وزارة الصحة
Ministry of Health

CLINICAL PRACTICE GUIDELINES

Adult Multi-Chamber Bag Parenteral Nutrition

1. STATEMENT OF PURPOSE

1.1 To provide essential information for healthcare professional involved in the provision and administration of Multi-Chamber Bag Parenteral Nutrition (MCB-PN) in adult.

1.2 To enhance patient safety and clinical outcomes by improving the management of adult patients requiring parenteral nutrition (PN) support.

2. RELATED DOCUMENTS

2.1 **1431-201 CPP** High Alert Medication

2.2 **1431-290 CPP** Parental Nutrition

3. RELATED ACCREDITATION STANDARDS

3.1 **CBAHI 3rd edition:** MM.5, MM.27, & MM.32.6

3.2 **JCI standards 7th edition: MMU.5**

4. ABBREVIATIONS AND DEFINITIONS

4.1 PN: Parenteral Nutrition is the provision of nutrients via the intravenous route.

4.2 MCB-PN: Multi-chamber bag parenteral nutrition

4.3 EN: Enteral nutrition

4.4 GI: Gastrointestinal

4.5 PPN: Peripheral Parenteral Nutrition

4.6 CPN: Central Parenteral Nutrition

4.7 CVADs: Central venous catheter devices

4.8 AA: Amino acid

4.9 GIR: Glucose infusion rate

4.10 ILE: Intravenous lipid emulsion

4.11 EFAs: Essential fatty acids

4.12 ASPEN: American Society for Parenteral and Enteral Nutrition

4.13 TNAs: Total nutrition admixtures

4.14 CRBSI: Catheter-related bloodstream infection

4.15 SBS: Short bowel syndrome

4.16 EFAD: Essential fatty acid deficiency

5. GUIDELINES/ PROTOCOL/PATHWAY

5.1 Introduction

5.1.1 Commercially available multi-chamber bag parenteral nutrition (MCB-PN) products have recently seen an increase in use due to reduced staff time required for its preparation and, in part, due to recent PN product shortages. **ASPEN defines MCB-PN** as standardized, commercially available parenteral nutrition (PN) formulations from a manufacturer. These products require fewer compounding steps before administration. The term "premixed" should be avoided as bag activation and additives are required.

5.1.2 MCB-PN Products come as 2-chamber or 3-chamber products

5.1.3 Advantages of using MCB-PN

- Reduced risk of prescribing and compounding errors
- Reduced infection rates
- Cost advantage including reduced pharmacy time
- Comparable nutrition efficacy
- More efficient storage; no refrigeration required.
- One infusion pump required during infusion
- May offer radical solution during nutrients shortage.

5.1.4 Disadvantages are:

- Limited formulations thus not able to prescribe for all patients.
- Those with significant fluid or electrolyte imbalances, high gastrointestinal tract output, or require large amounts of amino acids or electrolytes may not be candidates.
- May require two systems of ordering PN, one for compounded and one for MCB-PN.
- Transitions of care may be confusing from a hospital MCB-PN to a home compounded PN.
- Not complete PN (still need activation and additives such as micronutrients).

5.2 Indications:

5.2.1 **Impaired absorption or loss of nutrients via the Gl tract because of one or more of the following:**

- Massive small bowel resection.
- High output Gl fistulae: Greater than 500 ml/day.
- High volume fistula output with EN.

- Neutropenic colitis: Typhlitis or opportunistic infection in the immune-compromised patients.
- Small bowel mucosal disease. Radiation or chemotherapy-related enteritis, autoimmune enteropathy, intractable diarrhea of infancy.
- Intestinal atresia.
- Meconium ileus.
- Mesenteric thrombosis.

5.2.2 Mechanical bowel obstruction:

- Intrinsic or extrinsic blockage of intestinal lumen.
- Inflammatory disease.
- Peritoneal carcinomatosis.
- Severe adhesive disease.
- Severe superior mesenteric artery syndrome.

5.2.3 Restricted oral intake or EN necessary for bowel rest:

- Ischemic bowel.
- Severe pancreatitis.
- Chylous fistula.
- Severely malnourished patient with non-functional Gl tract for 7 to 10 days prior to surgery.

5.2.4 Motility disorders:

- Prolonged ileus.
- Pseudo-obstruction.
- Visceral organ myopathy.
- Very long segment Hirschsprung's disease.
- Severe adhesive disease.

5.2.5 Inability to achieve or maintain enteral access or EN:

- Hemodynamic instability.
- Active Gl bleeding.
- Severe neutropenic fever.

5.2.6 **MCB-PN** can be used in many patients who require PN. These products had limited utility in patients requiring higher amounts of protein and calories, but newer formulations have somewhat bridged this gap. MCB-PN had also some limited utility in patients with fluid and electrolyte abnormalities.

5.3 Time frame for initiating PN

5.3.1 Previously well-nourished patients: Initiate PN after 7 days of oral intake or EN less than 50% of estimated requirements.

5.3.2 Nutritionally at-risk patients (i.e., involuntary loss of 10% or more of usual body weight within 6 months; involuntary loss of 5% or more of usual body weight in 1-month, involuntary loss or gain of 10 pounds within 6 months, BMI less than 18.5 kg/m2, inadequate nutrition intake, including inadequate food or nutrition products for greater than 7 days): **Initiate PN after 3 to 5 days of oral intake or EN less than 50% of estimated requirements.**

5.3.3 Moderate or severely malnourished patients: Initiate PN as soon as feasible for those in whom oral intake or EN is not possible or sufficient.

5.3.4 Delay PN in metabolically unstable patients until improvement in clinical condition.

5.4 Constituents of Parenteral Nutrition: PN solutions contain some or all the following constituents

5.4.1 Amino Acids (Protein / Nitrogen)

5.4.1.1 Proteins are the major structural and functional components of all cells in the body and are made up of chains of amino acids.

5.4.1.2 In the amino acid (AA) solutions currently used, each gram of AA contains approximately 4 kcals.

5.4.2 Carbohydrate

5.4.2.1 Carbohydrate is the main source of energy in PN, it is recommended that approximately 60-75% of non-protein energy comes from carbohydrate.

5.4.2.2 Each gram of dextrose contains 3.4 kcal.

5.4.2.3 Glucose provision can be calculated as the glucose infusion rate (GIR), expressed as mg/kg/minute. GIR= (% of Dextrose X ml/kg/day)/144

5.4.3 Intravenous Lipid Emulsion (ILE)

5.4.3.1 ILEs are used in PN as a non-carbohydrate source of energy, to provide a source of essential fatty acids (EFAs).

5.4.3.2 It is recommended that approximately 25-40% of non-protein energy comes from lipids in patients receiving PN as a sole source of nutrition.

5.4.3.3 The energy provided per gram of lipid in PN is approximately 10 kcal.

5.4.4 Electrolytes

5.4.4.1 The main electrolytes included in PN necessary for the maintenance of many cellular functions are: Sodium (Na), Potassium (K), Calcium (Ca), Magnesium (Mg), Phosphate (P).

5.4.4.2 Electrolytes may be given to maintain normal serum concentrations or to correct deficits.

5.4.4.3 Consider other sources of electrolytes such as intravenous fluids and medications when ordering PN.

5.4.4.4 Adequate calcium, phosphate, and magnesium, together with vitamin D essential for bone mineralization.

5.4.4.5 Electrolytes should be prescribed in the form of complete salts rather than individual ions to minimize the risk of dosing errors and ensure accurate preparation and administration

5.4.5 Calcium and Phosphate

5.4.5.1 The precipitation of calcium and phosphorus is a common interaction that is potentially life-threatening.

5.4.5.2 The risk of precipitate formation is greater with:

5.4.5.3 Increased solution temperature and pH.

5.4.5.4 Higher concentrations of calcium and phosphorus.

5.4.5.5 Lower concentrations of amino acids and dextrose.

5.4.5.6 Use of the chloride salt of calcium.

5.4.5.7 Improper mixing sequence when adding calcium and phosphorus salts.

5.4.5.8 The presence of other additives (including ILES).

5.4.5.9 Steps to minimize the risk of calcium and phosphate precipitation in PN admixtures include:

5.4.5.10 The use of calcium gluconate instead of calcium chloride because it is less reactive.

5.4.5.11 Use organic phosphate salt.

5.4.5.12 Adding phosphate salts early in the mixing sequence, adding calcium last or nearly last, and agitating the mixture throughout the admixture process to achieve homogeneity.

5.4.6 Chloride and Acetate

5.4.6.1 Amount of chloride and acetate based on acid-base balance.

5.4.6.2 Because the addition of bicarbonate to acidic PN admixtures may result in the formation of carbon dioxide gas and insoluble calcium and magnesium carbonates, sodium bicarbonate used in

PN admixtures is not recommended. Use of a bicarbonate precursor salt such as acetate usually is preferred.

5.4.6.3 Acetate is metabolized in the liver to produce bicarbonate on a 1:1 molar ratio.

5.4.6.4 Chloride in PN (as sodium chloride or potassium chloride) can be partly replaced by acetate (as sodium acetate or potassium acetate) to reduce metabolic acidosis and/or hyperchloremia.

5.4.7 Trace Elements

5.4.7.1 Many trace elements are an important part of metalloenzymes and function as cofactors in a variety of regulatory metabolic pathways.

5.4.7.2 Injectable trace elements are available as single trace element solutions and as multiple trace element combinations.

5.4.7.3 Requirements for trace elements also vary based on the patient's clinical condition.

5.4.7.4 Higher doses of supplemental zinc likely are necessary for patients with high-output ostomies or diarrhea because the Gl tract is the predominant excretion route for zinc.

5.4.7.5 Manganese and copper are excreted through the biliary tract, chromium, molybdenum, and selenium are excreted renally.

5.4.7.6 Multi-trace dosage may require alteration in patients with increased gastrointestinal or skin losses or with hepatic or renal dysfunction.

5.4.8 Vitamins

5.4.8.1 Both water-soluble and fat-soluble vitamins are added to PN.

5.4.8.2 Water-soluble vitamins are the B group of vitamins and vitamin C; and fat-soluble vitamins are vitamins A, D, E, and K.

5.4.9 Routes of PN administration

5.4.9.1 Peripheral route

5.4.9.1.1 Peripheral parenteral nutrition (PPN) is an option for mild to moderate stressed patients in whom adequate Gl tract function is expected to return within 10-14 days.

5.4.9.1.2 Potential PPN candidates should not be fluid-restricted or require large nutrient amounts.

5.4.9.1.3 Lower concentration of dextrose (10-12.5% final concentration), and micronutrients must be used for peripheral route administration.

5.4.9.1.4 The primary advantages of PPN include a potentially lower risk of infectious and technical complications associated with CVC access.

5.4.9.1.5 Most PPN formulations are between 750 and < 900 mOsm/L.

5.4.9.2 Central route

5.4.9.2.1 Central Parenteral Nutrition (CPN) is the preferred route for PN delivery and is used predominantly for patients who require PN for a period of more than 7 to 14 days.

5.4.9.2.2 CPN is the preferred route for patients who have large nutrient requirements, poor peripheral venous access, or fluctuating fluid requirements.

5.4.9.2.3 Unlike peripheral veins, central veins have a higher blood flow, which quickly dilutes the hypertonic solution, PN can with higher osmolarities.

5.4.9.2.4 The most common insertion sites include, subclavian, internal jugular, femoral, cephalic and basilic veins.

5.5 Ordering and Prescribing Parenteral Nutrition

5.5.1 In all cases, the following should be included in PN prescription/order:

5.5.1.1 PN volume (ml/day)

5.5.1.2 Infusion hours

5.5.1.3 Central/peripheral access

5.5.1.4 Working weight/dosing weight (kg)

5.5.1.5 Amino acid (g/day)

5.5.1.6 Glucose (mg/kg/min) or (%)

5.5.1.7 Lipid (g/day)

5.5.1.8 Electrolytes as salt (mmol/day)

5.5.1.9 Multi-vitamins

5.5.1.10 Trace elements

5.5.2 PN volume should be determined after subtracting all other patient's fluids from total fluid intake, up to 10% may be added as extra PN volume if needed.

5.5.3 PN prescriptions must be reviewed and verified by a PN pharmacist prior to transmitting to the PN compounding process

5.6 Dosing of Parenteral Nutrition

5.6.1 **Dosing:** The dosage depends on the patient's energy expenditure, clinical status, body weight, as well as additional energy or proteins provided orally/enterally; therefore, the bag size should be chosen accordingly.

5.6.2 Adults Products Appendix 1

5.6.2.1 Dosing refer to the manufacture recommendation

5.6.3 Preparation and other handling of MCB-PN

5.6.3.1 Mixing the solutions and the emulsion

5.6.3.1.1 Identifies the correct product and volume to meet the PN order

5.6.3.1.2 Confirm the integrity of the bag and of the nonpermanent seals. Use only if the bag is not damaged; if the nonpermanent seals are intact; if the amino acid solution and the glucose solution are clear, colorless, or slightly yellow, and practically free of visible particles; and if the lipid emulsion is a homogeneous liquid with a milky appearance.

5.6.3.1.3 Ensure that the product is at room temperature when breaking the nonpermanent seals.

5.6.3.1.4 Manually roll the bag onto itself, starting at the top of the bag (hanger end). The nonpermanent seals will disappear from the side near the inlets. Continue to roll the bag until the seals are open along approximately half of their length.

5.6.3.1.5 Mix by inverting the bag at least 3 times.

5.6.3.1.6 After reconstitution, the mixture is a homogeneous emulsion with a milky appearance.

5.6.4 Product-specific instructions for activating and mixing components in chambers should be followed.

5.6.5 It is preferable to dispense a MCB-PN bag volume that most closely approximates the daily volume required.

5.6.6 Use MCB-PN with electrolytes added by the manufacturer rather than those extemporaneously added as this is preferred when the electrolytes are appropriate for an individual patient.

5.6.7 Additives

5.6.7.1 Any additions (including vitamins) may be made into the reconstituted mixture. When making additions to formulations containing electrolytes, the amount of electrolytes already present in the bag should be considered.

5.6.7.2 When making additions, the final osmolarity of the mixture must be measured before administration via a peripheral vein.

5.6.7.3 MCB-PN supplemented with different electrolytes, additives should follow the manufacture recommendations.

5.6.7.4 To perform an addition:

- Aseptic conditions must be observed.
- Prepare the injection site of the bag.
- Puncture the injection site and inject the additives using an injection needle or a reconstitution device.
- Mix content of the bag and the additives

5.7 Delivery and Storage of Parenteral Nutrition

5.7.1 **Storage of MCB-PN:** Use immediately after introduction of additives. If not used immediately, consult manufacturer's product-specific information on storage conditions.

5.7.2 All PN should be stored in a designated medication refrigerator 2 to 8°C.

5.7.3 The aqueous solution and lipid solution should be removed from the fridge in advance, approximately one hour prior to commencing the infusion. This allows it to come to a suitable temperature for infusion.

5.7.4 PN solutions (solution, and lines) should be protected from light to prevent peroxidation and degradation of light-sensitive vitamins.

5.8 Administration of Parenteral Nutrition by Nurse

5.8.1 Labeling Considerations for MCB-PN

5.8.1.1 PN label must match the PN order for both MCB-PN and compounded PN's.

5.8.1.2 Volume of bag with additives; if volume to be infused is different than total volume of bag, this should be noted on the label.

5.8.1.3 Complete name of MCB-PN product plus names and amounts of any additives should be listed on the label.

5.8.1.4 Any extemporaneously added electrolytes shall be listed as the complete salt form.

5.8.1.5 Amount of extemporaneously added electrolyte on the pharmacy label shall reflect the amount added to the bag. This may or may not be the amount which is actually infused into the patient, depending on whether the entire bag is to be infused.

5.8.1.6 For two-chambered MCB-PN with no ILE added: list concentrations of dextrose and amino acids and name of the product. These will reflect the actual final concentrations in the bag before addition of any additives.

5.8.1.7 For two-chambered MCB-PN with ILE added: list concentrations of dextrose and amino acids and name of the product. These will reflect the actual final concentrations in the bag before addition of any additives. List the amount of ILE added as separate item.

5.8.1.8 For three-chambered MCB-PN: List concentrations of dextrose, amino acid, and ILE will be and name of the product. These will reflect the actual final concentrations in the bag before addition of any additives.

5.8.2 Steps in the Administration Process with MCB-PN

5.8.2.1 Ensure 5 Rights of Medication Administration (Patient, Drug, Dose, Time, Route).

5.8.2.2 Use proper Equipment/Supplies (administration Pump, Administration Set, Proper Filters for solution).

5.8.2.3 Solution should also be Checked for cracking, precipitate, match label to prescriber order).

5.8.2.4 Patient Tolerance should be assessed (glucose control, accurate intake and output, body weight, vital signs).

5.8.2.5 Individual administering PN should assessed for complications related to PN therapy (extravasation, infection, hyperglycemia, altered labs).

5.8.2.6 Monitoring (weight, growth- to whether the patient is meeting goals of therapy).

5.8.2.7 Documentation of the infusion in the Electronic Health Record

5.8.2.8 Use a 0.2-micron filter for aqueous PN solution and a 1.2 micron filter for lipid- containing PN.

5.8.3 Monitoring of Parenteral Nutrition

5.8.3.1 Consistent monitoring of patients who are receiving PN is necessary to ensure that the desired nutritional outcomes are achieved and to prevent the occurrence of adverse effects or complications.

5.8.3.2 Special attention is required when PN is being increased or adjusted especially if the patient is clinically unstable, or if PN is to be provided long term.

5.8.3.3 Serum concentrations of electrolytes, hematologic indices, and biochemical markers for kidney and liver function, and nutrition status should be measured before PN initiation and periodically

thereafter depending on the patient's age, nutrition status, and clinical condition.

5.8.3.4 Fluid balance, including input and output from all sources, must be monitored daily and provision of fluid and electrolytes adjusted as required.

5.8.4 Recommended Monitoring Parameter While Patient on PN

Parameter	Baseline	Initiation	Critically ill patient	Stable patient
Wight	Yes	Daily	Daily	2-3 X per week
Intake and output	Yes	Daily	Daily	Daily unless fluid status is assessed by physical exam
CBC with differential	Yes		Weekly	Weekly
INR, PT, PTT	Yes		Weekly	Weekly
Electrolytes: Na, K, Cl, CO2, Mg, Ca, Phosphorus, BUN, Cr	Yes	Daily X 3	Daily	1-2 X per week
Serum triglyceride	Yes	Day 1	Weekly	Weekly
Serum glucose	Yes	Daily X 3-4	Daily	1-2 X per week
Capillary glucose		As needed	Twice daily	As needed
ALT, AST, ALP, total bilirubin	Yes	Day 1	Weekly	Weekly
Nitrogen balance	As needed		As needed	As needed

5.8.5 Complication of Parenteral Nutrition

5.8.5.1 Infectious Complication

5.8.5.1.1 Infection is one of the most common and potentially fatal complications of Central venous access devices (CVADs).

5.8.5.1.2 Catheter related bloodstream infections (CRBSIS), defined as the presence of clinical manifestations of infection (e.g., fever, chills, hypotension) associated with bacteremia or fungemia resulting from no apparent source other than the catheter, are common source of systemic infection.

5.8.5.1.3 The source of a CVC infection may be skin organisms from the catheter insertion site, contamination of the catheter hub, or hematogenous seeding of the catheter from a distant site.

5.8.5.1.4 When Infection is suspected PN **should be stopped** and central blood cultures obtained, ideally a peripheral blood culture should be obtained at the same time**.**

5.8.5.1.5 Before this diagnosis can be made, there should be evidence of more than one positive blood culture result obtained from the peripheral vein with growth of the same organism from a blood culture obtained from the catheter or catheter segment.

5.8.5.1.6 When a CRBSI is suspected or confirmed, appropriate antimicrobial therapy should be initiated. Retention or removal of the CVC depends on the patient's severity of illness, the suspected or identified pathogen, and the type of catheter involved.

5.8.5.1.7 Filling the catheter with antimicrobials such as vancomycin or antiseptics such as 70% alcohol and allowing the solution to dwell for a period while the catheter is not in use is referred to as a **catheter lock therapy**.

5.8.5.1.8 The duration of antibiotics is guided by the identified organism

5.8.5.2 Refeeding Syndrome

5.8.5.2.1 Refeeding syndrome can be defined as the potentially fatal shifts in fluids and electrolytes that may occur in malnourished patients receiving artificial refeeding (whether enterally or parenterally).

5.8.5.2.2 Refeeding syndrome is characterized by acute electrolyte imbalances, most notable hypophosphatasemia, hypokalemia, hypomagnesaemia, and hypoglycemia.

5.8.5.2.3 **Individuals at greatest risk:**

5.8.5.2.3.1 Severely malnourished patients with considerable weight loss who receive aggressive nutritional supplementation.

5.8.5.2.3.2 Those who are unfed for 7 to 10 days with evidence of stress or nutritional depletion.

5.8.5.2.3.3 Those with chronic diseases causing undernutrition such as cancer, cardiac cachexia, chronic obstructive pulmonary disease, or cirrhosis.

5.8.5.2.3.4 Individuals who were previously morbidly obese and have experienced massive weight loss.

5.8.5.2.4 To reduce risks of refeeding syndrome:

5.8.5.2.4.1 Recommendations for initiating PN in adults at risk for refeeding syndrome include providing 100 to 150 g of dextrose or 10 to 20 kcal/kg for the first 24 hours and advancing calories by 33% every 1to 2 days

5.8.5.2.4.2 Check serum potassium, magnesium, and phosphorus before initiation of nutrition.

5.8.5.2.4.3 Monitor every 12 hours for the first 3 days in high-risk patients. May be more frequent based on clinical picture and replace low electrolyte.

5.8.5.2.4.4 Patients may be at risk of thiamine deficiency, therefore supplementation with thiamine and a multivitamin is essential.

5.8.5.2.4.5 Maintenance requirement of thiamine for PN: 200-300 mg daily orally. (ASPEN's proposed guidelines also recommend 100 mg of thiamine supplementation before the use of dextrose-based solutions or feeding).

5.8.5.3 Metabolic Bone Disease

5.8.5.3.1 PN-related metabolic bone disease has been described in patients on long-term PN. It's characterized by osteomalacia with or without osteoporosis that may present without associated clinical, radiologic, or biochemical abnormalities.

5.8.5.3.2 Regular measurements of urinary calcium, plasma calcium, phosphorus, alkaline phosphatase, parathyroid hormone, and vitamin D concentrations are advised.

5.8.5.3.3 Regular assessment of bone mineralisation should be undertaken in adults on long-term or home PN.

5.8.5.3.4 Treatment options include pharmacologic intervention, calcium and vitamin D supplementation.

5.8.5.4 Hepatobiliary Complications

5.8.5.4.1 Patients requiring long-term PN are at high risk of developing PN- associated liver disease PNALD and in most cases it is moderate and reversible.

5.8.5.4.2 Parenteral nutrition (PN)-associated liver disease (PNALD) refers to liver dysfunction caused by intestinal failure, or inability to digest and absorb nutrients, that occurs in the setting of PN use. There are three primary types of PNALD: steatosis, cholestasis, and gallbladder sludge/ stones. Patients may have one of these disorders or a combination of the three.

5.8.5.4.3 Risk factors include:

5.8.5.4.3.1 Absence of enteral nutrition.

5.8.5.4.3.2 Short bowel syndrome (SBS) which may be associated with disruption of bile acid enterohepatic circulation, and bacterial overgrowth.

5.8.5.4.3.3 Recurrent septic episodes

5.8.5.4.3.4 Excessive carbohydrate intake and/or continuous PN infusion leading to hyperinsulinism and subsequently to steatosis.

5.8.5.4.4 Prevention and treatment of cholestasis:

5.8.5.4.4.1 Introduce enteral nutrition as soon as possible, even if only minimal amount.

5.8.5.4.4.2 Consider decreasing lipid infusions if unexplained and sustained rise of conjugated bilirubin occurs (> 2 mg/dl).

5.8.5.4.4.3 Consider Cycled infusions (PN infusion less than 24 hours, generally 8-12 hours).

6. Education.

6.1 To ensure the safe, effective, and consistent use of Multi-Chamber Bag Parenteral Nutrition (MCB-PN), education and training of involved healthcare professionals is essential includes physicians, pharmacists, and nursing staff.

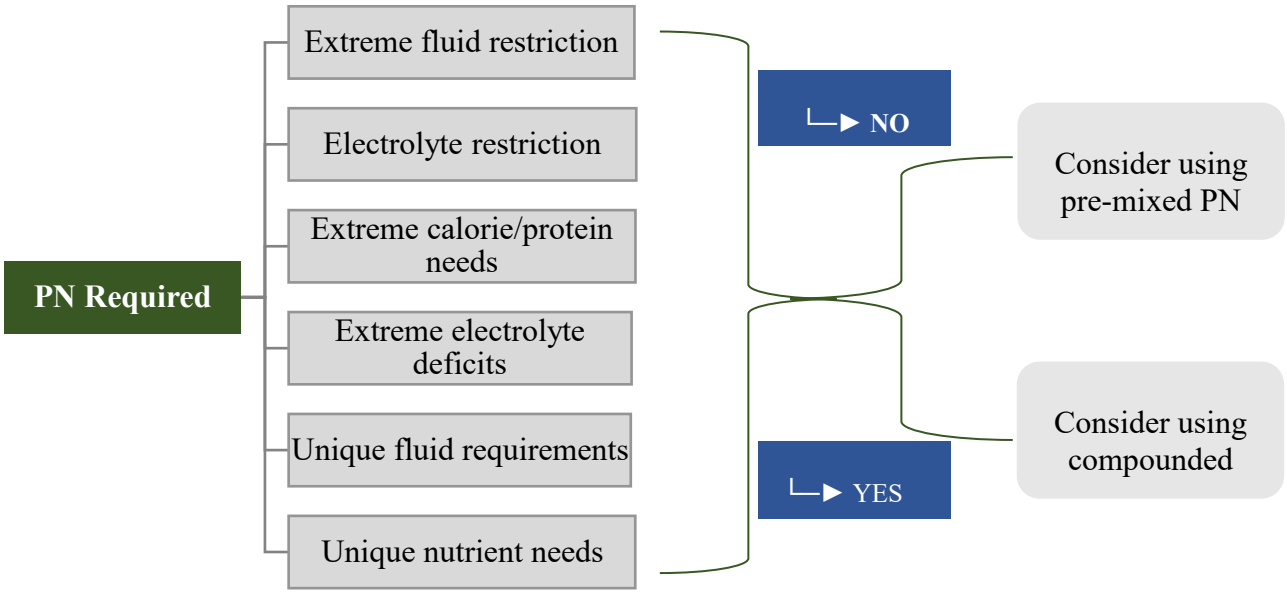
7. Activation bag

7.1 Activation must be performed in accordance with the manufacturer's specifications using aseptic technique, and the final product should be visually inspected for uniformity prior to administration.

8. APPENDICES

8.1 Appendix 1

Decision-Making Flowchart: Is the Patient a Candidate for MCB-PN?



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Ministry of Health

CLINICAL PRACTICE GUIDELINES

TITLE:

APPLIES TO: **Physicians, Pharmacist, And Nursing Staff ICU Department**

Disclaimer:
Author names included in this protocol are provided at the discretion and responsibility of the issuing department.
APPROVED BY:
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Multi-Chamber Bag Parenteral Nutrition

Adult Products

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Name	Volumes	Patient Group	Average Daily Requirements	Maximal Infusion Rate	Line
PERIPHERAL THREE CHAMBER PARENTERAL NUTRITION BAG WITH IV LIPIDS FISH BASED WITH MEDIUM CHAIN TRIGLYCERIDE AND OLIVE OIL SOYBEAN OIL	1448 ML	Adult and Pediatric more than 2 years	Adults 20-40 ml SmofKabiven Peripheral/kg bw/day Children (2-11 years) The dose up to 40 ml/kg bw/day should be regularly adjusted to the requirements of the pediatric patient that varies more than in adult patients.	- The infusion rate should not exceed 3.0 ml/kg/h - The maximum infusion rate for glucose is 0.25 g/kg/h for amino acids 0.1 g/kg/h and for lipids 0.15 g/kg/h. - The recommended infusion period is 14-24 hours.	PERIPHERAL and CENTRAL
CENTRAL THREE CHAMBER PARENTERAL NUTRITION BAG WITH ELECTROLYTES AND IV LIPIDS FISH BASED WITH MEDIUM CHAIN TRIGLYCERIDE AND OLIVE OIL SOYBEAN OIL	1970 ML	Adult and Pediatric more than 2 years	Adults 13-31 ml SmofKabiven/kg bw/day Children (2-11 years) The dose up to 35 ml/kg bw/day should be regularly adjusted to the requirements of the pediatric patient that varies more than in adult patients.		CENTRAL ONLY