 Management of suspected line sepsis

(temperature > 38°C; see Figure 9).

If no other sources of infection are apparent:

- stop PN;
- inform medical staff/Nutrition Team;
- take blood cultures (peripheral and central);
- ensure that bottles go to the Bacteriology Department the same day
- commence peripheral IV fluids; if patient's clinical condition permits, withhold antibiotic treatment until bacteriological report is available.

If line colonisation in tunnel is confirmed by blood cultures but patient has no septicaemia or bacteraemia:

- do not restart PN;
- insert Taurolock (on advice of the Bacteriologist) usually 2.5 mL into the central line. The lock should remain in place for 24 hours unless recommended otherwise;
- withdraw Taurolock and discard after 24 hours, then repeat the above step;
- after a further 24 hours, remove lock and discard, then insert Taurolock for a further 24 hours;
- once Taurolock has been removed and discarded on day 3, withdraw blood from line for blood cultures and await results;
- once blood culture results are available they should be discussed with the Bacteriologist who will advise when to restart PN.

If septicaemia or bacteraemia is present:

- removal of the line may be necessary;
- before proceeding with line removal, possible use of Taurolock should be discussed with the Bacteriologist;
- treat with antibiotics as recommended by the Bacteriologist.

If line colonization is confirmed by blood cultures:

- do not restart PN;
- give antibiotics (on advice from Bacteriologist) for 48 hours via peripheral line;
- insert antibiotic lock (on advice from Bacteriologist) into central line;
- after antibiotic lock has been in place for 24 hours, withdraw lock and then withdraw blood for blood cultures;
- recommence PN and observe patient;
- if patient again becomes pyrexial, take blood cultures again and stop PN;
- commence peripheral IV fluids and await blood culture results.

If line sepsis is unconfirmed and clinical condition of the

Management of Suspected Line Sepsis

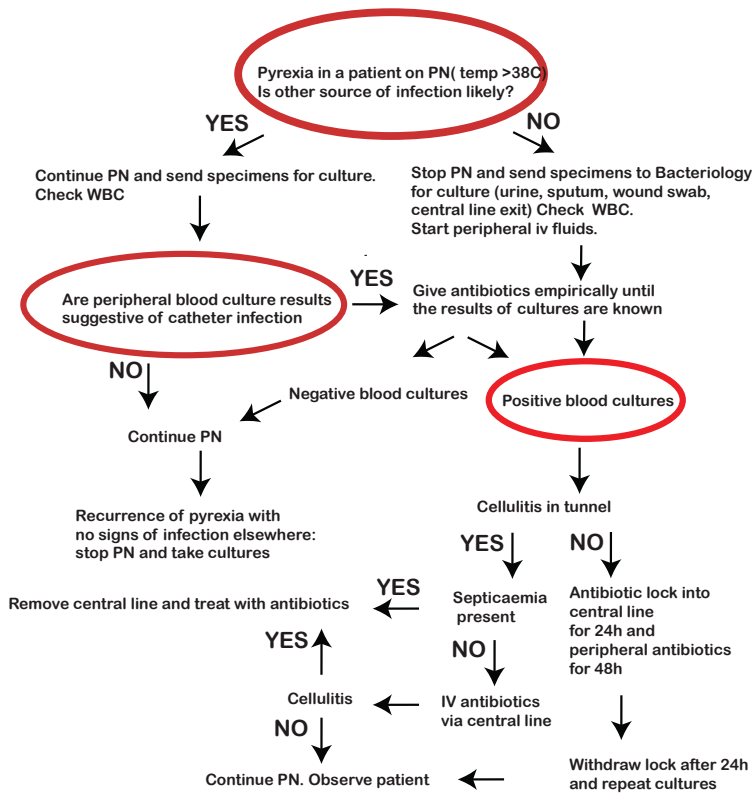


Figure 9.

patient permits (i.e., there is no temperature, the patient is clinically not unwell, and the white cell count is normal):

- recommence PN and observe closely;
- document observations, i.e. no reaction to PN being recommenced.

If line sepsis is considered clinically to be the problem in the absence of positive bacteriological tests:

- treat as line colonisation.

3.15.3 Metabolic problems

Dehydration or over-hydration

A fluid-chart is essential to prevent these. If severe electrolyte disturbances are present (such as, for instance sodium concentration above 150 mmol/L or below 125 mmol/L) we recommend controlling these by treatment with crystalloids and delaying the commencement of PN until electrolyte balance is under control.

Hypokalaemia

Hypokalaemia is a frequent complication of PN. The potassium content of bags is adjusted according to the serum level and monitoring serum potassium is essential. The patient may require potassium supplementation over and above of the amount given with PN.

Hyperkalaemia

Our recommendation is that if serum potassium concentration in a patient on TPN exceeds 5.5 mmol/L, the PN should be discontinued and a member of the Nutrition Team contacted to adjust the potassium content of PN solution.

Hyponatraemia

It is a common complication of PN. If a patient becomes hyponatraemic and needs crystalloids, give saline only, not dextrose. Volume restriction or sodium supplementation may be required.

Hypernatraemia

Mostly related to dehydration. If crystalloids are required give dextrose

only, no saline (except severe dehydration, where saline might be initially required to expand the extracellular fluid).

Hypomagnesaemia

May occur in presence of large losses of intestinal fluid. Both hypokalaemia and hypocalcaemia may occur on the background of hypomagnesaemia. Remember to measure magnesium in hypokalaemic patients.

Hypo- and hyperphosphataemia

Hypophosphataemia may follow the introduction of nutritional support due to movement of phosphate into the cells. Hyperphosphataemia is common in renal failure.

Glucose intolerance and diabetes

Commencing PN may result in hyperglycaemia, particularly in patients with glucose intolerance and diabetes mellitus. It is therefore good practice to monitor glucose regularly. Patients with diabetes may require the sliding scale insulin treatment during PN.

Hypoglycaemia

Hypoglycaemia is rare in patients on TPN who do not require additional insulin. Glucose needs to be closely monitored when insulin is administered, particularly during changes in PN regimen.

Abnormal liver function

A mild increase of alkaline phosphatase and/or transaminases may be a normal finding after a few days of PN. If levels continue to rise and infection is excluded, we would consider decreasing fat content of PN, or stopping PN. If LFT disturbance is a consequence of PN, a cholestatic pattern is likely.

Dyslipidaemia

Fat metabolism may be impaired in renal insufficiency, uncontrolled diabetes mellitus and liver disease. Triglyceride levels should be monitored to ensure that an infused lipid emulsion is cleared from the bloodstream.

Trace metal and vitamin deficiencies

Deficiencies of zinc or copper or vitamins may rarely become apparent during long-term PN.

3.15.4 Significance of serum albumin concentration in PN

Albumin is a good marker of the nutritional status when a patient is stable and free of other illnesses. On the other hand, in acutely ill patients albumin is a poor marker of nutrition. In particular, it decreases when the patient is over-hydrated. Albumin concentration provides useful information only in association with the assessment of clinical state and with other nutritional markers.

3.15.5 Refeeding syndrome

Refeeding syndrome is a potentially life-threatening disorder of electrolyte metabolism that may occur in a malnourished patient who has been starving for a prolonged period. It is precipitated by large amount of nutrients (particularly carbohydrates).

When refeeding syndrome is suspected, contact Nutrition Team for advice.

The hallmark of the refeeding syndrome is hypophosphataemia. Hypomagnesaemia and hypokalaemia also occur. Cardiac arrhythmias may occur. In severely malnourished patients and in patients who eaten little or nothing for more than 5 days feeding must be re-introduced gradually.

A patient is at a high risk of refeeding syndrome (NICE 2006 guidelines) if:

- the BMI is less than 16 kg/m²;
- there is unintentional weight loss >15% within the last 3-6 months;
- there was little or no nutritional intake for more than 10 days;
- hypokalaemia, hypophosphataemia or hypomagnesaemia is present prior to commencement of feeding;

or if two of the following criteria are fulfilled:

- BMI less than 18.5 kg/m²;
- unintentional weight loss >10% within the last 3-6 months;
- little or no nutritional intake for more than 5 days;
- history of alcohol abuse, chemotherapy or treatment with insulin, antacids and diuretics.

When refeeding syndrome is suspected, carefully monitor potassium, magnesium and phosphate concentrations and contact Nutrition Team for advice.

3.16 PARENTERAL NUTRITION- NURSING PROCEDURES

Nurse's role in parenteral nutrition. The nurse's role is essential in monitoring nutritional support and in recognising and preventing complications. In particular, effective management of the central or peripheral line is fundamental for the success of PN treatment. At ward level the nurse is responsible for:

1. Strict aseptic technique when changing infusion bags.
2. Accurate observation and assessment of the patient by:
 - maintaining accurate fluid balance charts;
 - recording temperature and pulse (4 hourly);
 - observation of catheter/Venflon insertion site – this observation should be documented;
 - weekly weighting of patient;
 - taking weekly bacteriological swab from catheter site;
 - weekly change of central line dressing (more often, if necessary);
 - weekly change of Vygon Bionector.
3. Psychological care of the patient.
4. Removal of upper chest wound sutures 7 days after Hickman line placement.
5. Removal of anchoring suture on Hickman line 4 weeks after insertion.

(NPN 1). ADMINISTRATION OF PN VIA CENTRAL LINE USING VYGON BIONECTOR SYSTEM

Prior to commencement of the **first** PN bag, it is important that it has been confirmed by X-ray that the catheter is in the correct position.

(NPN 1a). PROCEDURE TO BE FOLLOWED WHEN PN IS BEING COMMENCED FOR THE FIRST TIME

REQUIREMENTS

- Trolley.
- Large dressing pack.
- Mediswabs.
- Clean plastic apron.
- Sterile gloves.
- Alcohol hand-rub.
- Sterile hand towel.
- Antiseptic hand wash solution.
- Dale hug clip.
- Disposal bag.
- PN solution bag (remove from the fridge at least 30 minutes prior to use to bring the solution to room temperature).
- IV stand and a suitable volumetric pump.
- White prescription labels.
- Tape.
- Vygon Bionector.

PROCEDURE

- Wash your hands.
- Put on plastic apron.
- Wash trolley thoroughly with general purpose neutral detergent and hot water, rinse and dry and wipe over with 70% alcohol-impregnated wipe.
- Set out required materials on the bottom shelf of trolley.
- Two trained nurses, one of whom must be registered, need to check PN bag against prescription also check patient name, hospital number and PN expiry date.
- Initial the outer label on PN bag.
- Wipe Baxter Flogard or other suitable volumetric pump with detergent wipes.

- Hang PN bag on IV stand (keep it covered with its protective plastic bag, as some additives are light- sensitive) and proceed to insert giving set into the volumetric pump. Prime the line until it is free of air.
- Tape the giving set to pump to avoid it accidentally falling on the floor while transporting the pump to the bedside.
- Set volume and PN rate on pump (Note: the white label on the PN bag will tell you the rate and volume; PN usually runs over 24 hours). Ensure that PN bags do not hang on the IV stand for more than 24 hours.

AT BEDSIDE

- Explain to the patient what you are going to do. Screen the bed. Check patient's identification details.
- Wash hands thoroughly with antiseptic hand wash solution and dry with sterile hand towel.
- Empty dressing pack from its outer pack onto top of trolley.
- Apply alcohol hand-rub.
- Open out dressing pack and empty out required materials onto sterile field.
- Apply alcohol hand-rub and put on sterile gloves.
- Put sterile drape under central line; forceps can be used to lift up the central line to place it on drape.
- Ensure central line is clamped.
- Remove central line cap, cleanse the central line port to be used for PN with a Mediswab and leave to dry for 30 seconds.
- Attach Vygon Bionector to the central line. Vygon Bionector is to be changed weekly.
- Attach giving set to Vygon Bionector.
- Release clamp on central line.
- Turn on the volumetric pump and wait until the first 1-2 mL of PN solution have been infused.
- You can secure the giving set to patient's outer garments with a Dale hug clip.
- Leave the patient comfortable.

- Record commencement of PN on fluid chart, stick the white PN prescription label on the fluid prescription chart.
- Dispose of equipment safely.
- Remove gloves and apron and discard as clinical waste.
- Wash hands with antiseptic hand-wash solution.

(NPN 1b). PROCEDURE TO BE FOLLOWED WHEN PN IS ALREADY ESTABLISHED**REQUIREMENTS**

- Trolley.
- Large dressing pack.
- Mediswabs.
- Clean plastic apron.
- Sterile gloves.
- Alcohol hand-rub.
- Sterile hand towel.
- Antiseptic hand-wash solution.
- Dale hug clip.
- Disposal bag.
- PN solution bag (remove from the fridge at least 30 minutes prior to use to bring the solution to room temperature).
- IV stand and a suitable volumetric pump.
- White prescription labels.
- Tape.

PROCEDURE

- Wash hands.
- Put on plastic apron.
- Wash trolley thoroughly with general purpose neutral detergent and hot water, rinse and dry. Wipe over with 70% alcohol-impregnated wipe.
- Set bottom shelf of trolley with required materials.
- Two trained nurses, one of whom must be registered, must check PN bag against prescription, and also check patient name, hospital number and PN expiry date.
- Initial the outer label on PN bag.

AT BEDSIDE

- Explain to patient what you are going to do, screen the bed and check patient's identification details.
- Wash hands.
- Put clamp on central line.
- Remove giving set from central line.
- Remove previous PN bag from IV stand, and remove the giving set

from the volumetric pump.

- Wipe volumetric pump (Baxter Flogard or other suitable one) with detergent wipes.
- Hang new PN bag (keep it covered with its plastic protective bag as some additives are light- sensitive) on IV stand, and proceed to insert giving set into volumetric pump. Prime line until free of air.
- Tape giving set to the pump to avoid it accidentally falling on the floor.
- Set volume and PN rate on pump (Note: the white label on the PN bag will tell you the rate and volume. Usually PN runs over 24 hours). Ensure that PN bags do not hang on stand for more than 24 hours.
- Wash hands thoroughly with antiseptic hand-wash and dry with a sterile hand towel.
- Empty dressing pack from its outer pack onto top of trolley.
- Apply alcohol hand-rub.
- Open out dressing pack and empty out required materials onto sterile field.
- Apply alcohol hand-rub and put on sterile gloves.
- Put sterile drape under central line; forceps can be used to lift up the central line to place on the drape.
- Cleanse the Vygon Bionector with a Mediswab and allow to dry for 30 seconds.
- Attach new giving set to the Vygon Bionector.
- Release clamp on the central line.
- Turn on volumetric pump and wait until the first 1-2 mL of PN solution have been infused.
- You can secure the giving set to patient's outer garments with a Dale hug clip.
- Leave the patient comfortable.
- Record the commencement of PN on fluid chart, stick the white PN prescription label on the fluid prescription chart.
- Dispose of equipment safely.
- Remove gloves and apron and discard as clinical waste.
- Wash hands with antiseptic hand-wash solution.

(NPN 2) ADMINISTRATION OF PERIPHERAL PARENTERAL NUTRITION

(NPN 2a).PROCEDURE TO BE FOLLOWED WHEN PERIPHERAL PARENTERAL NUTRITION IS BEING COMMENCED FOR THE FIRST TIME

REQUIREMENTS

- Trolley.
- Large dressing pack.
- Mediswabs.
- Clean plastic apron.
- Sterile gloves.
- Alcohol hand-rub.
- Sterile hand towel.
- Antiseptic hand-wash solution.
- Dale hug clip.
- Disposal bag.
- PPN solution bag (remove from the fridge at least 30 minutes prior to use to bring the solution to room temperature).
- IV stand and suitable volumetric pump.
- White prescription labels.
- Tape.

PROCEDURE

- Wash hands.
- Put on plastic apron.
- Wash trolley thoroughly with general purpose neutral detergent and hot water, rinse and dry and wipe over with 70% alcohol - impregnated wipe.
- Set bottom shelf of trolley with required materials.
- Two trained nurses, one of whom must be registered, must check PPN bag against prescription, and also check patient name, hospital number and PPN expiry date.
- Initial outer label on PPN bag.
- Wipe volumetric pump (Baxter Flogard or other suitable one) with detergent wipes.
- Hang PPN bag (keep it covered with its plastic protective bag as some additives are light-sensitive) on IV stand and proceed to insert giving set into volumetric pump. Prime the line until free of

air.

- Tape giving set to pump to avoid it accidentally falling on the floor while transporting the pump to the bedside.
- Set volume and PPN rate on pump (Note: the white label on the PPN bag will tell you the rate and volume. Usually the PN runs over 24 hours). Ensure that PPN bags do not hang on the IV stand for more than 24 hours.

AT BEDSIDE

- Explain to the patient what you are going to do. Screen the bed. Check patient's identification details.
- Wash hands thoroughly with antiseptic hand-wash solution and dry with a sterile hand towel.
- Empty dressing pack from its outer pack onto top of trolley.
- Apply alcohol hand-rub.
- Open out dressing pack and empty out required materials onto sterile field.
- Apply alcohol hand-rub and apply sterile gloves.
- Put sterile drape under patient's arm that has the Venflon to be used for PPN.
- Cleanse the Venflon cap and surrounding area with a Mediswab and allow to dry for 30 seconds.
- Get patient to elevate forearm.
- Remove Venflon cap while arm elevated and attach Vygon Bionector, lower patient's arm and attach giving set with PPN to Vygon Bionector.
- Turn on volumetric pump and wait until the first 1-2 mL of PPN solution have been infused.
- Secure the giving set to patient's arm and apply a light Kling bandage.
- Leave the patient comfortable.
- Record the commencement of PPN on fluid chart, stick the white PN prescription label on the fluid prescription chart.
- Dispose of equipment safely.
- Remove gloves and apron and discard as clinical waste.
- Wash hands using an antiseptic hand-wash solution.

(NPN 2b). PROCEDURE TO BE FOLLOWED WHEN PERIPHERAL PARENTERAL NUTRITION IS ALREADY ESTABLISHED

REQUIREMENTS

- Trolley.
- Large dressing pack.
- Mediswabs.
- Clean plastic apron.
- Sterile gloves.
- Alcohol hand-rub.
- Sterile hand towel.
- Antiseptic hand-wash solution.
- Dale hug clip.
- Disposal bag.
- Peripheral parenteral nutrition solution bag (remove from the fridge 30 minutes prior to use to bring the solution to room temperature).
- IV stand and suitable volumetric pump.
- White prescription labels.
- Tape.

PROCEDURE

- Wash hands.
- Put on plastic apron.
- Wash trolley thoroughly with general purpose neutral detergent and hot water, rinse and dry, and wipe over with 70% alcohol-impregnated wipe.
- Set bottom shelf of trolley with required materials.
- Two trained nurses, one of whom must be registered, must check PPN bag against prescription; also check patient name, hospital number and PPN expiry date.
- Initial outer label on PPN bag.

AT BEDSIDE

- Explain to the patient what you are going to do. Screen the bed. Check patient's identification details.
- Wash hands.
- Remove bandage.

- Remove giving set from Vygon Bionector.
- Remove previous PPN bag from IV stand, and remove the giving set from volumetric pump.
- Wipe the volumetric pump (Baxter Flogard or other suitable one) with detergent wipes.
- Hang PPN bag on IV stand (keep it covered with its plastic bag as some additives are light- sensitive), and proceed to insert giving set into volumetric pump. Prime the line until it is free of air.
- Tape giving set to pump to avoid it accidentally falling on the floor.
- Set volume and PPN rate on pump (Note: the white label on the PPN bag will tell you the rate and volume. Usually PPN runs over 24 hours). Ensure that PPN bags do not hang on the IV stand for more than 24 hours.
- Wash hands thoroughly with antiseptic hand-wash and dry with a sterile hand towel.
- Empty dressing pack from its outer pack onto top of trolley.
- Apply alcohol hand-rub.
- Open out dressing pack and empty out requirements onto sterile field.
- Apply alcohol hand-rub and put on sterile gloves.
- Put sterile drape under patient's arm that has the Venflon to be used for peripheral PN.
- Cleanse the Vygon Bionector with a Mediswab and allow to dry for 30 seconds.
- Attach giving set with PN to the Vygon Bionector.
- Turn on volumetric pump and wait until the first 1-2 mL of PPN solution have been infused.
- Secure the giving set to patient's arm and apply a light Kling bandage.
- Leave the patient comfortable.
- Record the commencement of PPN on fluid chart, stick the white PN prescription label on the fluid prescription chart.
- Dispose of equipment safely.
- Remove gloves and apron and discard as clinical waste.
- Wash hands with antiseptic hand-wash solution.

(NPN 3). CENTRAL LINE DRESSING

Dressing should be changed weekly (e.g. on Mondays) or more often if the dressing becomes loose or soiled. A swab should be taken from the central line entry site at time of dressing change and sent to the Bacteriology Department.

REQUIREMENTS

- Trolley.
- Dressing Pack.
- Chlorhexidine 2% in 20 mL bottle (discard remainder in bottle after use).
- Tegaderm 10 cm x 12 cm.
- Alcohol hand-rub.
- Antiseptic hand-wash solution.
- Sterile hand towel.
- Sterile gloves.
- Plastic apron.
- Bacteriology swab stick.
- Disposal bag.

PROCEDURE

- Wash hands.
- Wear a plastic apron.
- Wash hands with antiseptic hand-wash solution and dry thoroughly.
- Wash trolley thoroughly with general purpose neutral detergent and hot water, rinse and dry and wipe over with detergent wipe.
- Set bottom shelf of trolley with materials required for dressing.

AT BEDSIDE

- Explain procedure to patient.
- Wash hands thoroughly with antiseptic hand-wash and dry with a sterile hand towel.
- Empty out dressing pack onto top shelf of trolley.
- Apply alcohol hand-rub.
- Open out dressing pack and empty out required materials on sterile field.
- Apply alcohol hand-rub and remove dressing from central line.
- Inspect area at insertion site for any signs of inflammation,

- swelling, discharge or discomfort.
- Take swab from central line site for culture organism and sensitivity (CO&S).
- Apply alcohol hand-rub and put on sterile gloves.
- Put drape out under central line.
- Clean area at insertion site with 2% chlorhexidine antiseptic solution, working away from the entry site, and clean underneath the central line using a new swab for each stroke. Dry in the same pattern.
- Apply Tegaderm over central line site.
- Leave patient comfortable.
- Dispose of equipment safely.
- Wash hands thoroughly with antiseptic hand-wash solution.
- Remove gloves and apron and discard as clinical waste.
- Document procedure in the nursing notes.
- Send swab to the Bacteriology Department with the completed request form.

(NPN4). KEY POINTS TO GOOD PRACTICE. HANDLING CENTRAL LINES AND ADMINISTERING PARENTERAL NUTRITION

KEY POINTS

- Wash hands with antiseptic hand wash and dry thoroughly.
- Wear sterile gloves and plastic apron.
- Take a trolley washed with general purpose neutral detergent and hotwater, rinse and dry, and wipe over with 70% alcohol-impregnated wipe.
- Wipe Baxter Flogard or other suitable volumetric pump with detergent wipe.
- Two trained nurses, one of whom is registered, must check the PN bag.
- Use aseptic technique.
- Use a dressing pack.
- Use a sterile drape below central line.
- Vygon Bionector to be cleansed with a Mediswab, leave to dry for at least 30 seconds before connecting giving set.
- Aim to maintain a closed system at all times. PN is run over 24 hours. In some cases, in consultation with the nutrition team, PN can be run over a shorter time.
- Ideally, single lumen central line to be used for PN. If the line has several lumens, **designate one lumen for PN only.**
- Three- way taps should not be used on central lines, if possible.
- Antibiotic/drugs or blood should not be administered via a central line that is being used for PN because this is a potential source of infection. If possible, use a peripheral route instead.
- Designate one day in the week (e.g. Monday) as 'PN day' to do the following:
 - weekly weighing of patient;
 - weekly change of central line dressing (this needs to be done more often if required) taking a swab for bacteriology from central line entry site;
 - weekly change of Vygon Bionector.

The nurse's effective management of the central line is fundamental for success of PN and for preventing complications.

ASSISTANCE: If you have any problems with PN, please contact Joan Dimmick, Nutritional Support Sister on ext. 51014 or page 4059.

(NPN 5). ADMINISTRATION OF PERIPHERAL PARENTERAL NUTRITION

KEY POINTS TO GOOD PRACTICE

The nurse's effective management of the peripheral line is fundamental for the success of peripheral parenteral nutrition and for preventing complications.

KEY POINTS

- Peripheral parenteral nutrition (PPN) is best administered via a pink Venflon.
- GTN 5mg patch should be applied over the vein distal to Venflon, and changed every 72 hours.
- A 2.5 litre low osmolality PPN solution bag is used.
- Deliver PPN using Baxter Flogard or other suitable volumetric infusion pump, which has been wiped with detergent wipes.
- Two trained nurses, one of whom is registered, must check PPN bag.
- Take a trolley washed with general purpose neutral detergent and hot water, rinse and dry, and wipe over with 70% alcohol-impregnated wipe.
- Wash hands with antiseptic hand -wash and dry thoroughly.
- Wear apron.
- Wear sterile gloves.
- Use a dressing pack.
- Use aseptic technique.
- Venflon must be used only for PPN (**it must not be used for the administration of antibiotics or blood**).
- Attach a Vygon Bionector to the Venflon.
- Use a Mediswab to clean entry port, and allow to dry for 30 seconds before attaching giving set.
- Change Vygon Bionector weekly.
- Weigh patient weekly.
- Observe the Venflon site for early signs of thrombophlebitis.

REMINDER: Observation of Venflon/cannula site should be documented and Venflon/cannula should be routinely replaced and the insertion site rotated every 96 hours.

ASSISTANCE: If you have any problems with PPN, please contact **Joan Dimmick, Nutritional Support Sister on ext. 51014 or page 4059.**

(NPN 6). PROCEDURE FOR HEPARINISATION OF CENTRAL LINE

This is to be carried out by medical or nursing staff who have their intravenous drug administration certificate.

REQUIREMENTS

- Trolley.
- Clean plastic apron.
- Sterile gloves.
- Antiseptic hand wash solution.
- Alcohol hand-rub.
- Mediswabs.
- Dressing pack.
- Hepsal 5 mL ampoule (50 I.U. in 5 mL)
- (Note: check prescription, solution and expiry date with a doctor or registered nurse).
- 10 mL normal saline.
- 5 mL syringe and 10 mL syringe x 2 and green needles x 2 – 21FG.
- Sharps container.
- Disposal bag.

PROCEDURE

- Wash hands.
- Wear a plastic apron.
- Wash trolley thoroughly with general purpose neutral detergent in hot water, rinse and dry and wipe with 70% alcohol-impregnated wipe.
- Set bottom shelf of trolley with requirements.

AT BEDSIDE:

- Explain to patient what you are going to do. Screen the patient's bed and check patient's identification details.
- Wash hands thoroughly with antiseptic hand-wash and dry with a sterile hand towel.
- Empty dressing pack from its outer pack onto top of the trolley.
- Apply alcohol hand-rub.
- Open out dressing pack and arrange equipment. Empty out all your required items onto sterile field. Sit Hepsal ampoule and Normal

Saline ampoule outside drape on trolley top.

- Apply alcohol hand rub and, with 1 Mediswab, pick up Hepsal, clean the ampoule and place it on sterile field. Repeat procedure with Normal Saline ampoule.
- Draw up the Hepsal and Saline ampoules.
- Apply alcohol hand-rub and sterile gloves.
- Place drape under central line.
- Clean Vygon Bionector with Mediswab and allow to dry for 30 seconds.
- Attach syringe with Normal Saline onto Bionector, release clamp on central line and inject Normal Saline at a slow, steady rate. Once injected put on clamp and release syringe.
- Attach syringe with Hepsal onto Vygon Bionector, release clamp on central line and inject Hepsal at a slow, steady rate. Once injected put on clamp and release syringe.
- Wrap the end of the central line in a sterile swab and tape securely.
- Dispose of equipment safely.
- Remove gloves and apron and discard as clinical waste.
- Wash hands with antiseptic hand-wash solution.

NOTE: Prior to recommencing TPN or crystalloids, using an antiseptic technique, attempt to withdraw back the Hepsal lock. Once withdrawn, flush the line with 10 mL normal saline.

(NPN 7). PROCEDURE FOR OBTAINING BLOOD CULTURE FROM A CENTRAL LINE

This is to be performed by medical staff or nurses trained in this procedure.

REQUIREMENTS

- Antiseptic hand wash solution.
- Trolley.
- Clean plastic apron.
- Dressing pack.
- Mediswabs.
- 20 ml syringe x 1.
- Blood culture bottle x 2.
- Sharps container.
- Disposal bag.
- Sterile gloves x 2.
- Sterile hand towel x 2.
- 10ml syringe x 2 and 3 x green needles 21 FG.
- Hepsal 5 mL ampoule (50 I.U. in 5mL).and normal saline 10 mL ampoule

PROCEDURE

- Wash hands.
- Apply plastic apron.
- Wash trolley thoroughly with general purpose neutral detergent in hot water, rinse and dry and wipe with 70% alcohol-impregnated wipe.
- Set bottom shelf of trolley with requirements.

AT BEDSIDE

- Explain to patient what you are going to do. Screen the bed.
- Wash hands thoroughly with antiseptic hand-wash and dry with a sterile hand towel.
- Empty dressing pack from its outer pack onto top of trolley.
- Apply alcohol hand- rub.
- Open out dressing pack and empty out required materials onto sterile field.
- Apply alcohol hand-rub and apply sterile gloves.
- Put sterile drape under central line.

- Ensure central line is clamped.
- Remove Vygon Bionector.
- Cleanse the central line lumen with Mediswab and allow to dry for 30 seconds.
- Attach 20 mL syringe to central line lumen.
- Release clamp on central line and withdraw 20 mL of blood. Clamp the line.
- Cleanse the central line lumen again with Mediswab and allow to dry for 30 seconds.
- Apply a new Vygon Bionector to central line lumen.
- Attach green needle to syringe and inject 10 mL of blood into aerobic bottle, and 10 mL of blood into anaerobic bottle.
- Now proceed to heparinise central line following the relevant protocol.
- Leave the patient comfortable.
- Dispose of equipment safely.
- Remove gloves and apron and discard as clinical waste.
- Wash hands with antiseptic hand-wash and dry thoroughly.
- Send samples to the Bacteriology Department.

(NPN 8). PROCEDURE FOR REMOVAL OF UNCUFFED CENTRAL LINE

REQUIREMENTS

- Trolley.
- Clean plastic apron.
- Sterile gloves.
- Antiseptic hand-wash solution.
- Alcohol hand rub.
- Sterile hand towel.
- Universal specimen container and wound swab.
- Chlorhexidine 2% solution in 20 mL bottle (discard the remainder after use).
- Large dressing pack.
- Disposal bag.
- Sterile scissors.
- Stitch cutter.
- Sharps box.

PROCEDURE

- Wash hands.
- Apply plastic apron.
- Wash trolley thoroughly with general purpose neutral detergent in hot water, rinse and dry, and wipe with detergent wipe.
- Set bottom shelf of trolley with required materials.

AT BEDSIDE

- Explain to patient what you are going to do. Screen the bed.
- Wash hands thoroughly with antiseptic hand wash and dry with a sterile hand towel.
- Empty dressing pack from its outer pack onto top of trolley.
- Apply alcohol hand-rub.
- Open out dressing pack and empty out requirements onto sterile field.
- Lie the patient flat in bed and elevate the end of the bed. Offer reassurance.
- Apply alcohol hand-rub.
- Remove old dressing from the central line. Take swab from exit site for Culture Organism and Sensitivity (CO&S).

- Apply alcohol hand-rub and apply sterile gloves.
- Put out drape under the central line.
- Cleanse entry site of central line with 2% chlorhexidine antiseptic solution. Work down either side of the catheter and underneath the catheter away from the exit site, down the length of the catheter, using a new swab for each stroke. Dry in the same pattern.
- Remove sutures.
- Prior to removing line, ask patient to hold their breath.
- Remove central line, being careful not to touch anything and, using sterile scissors, cut central line tip into specimen container.
- Apply swab with light pressure over exit site. Patient can now breath normally. Keep light pressure up until bleeding stops.
- Apply dressing over site.
- Reposition the patient and leave patient comfortable.
- Dispose of used equipment safely.
- Remove gloves and apron and discard as clinical waste.
- Send central line tip to the Bacteriology Department for Culture Organism and Sensitivity (CO&S). This should only be done if there is an indication of infection.
- Wash hands with antiseptic hand-wash and dry thoroughly.
- Document procedure in nursing notes.

Note: If the patient has a central line with a Dacron cuff, this should be removed by medical staff, usually under a local anaesthetic, followed by an incision to free the cuff.

(NPN 9). PROCEDURE FOR ADMINISTERING UROKINASE 5,000 IU TO UNBLOCK A HICKMAN LINE

REQUIREMENTS

- Trolley.
- Clean plastic apron.
- Mediswabs.
- 10 mL syringe x 3.
- Antiseptic hand-wash solution.
- Alcohol hand-rub.
- Cap for Hickman line lumen.
- Urokinase 5,000 IU vial.
- Sterile water 3 mL.
- Sodium chloride 10 mL.
- Sharps container.
- Disposal bag.
- Sterile gloves x 2.
- Sterile hand towel.
- Green needle 21 FG, x 3.
- Tape.

PROCEDURE

- Wash hands.
- Wear a plastic apron.
- Wash trolley thoroughly with general purpose neutral detergent in hot water, rinse and dry and wipe with 70% alcohol-impregnated wipe.
- Set bottom shelf of trolley with requirements.
- Check prescription and expiry date on ampoules and vials with a registered nurse or doctor.

AT BEDSIDE

- Explain to patient what you are going to do. Screen the bed.
Check patient's identification details.
- Wash hands thoroughly with antiseptic hand-wash and dry with a sterile hand towel.
- Empty dressing pack from its outer pack onto top of trolley.
- Apply alcohol hand- rub.
- Open out dressing pack and empty out required materials onto

- sterile field.
- Cleanse ampoules and vial with Mediswabs before placing them on sterile field. Draw up sodium chloride 10mL, sterile water 3mL, and reconstitute Urokinase 5,000 IU with the water and shake well.
 - Apply alcohol hand-rub and apply sterile gloves.
 - Put sterile drape under Hickman line; use forceps to lift up line to place on drape.
 - Ensure Hickman line is clamped.
 - Remove Vygon Bionector.
 - Cleanse Hickman line lumen with a Mediswab and allow to dry for 30 seconds.
 - Attach 10 mL syringe and attempt to withdraw back any lock.
 - Attach syringe with 10 mL of sodium chloride to the Hickman line lumen, release clamp and inject sodium chloride at a slow and steady rate. Clamp line and remove syringe.
 - Cleanse Hickman line lumen again with a Mediswab and allow to dry for at least 30 seconds.
 - Attach syringe with 3 mL Urokinase 5,000 IU, unclamp line and inject it at a slow steady rate. Clamp catheter and remove syringe. Attach cap to Hickman line lumen. Tape catheter in upright position on chest wall.

Wash hands with antiseptic hand wash and dry thoroughly. Wait 3 hours. **After 3 hours withdraw Urokinase and flush the line with Hepsal as detailed below.**

REQUIREMENTS

- Trolley.
- Clean plastic apron.
- Mediswabs.
- 10 mL syringe x 2.
- Antiseptic hand wash solution.
- Alcohol hand rub.
- Hepsal 5 mL (50 I.U. in 5mL).
- Sharps container.
- Disposal bag.
- Sterile gloves.
- Sterile hand towel.
- Green needle 21 FG.
- Tape.

- Vygon Bionnector.

PROCEDURE

- Wash hands.
- Wear a plastic apron.
- Wash trolley thoroughly with general purpose neutral detergent in hot water, rinse and dry and wipe with 70% alcohol-impregnated wipe.
- Set bottom shelf of trolley with requirements.
- Check Hepsal and expiry dates on ampoules and vials with a registered nurse or doctor.

AT BEDSIDE

- Explain to patient what you are going to do. Screen the bed. Check patient's identification details.
- Wash hands thoroughly with antiseptic hand-wash and dry with a sterile hand towel.
- Empty dressing pack from its outer pack onto top of trolley.
- Apply alcohol hand-rub.
- Open out dressing pack and empty out required materials onto sterile field.
- Cleanse Hepsal ampoule with Mediswabs before placing on sterile field and then draw up Hepsal.
- Apply alcohol hand-rub, and apply sterile gloves.
- Put sterile drape under Hickman line; forceps can be used to lift up line to place on drape
- Ensure Hickman line is clamped.
- Remove cap from Hickman line lumen.
- Cleanse Hickman line lumen with a Mediswab and allow to dry for 30 seconds.
- Attach syringe to Hickman line lumen, release clamp and withdraw 5 mL of blood including the 3 mL of Urokinase solution. Clamp catheter.
- Cleanse Hickman line lumen again with a Mediswab and allow to dry for 30 seconds.
- Attach syringe with Hepsal 5 mL, release clamp and inject Hepsal at a slow and steady rate; clamp line, remove syringe, cleanse the Hickman line lumen with Mediswab and apply a Vygon Bionnector.
- Tape catheter in an upright position.

SECTION 4

INFECTION CONTROL

4.1 Infection control: general issues

Intravascular devices, e.g. Hickman lines, central venous catheters, are an indispensable part of medical care and are frequently used to administer nutritional support. The insertion and management of any intravascular device has an important effect on the incidence of device-associated complications; infection being one of these complications. There is considerable potential to minimize the risk of infection through the application of basic infection control measures, i.e. hand hygiene, standard precautions, aseptic technique.

The NHS Greater Glasgow and Clyde (NHSGGC) Infection Control Policy Manual, ICPM) is available in every clinical area as a guide for staff. The manual can also be accessed electronically via NHSGGC website.

The ICPM is divided into four sections:

- Administration
- Core Prevention Policies
- Organism, Disease and Symptoms Specific Policies
- Standard Operating Procedures

The Core Prevention Policies contained within the ICPM provide a comprehensive guide to key infection control measures, i.e. hand hygiene and standard precautions. An outline of some of the policies can be found below.

4.2 Hand hygiene policy

A systematic review carried out by those responsible for the NHSGGC Hand Hygiene Policy found that effective hand hygiene results in a significant reduction in the carriage of potential pathogens on the hands and, therefore decreases the incidence of preventable healthcare-associated infection, leading to a reduction in patient morbidity and mortality.

It is the responsibility of each individual healthcare worker to follow the

NHS GGC hand hygiene policy.

This Handbook provides indicators to remind staff where hand hygiene is essential and which type of hand hygiene procedure is appropriate before, during and after a particular procedure, i.e. intravascular device insertion or management. This resource should be used in conjunction with the NHSGGC Hand Hygiene Policy that advises when to perform hand hygiene, how to perform hand hygiene, which hand hygiene procedure to use, basic requirements to achieve effective hand hygiene, as well as providing a visual guide to hand hygiene technique.

4.3 Standard precautions

Standard Precautions are the precautions necessary to reduce the risk of transmission of microorganisms from recognized and unrecognized sources of infection.

All healthcare workers in **all** situations involving the care of patients or contact with the environment must use Standard Precautions.

There are nine elements to standard precautions. Knowledge and implementation of several of the elements, i.e. personal protective equipment, blood and body fluid spillages and occupational exposure prevention, are essential during insertion and maintenance of intravascular devices.

The Infection Control Team is available as a resource for information and support in the implementation of standard precautions. However, it is the responsibility of each individual healthcare worker to comply with the policy.

4.4 Aseptic technique

Infections such as insertion site sepsis or catheter-related blood stream infection could arise as a consequence of what healthcare workers do or do not do during the insertion and maintenance of an intravascular device. Strict guidelines on asepsis must be adhered to during both procedures.

A Standard Operating Procedure (SOP) contained within the ICMP offers specific guidelines on asepsis. Healthcare workers must adhere

to the guidance contained within the SOP. Any issues surrounding compliance should be raised with a member of the Infection Control Team or the Nutrition Team.

ASSISTANCE:

The Infection Control Nurses are available:- Monday to Friday - 8.30 am to 4.30 pm , ext. 53405 / 53407 / 53160, page 4153 or 3301
Infection Control advice out of these hours can be gained by contacting the on-call Bacteriologist via the Hospital Switchboard Operator.

SECTION 5

TUNNELLED CENTRAL VENOUS CATHETER SERVICE (HICKMAN LINE SERVICE)

The tunnelled central venous catheter service is a nurse led service that was set up in October 2002. The service is based at the Gartnavel General Hospital (GGH), but has sessions at the Western Infirmary Glasgow Royal Infirmary and we are hoping to have a session at Stobhill Hospital.

5.1 Procedure

Procedures take place in either the radiology department, theatre or other clean area. We do not use X-ray screening to place the catheters. Jugular puncture is performed using ultrasound guidance, and the usual approach is right internal jugular. All lines are tunnelled.

Patients receive a chest X-ray post procedure to check for tip position. All documentation is sent back to the ward with the patient, including post procedure care and patient information. The service can be contacted for further advice or information.

If a patient requires a left approach for catheter insertion this would be booked onto a list where we had access to x-ray screening.

5.2 Staff and contact details

Lead Nurse Specialist: Linda J. Kelly
CNS: Chris Thomson, Ann Brown Esther Buchanan, Miriam Brady
Office: Flat 6, Shelley Court, Gartnavel General Hospital,
tel. 50079, fax 50165, page 4450 or 3822

All patients should be referred to the Tunnelled Central Line Service using the appropriate referral cards (available from the Service).

Information provided should include:

- date the line is required;
- whether it should be dual or single lumen (single lumen 6.6fr for PN lines);
- clinical history;
- coagulation status if appropriate;

The card must be signed by a member of medical staff. Cards should be faxed or posted to the Hickman Line Service or left at X-ray reception at GGH. Confirmation of appointments will be given.

Patients should fast 4 hours prior to procedure but allowed clear fluids. INR should be checked if patient is anti-coagulated. Warfarin should be stopped for 3 days and heparin 2 hours prior to procedure. INR should be checked on the morning of procedure, and it must be 1.5 or below.

If patient is diabetic, check BM-stick glucose prior to sending patient for procedure, and withhold insulin treatment until after procedure.

If patient requests or requires sedation, a prescription should be written and a Venflon should be in place. Sedation and antibiotics are not routinely given.

SECTION 6

REFERENCES

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SECTION 7

APPENDIX

FORMS AND REFERENCE VALUES

7.1 Oral intake assessment chart



NHS Greater Glasgow
 North Glasgow University Hospitals Division
 Department Of Nutrition & Dietetics
 Western Infirmary ☎ (0141) 211 2413
 Gartnavel General ☎ (0141) 211 3130

Patients Name: _____ Ward: _____
 Dietitian: _____ Contact No: _____ Date Commenced: _____

Oral Intake Assessment Chart

Please record all food and fluids taken and estimate amount of portion taken (i.e all, 3/4, 1/2, 1/4, none).

Ward staff/patient to complete		Dietitian to complete		
Date & Time	Food & Drink offered	Quantity Consumed	Kcal	Protein

7.2 Enteral feeding products

PRODUCT	DESCRIPTION	PRESENTATION	INDICATIONS
JEVITY	Isotonic, whole protein feed nutritionally complete with added fibre (27 g per 2000 mL) and trace elements 1 Kcal/mL.	500 mL, 1000 mL or 1500 mL bottles attach directly to giving set & Patrol Pump.	As a starter feed to maintain gut integrity and for long-term feeding. Helps to maintain a more natural bowel movement.
OSMOLITE	Isotonic, whole protein feed, nutritionally complete. Contains trace elements. 1 Kcal/mL.	500 mL, 1000 mL or 1500 mL bottles as above.	Low-residue feed, indicated as a starter feed when limited fibre is indicated.
ENSURE PLUS	High protein, high calorie feed, whole protein, nutritionally complete 1.5 Kcal/mL.	500 mL or 1000 mL bottles as above.	Higher calorie / protein content in a reduced volume.
PERATIVE	Semi-elemental liquid feed contains peptides, free amino-acids & MCT moderate osmolality and 1.3 Kcal/mL.	500 mL or 1000 mL bottles.	Where easily absorbed formula required: e.g. in malabsorption, pancreatitis, inflammatory bowel disease, short bowel syndrome.
NEPRO	Nutritionally complete feed for patients on dialysis; 2 Kcal/mL, higher osmolarity.	237 mL cans - must be decanted into 500 mL Flexitainer.	High calorie, low volume feed, used in renal failure or other conditions requiring low fluid/ low electrolyte feed; very low potassium content (25 mmol per 1900 Kcal).
PULMOCARE	High calorie, high fat low carbohydrate feed; 1.5 Kcal /mL.	500 mL bottles as above.	Compromised respiratory function - weaning problems; reduces CO ₂ production.

7.3 Starter feed (Jevity). Data related to the 24-hour period

	Fluid (mL)	Energy (Kcal)	Protein (g)	N (g)	CHO (g)
25 mL per hour	500	525	20	3.2	74
50 mL per hour	1000	1050	40	6.4	148
75 mL per hour	1500	1575	60	9.6	222
100 mL per hour	2000	2100	80	12.8	296

	Fat (g)	K ⁺ (mmol)	Na ⁺ (mmol)	Mg ²⁺ (mg)	Zn ²⁺ (mg)
25 mL per hour	17.5	21	21	115.5	6
50 mL per hour	35	42	42	231	12
75 mL per hour	52.5	63	63	346.5	18
100 mL per hour	70	84	84	462	24

7.4 Nutrient content of enteral feeding products (per litre)

Feed	Osmolality (mmol/L)	Energy (kcal)	Protein (g)	Fat (g)	Carbohydrate (g)
JEVITY	250	1050	40 (15%)	35 (30%)	148 (53%)
OSMOLITE	244	1010	40 (16%)	34 (30%)	136 (50%)
ENSURE PLUS	392	1510	63 (17%)	49 (29%)	204 (51%)
PERATIVE	308	1310	67 (20%)	37 (25%)	177 (51%)
NEPRO	446	2000	70 (14%)	96 (43%)	206 (39%)
PULMOCARE	383	1510	63 (17%)	93 (55%)	106 (26%)

7.5.1 Biochemistry reference values relevant to nutritional assessment (see also Biochemistry Service Handbook)

Trace elements

Test		Sample tube	Reference values
Copper	plasma	green (heparin)	11.5 to 23.5 $\mu\text{mol/L}$
Selenium		green (heparin)	Adult 0.8 to 2.0 $\mu\text{mol/L}$
Glutathione peroxidase	serum RBC	green (heparin)	200 to 1000U/L Adult 20 to 70 U/g Hb
Zinc	serum	dark blue (trace metals tube)	12 to 18 $\mu\text{mol/L}$

7.5.2 Biochemistry reference values relevant to nutritional assessment

Vitamin D and parathyroid hormone

Test	Sample tube	Reference values	
Parathyroid hormone (PTH)	purple (EDTA)	adults	1.0 to 6.0 pmol/L
25-Hydroxy vitamin D3 (25 hydroxycholecalciferol)	yellow (gel)	adults winter	15 to 50 nmol/L
		summer	15 to 100 nmol/L
1,25 Dihydroxy vitamin D3 (1,25 dihydroxycholecalciferol)	yellow (gel)	adults	20 to 120 pmol/L

*Haemolysed specimen unsuitable. Separate and freeze specimen immediately. Transport frozen. Full EDTA tube required.

7.5.3 Biochemistry reference values relevant to nutritional assessment

Vitamins

Test	Sample	Sample tube	Reference values
Vitamin A (retinol)	blood	green (heparin)	1.0 to 2.8 $\mu\text{mol/L}$
Vitamin B1 (thiamine)	blood	green (heparin)	275 to 675 ng/g Hb
Vitamin B2 (riboflavin)	blood	green (heparin)	<70% inhibition
Vitamin C*	blood	green (heparin)	10 to 115 $\mu\text{mol/L}$
Vitamin B6 (pyridoxal phosphate)	blood	green (heparin)	18 to 135 nmol/L
Vitamin E	blood	green (heparin)	15 to 40 $\mu\text{mol/L}$
Folate	blood	purple (EDTA)	200 to 800 ng/mL
Vit B12	blood	yellow	210 to 1000 pg/mL

* Send to laboratory immediately

Nutrition Team Contact Information:

THE WESTERN INFIRMARY & GARTNAVEL GENERAL HOSPITAL NUTRITION TEAM www.nhsggc.org.uk/nutritionteam

Dr Sandy Binning Consultant Anaesthetist	Ext. 52280
Mr Graham Conkie Principal Pharmacist/WIG	Ext. 52755 or 52882
Miss Joan Dimmick Nutritional Support Sister	Ext. 51014, page 4059
Mr Graham Docherty Senior Pharmacist/GGH	Ext. 53322 or 52822, page 3897
Prof Marek H Dominiczak - Consultant Biochemist	Ext. 52788
Ms Hannah Jones Senior Dietitian	Ext.53130 or 52312, page 3323
Dr Matthew Priest Consultant Gastroenterologist	Ext. 53283, page 4080
Ms Jackie Stewart Infection Control Nurse	Ext.53405, page 4153

Medical advice and arranging parenteral nutrition

Professor Marek H Dominiczak
Ext. 52788 or radiopage through the Hospital Switchboard

Biochemistry Specialist Registrar
Ext. 52788

Day-to-day problems with enteral or parenteral nutrition

Miss Joan Dimmick, Nutritional Support Sister
Ext. 51014, page 4059

Dietitian

Ms Hannah Jones, Senior Dietitian
Ext. 53130 or 52312, page 3323

To order additional copies of this handbook
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