ADMINISTRATION OF PARENTERAL NUTRITION PROCEDURE (ADULT INPATIENT)

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Parenteral nutrition (PN) is the direct infusion into a vein, of solutions containing the essential nutrients in quantities to meet all the daily needs of the patient.

1. Indications for Parenteral Nutrition

1.1 Nutrition is best supplied via the alimentary tract and parenteral nutrition (PN) should only be used where the intestine in unavailable or unable to absorb nutrients.

1.2 PN is not an emergency procedure and should be started electively with clear aims. PN should be established early in already malnourished or those patients with extreme metabolic stress i.e. 1-3 days into admission. In well nourished patients, with a non functioning GI tract, PN should be considered if recovery is not expected within 5-7 days.

1.3 PN should not be started until the patient has had a full clinical and dietetic nutritional assessment; a plan for feed has been formulated and adequate venous access in place.

1.4 Specific indications include.

- Intestinal obstruction
- Short bowel syndrome
- Inflammatory diseases such as Crohn's disease
- Intolerance of, or inability to provide adequate nutrition by enteral nutrition
- As an aid to resting the bowel.

1.5 Relative contra – indications include:

- Well nourished patients whose GI tract is likely to be useable within 5- 7 days (including post-operative period)
- When dependence on PN is anticipated to be less than 5 days
- Proven untreatable disease

2. Route of administration

The traditional method of access is a central venous catheter. The major hazard associated with the delivery of PN via a central venous catheter is infection.. Therefore catheter insertion should only take place using strict aseptic technique. On general wards this will mean insertion in a theatre environment by appropriately trained and supervised staff. A skin-tunnelled catheter is the catheter of choice for long-term nutrition. The number of lumens will depend on the patient's peripheral venous access and the number of additional therapies required. If veins are considered inadequate then a double or triple lumen catheter should be inserted. If there is no other option than to use a multi-lumen catheter, then one lumen should be used exclusively for the PN. The lumen identified for exclusive PN use should be clearly labelled as such.

Central venous catheter with tip placement in the superior vena cava is required because PN solutions are hyperosmolar and there is a risk of thrombophlebitis associated with feeding into peripheral veins. However, it has been shown that with care and attention,

peripheral veins can be used to provide short-term peripheral PN. This would be a peripherally inserted central catheter (PICC).

The catheter or catheter lumen used for administration of PN should only be used for that exclusive purpose and administering other drugs or infusions down the line must be avoided. If the administration of any additional medications, blood products or CVP readings are required, then these should be carried out using a separate lumen or a separate peripheral device. Pharmacy advice should be sought if administering drugs down a separate lumen to ensure compatibility with the PN solution.

3. Procedure for the administration of Parenteral Nutrition

Equipment required for setting up PN

- patients prescription chart
- prescribed bag of Parenteral Nutrition
- intravenous infusion stand
- clean dressing trolley
- PN intravenous administration giving set unless bag pre spiked with specific filtration and needle free system connector.
- PN solutions should be removed from refrigeration two hours prior to infusion in order to reach approximate room temperature.
- clean dressing trolley
- Sterile dressing pack
- Sterile gloves
- Swabs containing 2% chlorhexidine in 70% isopropyl alcohol (known allergy contact pharmacy)
- volumetric pump
- 10ml Sodium chloride 0.9% for injection
- sterile 10ml syringe (nothing smaller)
- sharps bin

Action	Rationale
Ensure the intravenous access has been approved for use and is documented in the healthcare record before administering PN	To ensure that the devise is safe and in the correct position prior to infusing PN.
A single lumen catheter should be used for the administration of PN. If a multi-lumen catheter is used, PN should to be administered via a lumen kept exclusively for this purpose and strict aseptic technique implemented when handling this lumen. There is greater risk of infection the more times a line is manipulated Blood should not be sampled from this line.	There is greater risk of infection the more times a line is manipulated
Explain and discuss the procedure with the	To ensure that the patient understands the

patient.	procedure and gives their valid consent
Before administering any PN check that it is due and has not been given already.	To protect the patient from harm
Before administering any PN consult the patient's prescription chart and ascertain the following: (a)Drug (b)Dose/rate (c)Date and time of administration (d)Route and method of administration (e)Validity of prescription (f)Signature of prescriber.	To ensure that the patient is given the correct drug in the prescribed dose using the appropriate diluent and by the correct route To protect the patient from harm. To comply with NMC (2008a) Standards for Medicines Management.
Wash hands with bactericidal soap and water or bactericidal alcohol handrub.	To prevent contamination of medication and equipment
Prime the intravenous administration set with PN mixture and hang it on the Infusion stand. Administration sets used for PN should be changed every 24 hours or immediately upon suspected contamination or when the integrity of the product or system has been compromised. PN should never be disconnected and then reconnected unless in an emergency (If it is necessary to disconnect the PN in the middle of an infusion then the whole bag must be discarded and a new one commenced).	To ensure removal of air from set and check that tubing is patent. To prepare for administration. However, if the solution contains only glucose and amino acids, administration sets in continuous use do not need to be replaced more frequently than every 72 hours.
Draw up 10ml solution for injection to be used for maintaining patency, for example 0.9% sodium chloride using an aseptic technique.	To prepare for administration.
Place the syringes in a clinically clean receiver or tray on the bottom shelf of the dressing trolley	To ensure top shelf is used for sterile dressing pack in order to minimize the risk of contamination.
Collect the other equipment and place it on the bottom shelf of the dressing trolley.	To ensure all equipment is available to commence procedure.
Place a sterile dressing pack on top of the trolley.	To minimize risk of contamination.
Check that all necessary equipment is present.	To prevent delays and interruption of the procedure.
Wash hands thoroughly using bactericidal soap and water or bactericidal alcohol handrub before leaving the treatment room.	To minimize the risk of cross-infection
Proceed to the patient. Check patient's identity against prescription chart and prepared drugs.	To minimize the risk of error and ensure the correct drug is given to the correct patient
Open the sterile dressing pack.	To minimize the risk of cross-infection

Open the 2% chlorhexidine swab packet and empty it onto the pack.	To ensure the correct cleaning swab is available
Wash hands with bactericidal soap and water or with a bactericidal alcohol handrub.	To minimize the risk of cross-infection.
Inspect the insertion site of the device.	To detect any signs of inflammation, infiltration, and soon. If present, take appropriate action
Wash and dry hands.	To minimize the risk of contamination
Put on sterile gloves.	To protect against contamination with hazardous substances, for example cytotoxic drugs
Place a sterile towel under the patient's arm.	To create a sterile area on which to work.
Clean the needle-free cap with 2% chlorhexidine swab, and allow drying for 30 seconds.	To minimize the risk of contamination and maintain a closed system
Aspirate 5-10 mls from the line and there is a good backflow of blood on aspiration.	To ensure the patency of the line.
Inject gently 10 ml of 0.9% sodium chloride for injection.	To confirm the patency of the device.
Check that no resistance is met, no pain or discomfort is felt by the patient, no swelling is evident, no leakage occurs around the device	To ensure the device is patent
If concerned about the position of the line please check with medical staff.	To reduce the risk of extravation
Connect the infusion to the device.	To commence treatment.
Insert the tubing into an infusion pump and start pump. PN must always be administered via an infusion device.	To check the infusion is flowing freely.
Check the insertion site and ask the patient if they are comfortable.	To confirm that the vein can accommodate the extra fluid flow and that the patient experiences no pain.
Adjust the flow rate as prescribed.	To ensure that the correct speed of administration is established
Tape the administration set if necessary in a way that places no strain on the device, which could in turn damage the vein.	To reduce the risk of mechanical phlebitis or infiltration
Remove gloves.	To ensure disposal.
The equipment must be cleared away and new equipment only prepared when required at the end of the infusion.	To ensure that the equipment used is sterile prior to use.
Monitor flow rate and device site frequently.	To ensure the flow rate is correct and the patient is comfortable, and to check for signs of infiltration

4. Disconnecting Parenteral Nutrition

Action	Rationale
Stop the infusion when all the fluid has been delivered.	To ensure that all the prescribed mixture has been delivered and prevent air infusing into the patient
Wash hands and put on sterile gloves.	To protect against contamination with hazardous substances.
Disconnect the infusion set and clean the injection site of the cap with 2% chlorhexidine swab and allow 30 seconds to dry	To minimize the risk of contamination
Flush the device with 10 ml of 0.9% sodium chloride. (*The PN must not be stopped or disconnected for any other reason than completion of prescribed volume or an emergency*).	To flush any remaining irritating solution away from the cannula.
Attach a new sterile injection cap if necessary (weekly). If changing the cap wipe the end of the line with 2% Chlorhexadine and allow the cap to dry.	To maintain a closed system
Flushing must follow with 0.9% saline chlorideAdminister flushing solution using the push-pause technique and ending with positive pressure.	To maintain the patency of the device and if needle was used, to enable reseal of the injection site
Remove gloves and wash hands.	To ensure disposal.

5. Clinical Monitoring

During intravenous feeding monitoring is necessary to detect and minimize complications (see table below). Once feeding is established and the patient is bio chemically stable then the frequency of monitoring may be reduced if the clinical condition of the patient permits. Additional patient monitoring such as 24-hour urine collection for urinary urea, nitrogen and serum zinc may be carried out where indicated, e.g. in severe malnutrition.

Monitoring of PN – reference: NICE GUIDELINES: Nutrition Support in Adults 2006

Parameter	**Frequency of monitoring**
SEWS	6hrly
Body weight	Twice weekly
MUST	Weekly
Fluid balance	Daily
Sodium, Potassium, Urea and Creatinine	Baseline Daily until stable 1 or 2 x week thereafter
Blood glucose	Baseline, Daily until stable 3X weekly thereafter
BM monitoring (Capillary Blood Glucose)	6 hourly for 48 hours then twice daily for the duration of PN and at instruction of medical staff*
Magnesium and Phosphate	Baseline Daily if refeeding risk 3 x weekly until stable, weekly thereafter
LFT including INR	Baseline Twice weekly until stable, weekly thereafter
Calcium and albumin	Baseline, weekly thereafter
CRP	Baseline, twice weekly thereafter
Trace elements, e.g. selenium, copper, manganese, zinc	One month after commencing PN 3 – 6 monthly for long term PN

Capillary Blood glucose (BM) should be monitored 6 hourly and venous (formal laboratory) blood glucose once every 24 hours when starting on PN. Twice daily BM monitoring should continue throughout duration of PN but formal laboratory glucose can be tested 3 times weekly once stable. More frequent monitoring may be required if BM's or formal blood glucose measurements are erratic or if insulin treatment is prescribed.

*Where 2 or more blood glucose or BM readings are greater than 10, advice should be sought from the oncall diabetic team (Specialist Registrar or Nurse Specialist) regarding the requirement for treatment with insulin.

Glucose intolerance and mild hyperglycaemia is common when high concentrations of glucose are being infused intravenously.

Treatment with insulin is often required but this should be discussed with the diabetic team first.

BM monitoring frequency should be increased until blood levels stabilise, as directed by medical staff.

Parenteral nutrition should not be terminated until oral or enteral tube feeding is well established. The patient needs to be taking a minimum of 50% of their nutritional requirements via the enteral route. It is important that all members of the multidisciplinary team are involved in the decision to terminate PN.

6. Nursing Management

Action	Rationale
Daily weight before PN and twice weekly (Daily if there is a concern about fluid balance) 2) BMI weekly	1) Weekly measurements are used to assess change in tissue mass and therefore adequacy of energy provision. Takes into account muscle and fat. 2) Support aims/goals related to achieving and ideal body weight.
6 hourly temperature, pulse, respirations & Blood pressure.	Observe for evidence of infection/ general wellbeing
Accurate fluid balance chart	To maintain accurate fluid balance-prevent under/over hydration.
Capillary blood glucose monitoring 6 hourly for 48 hours – then twice daily	To detect hyperglycaemia and/or hypoglycaemia. Patient may require sliding scale Insulin if Blood sugar >10mmols
Daily assessment of vascular line	To detect exit site infection/ leakage
Dressing changes 48 hours after insertion, thereafter weekly or more frequent if loose, soiled or wet.	To maintain line integrity and reduce risk of CRBSI.
Twice weekly urinary sodium.	For nitrogen balance and electrolytes

7. References

Royal Cornwall Hospital **Clinical Guideline for Adult Total Parenteral Nutrition in the Hospital Setting** Available from: http://www.rcht.nhs.uk/DocumentsLibrary/RoyalCornwallHospitalsTrust/Clinical/Gastroenterology/ProcedureForCommencingPeripheralParenteralNutritionpdf.pdf Last Accessed 18th February 2015

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