Government of Western Australia
North Metropolitan Health Service
Women and Newborn Health Service

OBSTETRICS AND GYNAECOLOGY
CLINICAL PRACTICE GUIDELINE

Peripheral parenteral nutrition (PPN)

[NEW 2023]

Scope (Staff):	WNHS Obstetrics and Gynaecology Directorate staff
Scope (Area):	Obstetrics and Gynaecology Directorate clinical areas at KEMH

This document should be read in conjunction with this Disclaimer

Contents

Caution: PPN is administered via peripheral line.
For central line administration, refer to TPN guideline

Introduction

This document is to guide practice relating to **Peripheral** Parenteral Nutrition (PPN). PPN is similar to standard Total Parenteral Nutrition (TPN), however contains a lower osmolality and concentration of nutrients allowing for administration via a peripheral vein.

PPN should be used to provide short term nutritional support (ideally 5 – 7 days) for appropriate patients, who have adequate peripheral venous access, and where central access is unavailable or unsuitable.

Risk statement

Non-compliance with this guideline will:

Breach legislative requirements	☐	Impact on Patient Quality of Care	☒
Breach National/State/Hospital Policy	☐	Impact on Patient Safety	☒
Breach professional standards	☒	Misconduct	☐
Breach WNHS Mission and Values	☐	Other:	☐

Definitions

Extravasation	The unintentional instillation or leakage of a medication or substance out of the blood vessel and into the surrounding tissue
Phlebitis	The presence of inflammation within a vein and is clinically associated with pain, tenderness, induration and erythema along the course of the superficial vein

Management of PPN

Indications for PPN

- Gastrointestinal tract is not functional or accessible.[1]
- Supplemental nutrition via a parenteral route is required for a short duration (ideally less than 5-7 days).[2]
- When central access for TPN is not available or unsuitable.
- Awaiting access to enteral feeding or if enteral access is continuously lost.
- Malnourished patients where PPN can be used as a ‘bridging’ step to longer term forms of nutrition support (e.g. enteral nutrition (EN) or TPN) or as a supplementary nutrition source if the patient is not tolerating full EN.[2]

Contraindications for PPN

- Patient is able to meet their nutritional requirements via oral or enteral intake
- End of life / palliative care
- Patient is well-nourished and likely to commence oral or enteral intake in less

than 5 days[1]

- Fluid restriction[3]
- Lymphoedema[2]
- Difficult intravenous vascular access or predicted poor vascular access[2]
- Known hypersensitivity to egg, soya proteins, corn (maize) and corn products, peanut protein, components of the container, or to any other ingredient in the feeding solution.
- Severe hyperglycaemia
- Severe hyperlipidaemia
- General contraindications for administering an intravenous infusion
- Renal failure (PPN contains set quantities of electrolytes that may have inadequate clearance)
- Congenital abnormalities of amino acid metabolism
- Severe blood coagulation disorders

Formulation of PPN

PeriOlimel® N4-600E is the **only** PPN formulation available at KEMH/WHNS for peripheral administration. PeriOlimel® N4-600E is available as a 2000 mL volume, three chamber bag designed to be delivered over 24 hours. Due to its osmolality (760 mOsmol/L), the solution can be administered via a peripheral vein.

Electrolytes:

- PeriOlimel® N4-600E contains a pre-set amount of electrolytes.
- Additional electrolytes cannot be added to the bag.
- If additional supplementation is required, supplement via a separate peripheral cannula. The responsibility for replacement of any electrolytes is with the treating team.

Vitamins and minerals:

- PeriOlimel® N4-600E does not contain any vitamins or trace elements.
- If daily vitamins and trace elements are required as per the discretion of the dietitian and/or treating team, these can be charted and administered separately (externally to the PPN bag) via a separate peripheral cannula.

Prescribing and ordering PPN

- PPN must be prescribed only by the Gynae Oncology Team in conjunction with Dietetics and Pharmacy. If the Dietitian is unavailable, PPN may still be prescribed by the Gynae Oncology team if appropriate.
- PPN order form to be completed and signed by the treating team Medical Officer.

- Dietitian to complete the 'Nutritional Requirements' section of the PPN Order Form (MR742) and document the recommended starting rate and target rate of PPN.
    - Patients not at risk of refeeding syndrome can be commenced at the intended final infusion rate, which would normally be 80 mL/hr.[2]
    - The risk of refeeding is much less in those receiving PPN compared with TPN, due to the lower glucose content.
    - For patients at risk of refeeding syndrome, refer to the SCGOPHCG Refeeding Syndrome Guideline and commence PPN slowly (a suggestion is commencing at 50% of the intended final infusion rate).
- Treating team or ward pharmacist or dietitian to chute order form to Pharmacy (as specified on PPN Order Form (MR742) by 1500 hours for same day delivery.
- Pharmacy will stock PeriOlimel® N4-600E.
- PeriOlimel® N4-600E PPN bag will be delivered to the ward labelled with the patient's name and the directions: "For peripheral parenteral nutrition use only."
- Store PPN bag at room temperature on ward.

Peripheral access

- PPN must only be administered via a peripheral line.
- PPN must be delivered via a dedicated 20-22G Peripheral Vascular Catheter (PVC) into the largest peripheral vein available in the forearm to minimise phlebitis and allow for adequate blood flow around the device (avoid the cubital fossa).[2-5]
- PPN is never to be delivered via PVC in the hand or lower limb.
- All PVC's must have a j-loop attached.
- PPN runs continuously over a 24-hour period.
- PPN commencement and change time is 1800 hours, however in extraordinary circumstances PPN could be initiated in the morning but would still need to be changed at 1800 the same day.
- No intravenous (IV) medications should be administered concurrently through the dedicated PPN cannula whilst PPN is running.
- Aseptic technique should be maintained at all times during insertion and maintenance of the PVC.
- Documentation of the PVC insertion details are to be completed on the Peripheral Intravenous Cannula Observation Record (MR820) and PVC location and size is to be confirmed by Medical Officer on PPN Order Form (MR742)
- All PVCs are to be re-sited every 72 hours, or earlier, if clinically indicated. Refer to Department of Health WA Insertion and Management of PIVC in Healthcare Facilities guideline (external website).

Administration

- Observe the five moments for hand hygiene. Always follow aseptic technique and use the risk assessment outlined in the WNHS Infection Prevention and Management Aseptic Technique Policy. This must include use of appropriate Personal Protective Equipment (PPE) to prevent contamination and mucosal or conjunctival splash injuries.
- PPN is to be administered through an infusion pump at the rate prescribed on PPN Order Form (MR742).
- Prior to commencing or changing PPN infusions the patient identification must be checked by three indicators (e.g. name, DOB, address or UMRN) WNHS Pharmaceutical and Medicines Management Policy and Procedure, Medication Administration
- PPN must be checked at the bedside by two nurses, one of whom is a Registered Nurse/Midwife
- Both nurses must sign the PPN Order Form (MR742).
- Protect from light with protective covering provided by Pharmacy.
- Check labelled PPN bag against PPN prescription.
- Use only if the bag is not damaged and inspect for uniformity of colour and absence of precipitates.
- The route of administration must be identified on all administration lines and include the date and time that the line is commenced.
- Ensure the triphasic PPN bag is mixed well / activated prior to attaching the PPN bag to the dedicated peripheral cannula. This will be done in pharmacy prior to delivering to the ward.

To mix / activate PPN bag:

1. Ensure product is at room temperature.
2. Manually roll the bag onto itself, starting at the top of the bag (hanger end).The non-permanent seals will disappear from the side near the inlets.
3. Continue to roll until the seals are open along approximately half of theirlength.
4. Mix by inverting the bag at least 3 times.
5. After reconstitution, the mixture is a homogenous emulsion with a milky appearance.

Figure 1. Activation of PPN Bag (Baxter Healthcare Ltd)

Requirements

- Current valid PPN prescription
- PPN solution, giving set and 1.2 micron filter
- 10 mL sodium chloride 0.9% Posiflush SP TM Syringe Non-sterile gloves
- Chlorhexidine 2% in alcohol 70% solution or chlorhexidine 2% in 70% alcohol large wipe

Procedure

1. Perform hand hygiene.
2. Clean trolley with combined detergent disinfectant wipe or detergent and water. Allow to dry.
3. Gather equipment for procedure.
4. Perform hand hygiene.
5. Check the TPN solution has been mixed/activated. Please note that the triple chamber Baxter bag (2L N4-600E) that does contain additions (vitamins and trace elements) must be mixed/activated according to manufacturer instructions prior. See previous page- How to mix / activate PPN bag.
6. Attach filter to end of giving set, connect to PPN bag and prime.
7. Don non-sterile gloves. Protect key parts using a non- touch technique. Scrub the end of the needleless access port with a large chlorhexidine 2% and 70% alcohol wipe for 30 seconds using different areas of the wipe. Allow to air dry for 30 seconds.
8. Ensure the patient has a peripheral cannula dedicated for PPN use **ONLY**
9. Flush the PVC with normal saline, using a pulsatile motion (push-pause).
10. Connect giving set.
11. Commence infusion at prescribed rate.
12. Dispose of waste appropriately. Remove gloves.
13. Perform hand hygiene.
14. Clean trolley with combined detergent disinfectant wipe or detergent and water.
15. Perform hand hygiene

Monitoring and management of PVC, and phlebitis and extravasation

- Observe PVC insertion site for signs of phlebitis
    - Prior to use and each nursing shift
    - PIVAS should be performed 15 minutes after commencement of PPN infusion and 4 hourly thereafter
- Document inspection of the insertion site on the PVC insertion record (MR820), by

following the Peripheral Intravenous Assessment Score (PIVAS).

- Monitor for phlebitis-
  - if PIVAS score ≥1, increase PIVAS frequency to 2hourly, monitor signs of progression and treat
  - If PIVAS score ≥2, inform Medical Officer, ensure Datix CIMS entered and treat as per PIVC guideline (link below). Medical Officer should assess that PPN has not extravasated into surrounding tissues.

See the Department of Health WA Insertion and Management of Peripheral Intravenous Cannulae in Western Australian Healthcare Guideline (external website, PDF, 732KB).

If extravasation is suspected:

- Perform hand hygiene and apply PPE.
- Stop infusion immediately.
- Attempt to aspirate any infusion fluid from the PIVC, using a sterile 10 mL syringe.
- Remove PVC.
- Dispose of equipment appropriately, remove PPE and perform hand hygiene.
- Notify Medical Officer for review/assessment of PVC site.
- Document incident in the patient's medical notes and report using the Clinical Incident Management System (CIMS).

Monitoring of PPN

- Monitor and record the patient's core physiological observations a minimum of 4 hourly for the duration of the PPN infusion.
- Measure patient's weight prior to PPN commencement and then as directed by the dietitian or treating team.
- Record fluid intake and output on Fluid Balance Chart MR729 and Fluid Balance Summary MR730
- Record baseline blood glucose level (BGL) prior to commencement of PPN then monitor 6 hourly for 24 hours, then if stable (normoglycaemia 5-10 mmol), as per treating team. More frequent monitoring may be required depending on the patient's clinical status.
- Monitor biochemistry daily. The treating team is responsible for ordering and monitoring the following biochemistry[3]:
  - Urea and electrolytes
  - Full blood count
  - Liver function tests (LFTs)
  - Magnesium, phosphate, calcium
- Additional bloods can be ordered as clinically appropriate.

Cessation of PPN

- PPN is designed to be administered over 24 hours.
- The dietitian and/or treating team will make the decision regarding the continuation or cessation of PPN prior to the next scheduled bag change.
- PPN rate is reduced according to the patient's clinical situation (usually by halving the rate for 2 hours before discontinuing or as per Medical officers' orders)
- Please note abrupt cessation of PPN when the patient is not receiving any other form of nutrition may lead to hypoglycaemia on rare occasions.
- If the PPN is unexpectedly discontinued or access is lost, and the patient is not receiving any oral or EN:
  - Contact treating team
  - Check BGL one-hour post cessation and then as per treating team.

Compliance, monitoring and evaluation

The Gynae Oncology team will be responsible for monitoring compliance with this document via routine clinical incident review processes.

The Dietetics department will maintain a record of patients commenced on PPN and collect information on appropriateness, complications and information surrounding its use. This register will be regularly tabled at the PPN Working Group with escalation to Comprehensive Care Committee as required.

References

1. Society of Critical Care Medicine (SCCM) & American Society for Parenteral and Enteral Nutrition (ASPEN). Guidelines for the provision and assessment of nutrition support therapy in the adult critically ill patients. **Journal of Parenteral and Enteral Nutrition**. 2016;33(3):277-316.
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4. Pertkiewicz M, SJ. D. Basics in clinical nutrition: Parenteral nutrition, ways of delivery parenteral nutrition and peripheral nutrition (PPN). **European e-Journal of Clinical Nutrition and Metabolism**. 2009;4(3):e125-7.
5. Alexandrou E, Ray-Barruel G, PJ C, et al. Use of short peripheral intravenous catheters: Characteristics, management, and outcomes worldwide. **Journal of Hospital Medicine**. 2018;13(5).

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SCGOPHCG Peripheral Parenteral Nutrition (SCGH) has been used as a base for this guideline. Additional acknowledgments:

- Baxter Healthcare Ltd. Olimel-PeriOlimel-Activation-Steps-Poster. 2021.
- Department of Health WA, East Metropolitan Health Service. Parenteral Nutrition: Peripheral (PPN) Management. Clinical Practice Standard. Royal Perth Bentley Group. 2023.
- Ramsay Health Care. Medications – Adult Peripheral Parenteral Nutrition Guideline. Joondalup Health Campus. 2019.

Related WNHS policies, guidelines and procedures

WNHS Clinical Guidelines:

- Infection Prevention and Control Manual - Aseptic Technique Policy
- Obstetrics and Gynaecology: Total Parenteral Nutrition (TPN)

WNHS Pharmaceutical and Medicines Management Policy and Procedure, Medication Administration

Useful resources and related forms

Australian Commission on Safety and Quality in Health Care. National standard for user-applied labelling of injectable medicines, fluids and lines. Sydney: ACSQHC, 2015.

SCGOPHCG guidelines

- Aseptic Technique Guideline
- Oral and Enteral Refeeding Syndrome Guideline
- Peripheral Intravenous Catheters (PIVC): Insertion, Maintenance and Removal
- Peripheral Parenteral Nutrition

WNHS

- Infection Prevention and Management policy: Aseptic Technique
- Place card: Peripheral Intravenous Cannula Insertion and Management (link to resources)

Forms:

- MR729(KEMH) / MR144.1(OPH) Fluid Balance Chart
- MR730 Fluid Balance Summary Chart
- MR742 Peripheral Parenteral Nutrition (PPN) Order Form
- MR820(KEMH) / MR120.2(OPH) Peripheral Intravenous Cannula Observation Record

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Version history

Version number	Date	Summary
1	June 2023	First version

This document can be made available in alternative formats on request for a person with a disability.

Appendix 1: PPN formula

Nutrients	2000mL PeriOlimel® N4-600E
Nitrogen (g)	8
Amino acids (g)	50.6 (contains 17 amino acids, including 8 essential amino acids)
Glucose (g)	150
Lipid (g)	60
Lipid source	ClinOleic (80:20 Olive: Soy) (= 15% SFA, 65% MUFA, 20% PUFA)
Total Energy (kcal)	1400
Non nitrogen energy (kcal)	1200
Sodium (mmol)	42
Potassium (mmol)	32
Magnesium (mmol)	4.4
Calcium (mmol)	4.0
Chloride (mmol)	49
Phosphate (incl lipid) (mmol)	17
Acetate (mmol)	55
pH	6.4
Osmolarity (mOsm/L)	760