

# Hemodialysis: Intradialytic Parenteral Nutrition (IDPN)

## Site Applicability

SPH In Centre Hemodialysis Unit Only

## Practice Level

Specialized: Registered Nurses who have completed the required education and training, and provide nursing care in St. Paul's Hospital Renal Program hemodialysis units perform this procedure

## Need to Know

1. Intradialytic Parenteral Nutrition (IDPN) refers to Parenteral Nutrition given through venous chamber during Hemodialysis (HD).
2. Supplementary nutrition for patients whose voluntary oral intake is inadequate to meet optimal requirements. It is usually required for temporary use only (e.g. between four to six months).
3. The use of the gastrointestinal tract is inadequate to satisfy requirements.
4. The Nephrologist and Renal Dietitian will jointly determine the need for IDPN. Nutritional assessment is based on intake, history, physical parameters, pre-IDPN albumin and current albumin levels, micronutrient levels and protein catabolic rate.
5. An IDPN Powerplan is always entered by the provider in Cerner
6. Administration should be as a constant infusion over the full length of each hemodialysis (HD) treatment of usually four hours. Total volume should be infused in no less than 3 hours.
7. IDPN can be administered in a Community Dialysis Unit (only if the patient meets the criteria for a CDU and IDPN-related logistics can be worked out).
8. The CNL or charge nurse will notify Pharmacy of any changes in patient's dialysis schedule. Pharmacy must be alerted ASAP of possible cancellations or changes. This avoids wasting of solution and pharmacy's time, as the IDPN solutions are prepared the day prior to the scheduled dialysis, and have limited stability after preparation.
9. IDPN formulations can pose concern with glycemic control due to the presence of dextrose. Insulin may be added to the IDPN formulation by pharmacy on a patient specific-basis.
10. Dietitians assess patient nutrition status and monitor IDPN bloodwork/nutrients and provide nutrition recommendations to patient. Liaise with the team.
11. IDPN may reduce the post dialysis Kt/V by 0.2, which is approximately 10 % change in PRU. Bloodwork could be repeated on the next run and IDPN held on that session.

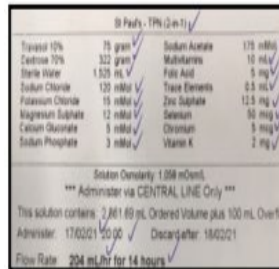

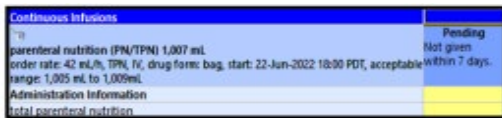
12. Bloodwork is required for baseline (initial treatment), weekly x 2 weeks, and then every 4 to 6 weeks to coincide with regular dialysis blood work and for laboratory monitoring: CBC, urea, creatinine, electrolytes, glucose, albumin, and pre-albumin, total bilirubin, alkaline phosphatase, AST, ALT, Phosphorus, magnesium, calcium and triglycerides. MD/RD to reassess.
13. Blood and blood products may be infused concurrently with IDPN during dialysis. Administer blood into the arterial bloodline/port and the IDPN via the venous port. (See [Appendix A](#)).
14. IV medications (e.g. antibiotics) and IV iron should not be infused in the same port of the extracorporeal circuit. (See [Appendix A](#)).
15. Parenteral nutrition (PN) solutions are composed of protein supplied as amino acids, carbohydrates as dextrose and lipids as a soybean or mixed lipid emulsions. All three macronutrients can be combined together to form a three-in-one admixture either commercially available product or mixed by pharmacy. SPH uses the pharmacy mixed VGH 930 mL 3 in 1 formulation that provides 112.5 Kcal three times per week. (See [Appendix C](#))

## Equipment and Supplies

1. 3- in-1 IDPN solution (prepared & delivered by Pharmacy, kept in unit medication fridge)
2. Alaris CareFusion Guardrail Pump with modules
3. Alaris Infusion Set with 1.2 micron (blue filter) and DEHP-free tubing


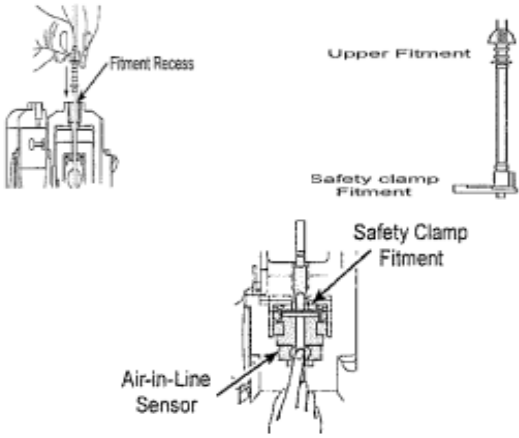
## Procedure

### Steps

STEPS	RATIONALE
<ol style="list-style-type: none"> <li>1. IDPN Powerplan (3-in-1)</li> <li>2. Check and Compare the following components from Cerner powerform, VGH Abacus label and MAR entry <ul style="list-style-type: none"> <li>▪ Nutrients</li> <li>▪ Total Volume</li> <li>▪ Infusion rate</li> <li>▪ Expiry date of solution</li> </ul> </li> </ol>	<p>Ensure correct solution is being administered to the rights patient</p> <div style="display: flex; justify-content: space-around;"> <div style="text-align: center;"> <p><b>1. VGH Abacus label</b></p>  </div> <div style="text-align: center;"> <p><b>2. Powerform</b></p>  </div> </div> <p style="text-align: center;"><b>3. 3-in-1 (1 Mar entry)</b></p> 

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<p>1. Hang IDPN bag from IV pole on Alaris pump.</p>	
<p>2. Prepare administration set:</p> <ul style="list-style-type: none"> <li>• Remove IV infusion set from package</li> <li>• Prime IV tubing and filter with TPN solution</li> <li>• Load into pump with the upper fitment positioned into fitment recess</li> <li>• Press Safety Clamp fitment into recess in pump module</li> <li>• Firmly press tubing into air-in-line sensor</li> </ul>	<p>* Attention to sterile technique is essential to prevent infection</p>  <p><b>3-In-1 IDPN Smarsite Low Sorbing Infusion Set with 1.2 micron filter (blue color)</b></p> 
<p>3. Follow instructions from <a href="#">Appendix A: Principles of Administration</a> if antibiotics, IV iron products or blood products are ordered during HD</p>	<p>Ensures correct medication port is used for IV medication and blood products with IDPN</p>
<p>4. Connect IDPN IV line into venous line of dialysis bloodlines distal to the dialyzer</p>	<p>Ready for direct administration into the dialysis system.</p>
<p>5. Add total volume of IDPN to other calculated fluid to be removed during each HD therapy. (see <a href="#">Appendix A</a>)</p>	<p>Aim is still to have patients come off dialysis at their dry/goal weight.</p>



6. Monitor for possible reaction to IDPN solution: nausea, vomiting, discomfort, hypotension, respiratory distress, hyperglycemia or hypoglycemia, and/or cardiac arrhythmias (rare)	If reaction is suspected, this may require to stop IDPN; then contact MD for direction  For hypoglycemia see <a href="#">Appendix D</a>
7. Monitor blood glucose <ul style="list-style-type: none"><li>• <b>If patient has diabetes</b> - check capillary blood glucose (CBG) for the first six (6) sessions and reduce to weekly afterwards unless outside of safe blood glucose ranges (more than 16.5 mmol/L at mid run or less than 6 mmol/L post dialysis)<ul style="list-style-type: none"><li>○ before starting IDPN or at the beginning of HD run</li><li>○ midway into dialysis</li><li>○ at end of dialysis</li></ul></li><li>• <b>If patient does not have diabetes</b> – check CBG for the first three (3) sessions then discontinue unless outside of safe limits ( more than 16.5 mmol/L or less than 6 mmol/L post dialysis)<ul style="list-style-type: none"><li>○ at the beginning of HD run</li><li>○ midway into dialysis</li><li>○ at end of dialysis</li></ul></li></ul> <b>If CBG is greater than 16.5 mmol, notify prescriber immediately</b>	This identifies any significant glucose intolerance of patient
8. Commence hemodialysis; then open all line clamps and press start button of the Alaris pump to start the infusion.	
9. 20 to 30 minutes prior to discontinuation of IDPN, ask patient to consume 15 to 30 g carbohydrate snack brought (e.g. 2 plain cookies) See <a href="#">Appendix B</a> ; or from the list of Carbohydrates supply in the unit's refrigerator. See <a href="#">Appendix D</a>	This prevents low blood sugar in the first two hours after IDPN is stopped



## Documentation

1. Activate the day of treatment (DoT) regimen order for the IDPN administration
2. Locate the IDPN order in the medication administration record (MAR). Before the IDPN solution is hung, check the information on both labels (the one on the VGH Abacus label and the Cerner medication label).
3. Sign the administration on the MAR after following the steps from Medication Administration Wizard (MAW).
4. Record **completed** on the DoT PowerPlan regimen after administration.

## Patient and Family Education

1. Explain to the patient that they have not met their protein and energy requirements with the regular food in their diet; therefore nutritional support with IDPN supplementation is recommended to satisfy their nutritional needs and to improve their health status.
2. Patient should be encouraged to bring 15 to 30g carbohydrate snack and to consume it 20 to 30 minutes prior to discontinuation of IDPN to prevent reactive hypoglycemia. (See [Appendix B](#)), if no snack is brought by patient, see [Appendix D](#) to provide the necessary carbohydrates from the unit supply.

## Related Documents

1. [B-00-13-10022](#) – TPN (Total Parenteral Nutrition) care of Patient, protocol for
2. [BD-00-13-40096](#) – Hypoglycemia, Management in Adults
3. [B-00-12-10007](#) – Alaris PC CareFusion Edition Infusion Pump with Guardrails
4. [PDTM](#) - Appendices
5. [Appendix A](#) – Principles of IDPN Administration
6. [Appendix B](#) – Snack ideas for hemodialysis Patients on IDPN
7. [Appendix C](#) - IDPN 3 in 1 Formulations in BC.
8. [Appendix D](#) - Initial Management of Hypoglycemia with Signs and Symptoms

## References

1. BC Provincial Renal Agency Standards and Guidelines (2021). Intradialytic parenteral nutrition guidelines at [http://www.bcrenal.ca/resource-gallery/Documents/Intradialytic\\_Parenteral\\_Nutrition%28IDPN%29.pdf](http://www.bcrenal.ca/resource-gallery/Documents/Intradialytic_Parenteral_Nutrition%28IDPN%29.pdf)
2. Carrero, J. & et al (2022). Intradialytic parenteral nutrition for patients on hemodialysis: when, how and to whom? *Clinical Kidney Journal*, Volume 16, Issue 1, January 2023, Pages 5-18. Retrieved March 14, 2023 from <https://doi.org/10.1093/ckj/sfac171>
3. Elsevier Clinical Skills (2022). Central Parenteral Nutrition with Lipid (Fat) Emulsion. Retrieved March 24, 2023 from [www.Elsevier.com](http://www.Elsevier.com)
4. Elsevier Clinical Skills (2022). Central Parenteral Nutrition. Retrieved March 24, 2023 from [www.Elsevier.com](http://www.Elsevier.com)



## **Appendices**

- [Appendix A](#) – Principles of IDPN Administration
- [Appendix B](#) – Snack ideas for Hemodialysis Patients on IDPN
- [Appendix C](#) – IDPN Formulations in B.C.
- [Appendix D](#) – Initial Management of Hypoglycemia with Signs and Symptoms

## **Appendix A: Principles of IDPN Administration**

### **IDPN Infusion:**

1. For a typical 4-hour HD dialysis run, initiate IDPN at the beginning of the run and run at a continuous rate throughout the run.
2. For an extended HD run (e.g., nocturnal dialysis), initiate IDPN at a lower rate and continue for the duration of the run.

### **Compatibility of IDPN with other substances:**

1. Medications, including antibiotics and iron products, should not be infused through the same port as IDPN during dialysis.
  - If more than one venous port exists, infuse medications and IDPN through separate ports.
  - If only one venous port exists, switch IDPN to the arterial chamber and infuse the medication through the venous chamber. IDPN should not be Y'ed in with another medication prior to being administered into the dialysis circuit
2. Blood/blood products may be infused concurrently with IDPN during dialysis. Administer into the arterial medication port while IDPN is infused via the venous port.

### **IDPN Interruptions:**

1. If IDPN needs to be interrupted for a period of time, reinitiate at the rate used prior to the interruption. Do not increase the rate to compensate for lost time.
2. Discard any remaining solution upon discontinuation of dialysis.

### **Withholding IDPN:**

1. Withhold IDPN if the fluid gain is higher than the typical interdialytic weight gain for a given patient. Discuss with nephrologist/NP regarding administration of IDPN.
2. Withhold IDPN if patient receiving single needle dialysis.
3. Withhold IDPN if patient has signs/symptoms of suspected or confirmed sepsis and inform the nephrologist

### **Calculation of UF target:**

1. Add the volume of IDPN to the amount of fluid that is to be removed. e.g., If 1.4 L is required for the total fluid removal target and the IDPN bag is 930 mL, remove  $1.4\text{ L} + 0.93\text{ L} = 2.33\text{ L}$ .

*\*Adapted from BC Renal ([BCRenal.ca](http://www.bcrenal.ca)), Intradialytic Parenteral Nutrition (IDPN), 2021. [http://www.bcrenal.ca/resource-gallery/Documents/Intradialytic\\_Parenteral\\_Nutrition\(IDPN\).pdf](http://www.bcrenal.ca/resource-gallery/Documents/Intradialytic_Parenteral_Nutrition(IDPN).pdf)*



## Appendix B: Snack Ideas for Hemodialysis Patients on IDPN

### Snack Ideas for Hemodialysis Patients on IDPN



► IDPN stands for intradialytic parenteral nutrition. It gives you nutrition while you are having dialysis.

- Some people have low blood sugar shortly after IDPN is stopped. This may happen right away or up to 2 hours after IDPN is stopped.
- **If you have low blood sugars you may feel light headed, shaky, sweaty, have blurred vision or a headache.** Low blood sugars are more common in people who take insulin.
- To prevent low blood sugar, **bring** a snack with you and **eat** it 20 -30 minutes before the end of your treatment or at the end of dialysis.

Your snack should have 15-30 grams of carbohydrate in it.  
Here are some ideas:



1 small apple or  
pear



½ - 1 cup of  
grapes



1 cup of berries



175 g flavoured  
yogurt



6-8 crackers



1 fruit cup



1 small muffin



1 pudding cup



½ sandwich



2 digestive or 3  
arrowroot biscuits



Vector® or Special K® Protein Bar

\*These bars may contain chocolate and nuts but are OK in potassium & phosphorus.



½ to 1 Ensure Plus® or  
Novasource Renal®

- Check the nutrition facts label to be sure you are getting enough carbohydrate.
- Ask your dietitian if you need more information or other snack ideas.

From: BC Renal ([BCRenal.ca](http://www.bcrenal.ca)), Intradialytic Parenteral Nutrition (IDPN), 2021 [http://www.bcrenal.ca/resource-gallery/Documents/Intradialytic\\_Parenteral\\_Nutrition\(IDPN\).pdf](http://www.bcrenal.ca/resource-gallery/Documents/Intradialytic_Parenteral_Nutrition(IDPN).pdf)

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### Appendix C: IDPN 3 in 1 Formulations in B.C.

Product	Volume	Composition			KCal	General Information
		Dextrose	Amino Acid (no lytes)	Lipid		
Pharmacy-mixed						
Pharmacy-mixed - Vancouver General	750 mL	D70W: 150 mL 105 g dextrose	Travasol 10%: 350 mL Protein = 35 g	Intralipid® 20%: 250 mL Soybean 100% Fat = 50 g	997	3in1 Refrigerated 7 day expiry
Pharmacy-mixed - Vancouver General	930 mL	D70W: 180 mL 126 g dextrose	Travasol 10%: 500 mL Protein = 50 g	Intralipid® 20%: 250 mL Soybean 100% Fat = 50 g	1125	3in1 Refrigerated 7 day expiry
Pharmacy-mixed- Fraser Health	750 mL	Dextrose 20% 100 g	Amino Acids 7% Protein = 35g	Intralipid® 20%: 250 mL Soybean 100% Fat = 50 g	480 + 500 (lipid) = 980	2in1 Refrigerated 7 day expiry. Lipids hung separately
Pharmacy-mixed- Fraser Health	1000 mL	Dextrose 16.6% 125 g	Amino Acids 7.5% Protein = 56 g	Intralipid® 20%: 250 mL Soybean 100% Fat = 50 g	648 + 500 (lipid) = 1148	2in1 Refrigerated 7 day expiry. Lipids hung separately.

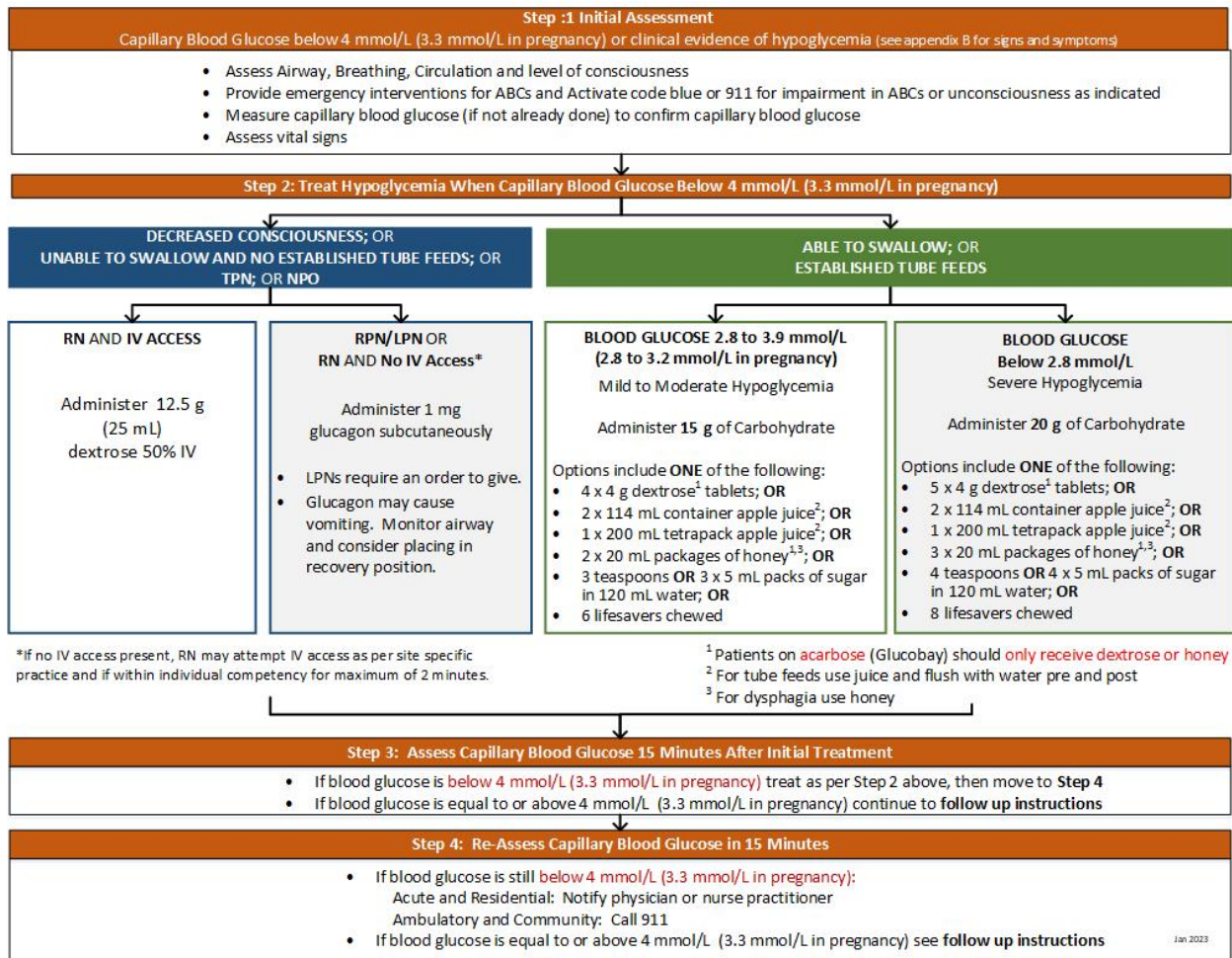
<b>Commercially available (code)</b>						
Fresenius Kabi - SMOFlipid® (831901610)	986 mL	125 g	50 g	SMOFlipid® 20%: 190 mL Fat = 38 g Fish oil: 3% w/v MCT: 6% w/v Olive oil: 5% w/v Soybean oil: 6% w/v	510 + 500 (lipid) = 1010	3in1 2 yr expiry at room temperature
Baxter Olimel® 5.7% (CJDB3XP1E)	1000 mL	110 g	56.9 g	ClinOleic 20%: 200 mL Fat = 40 g Soybean oil:20% Olive oil: 80%	1002	3in1 2 yr expiry at room temperature
Baxter Olimel®7.6% (CJDB3XH1E)	1000 mL	73.3 g	75.9 g	ClinOleic 17.5%: 200 mL Fat = 35 g Soybean oil: 20% Olive oil: 80%	950	3in1  2 yr expiry at room temperature

From: BC Renal ([BCRenal.ca](http://www.bcrenal.ca)), Intradialytic Parenteral Nutrition (IDPN), 2021 [http://www.bcrenal.ca/resource-gallery/Documents/Intradialytic\\_Parenteral\\_Nutrition\(IDPN\).pdf](http://www.bcrenal.ca/resource-gallery/Documents/Intradialytic_Parenteral_Nutrition(IDPN).pdf)



## Appendix D: Initial management of Hypoglycemia Algorithm with Signs and Symptoms

Refer to [Hypoglycemia Management in Adults](#) (Nurse Initiated Activity)



**Developed By:**

Nurse Educator, Renal Program

**Persons and Groups Consulted**

Renal Clinical Practice Group

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