

Update on the Use of Filters for Parenteral Nutrition

Executive Summary

- In-line intravenous filters serve a critical purpose in reducing exposure to particulate matter during parenteral nutrition (PN) therapy.
- Particles greater than 2 microns, which are retained by 1.2 micron filters, appear to pose the most serious risk for adverse consequences.
- Based on best available evidence and guidance from scientific and regulatory agencies, the American Society for Parenteral and Enteral Nutrition (ASPEN) recommends using a 1.2 micron in-line filter for administration of total nutrient admixtures (TNAs), dextrose-amino acids admixtures, and lipid injectable emulsions (ILE).

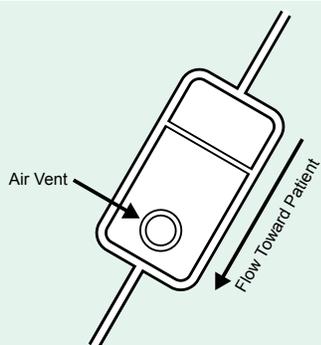


Figure 1. An example of an air-eliminating 1.2 micron in-line intravenous filter.

- For TNAs, place the 1.2 micron filter as close to the catheter hub as possible. For dextrose-amino acid admixtures, place the filter below the Y-site where the dextrose-amino acids admixture and the ILE co-infuse.
- The safety of using a single 1.2 micron filter for PN administration is supported by decades of experience in hospital and homecare settings. This approach alleviates the confusion and errors associated with using 2 filters with different pore sizes. Simplifying filtering practices could potentially increase compliance with recommendations for filter use with PN administration.

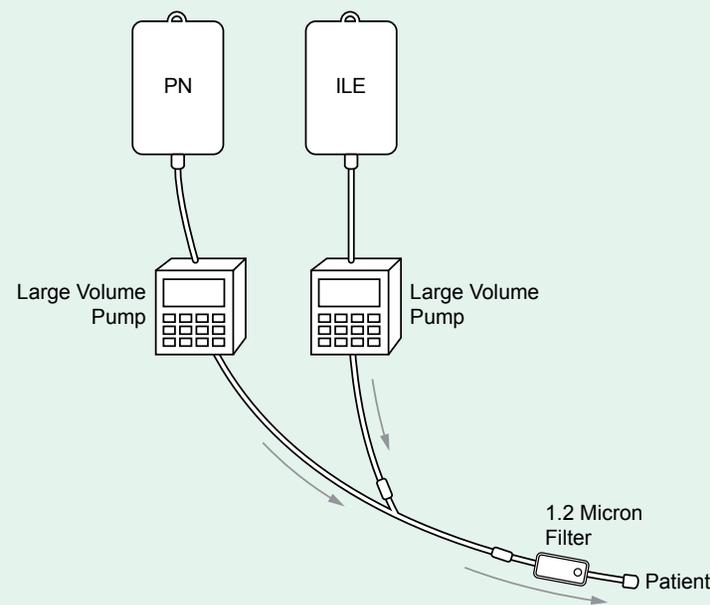


Figure 2. Setup for using a 1.2 micron in-line filter to administer dextrose-amino acids admixture with ILE given as a separate infusion.

PN = Parenteral Nutrition ILE = Lipid Injectable Emulsion.

- Although 1.2 micron filters are not recommended for use as a routine infection control measure, these devices are effective in preventing *Candida albicans*, a pathogen frequently associated with PN administration, from reaching the patient.
- ASPEN recommends that healthcare organizations that do not filter PN admixtures or ILE reevaluate these decisions and consider the small cost of filters in comparison to increased morbidity and mortality that may result from not filtering ILE or PN.

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Best Practices for Using Filters for PN Administration

1. Prior to compounding, a pharmacist must verify the stability and compatibility of the PN formulation.
2. Perform visual inspection of the PN container for evidence of particulate matter or admixture instability, including ILE cracking for TNAs.
3. When administering the dextrose-amino acids component of the PN and the ILE as separate infusions, the first infusion must be completely set up and the pump programmed for that fluid before setting up the second infusion.
4. Avoid co-administration of medications with PN admixtures. When no other option exists, contact a pharmacist to verify compatibility, and use appropriate flushing techniques before and after the medication is administered.
5. When co-administration of medications with PN cannot be avoided, the medication administration tubing should be attached at a Y-site above the 1.2 micron filter. Medications that must not be filtered should not be co-administered with the PN admixture.
6. Select a 1.2 micron filter for all PN regimens including TNAs, dextrose-amino acids admixtures, and ILEs.
7. Observe the manufacturer's directions for priming the filter before connecting to the patient's vascular access device (VAD).
8. Do not invert the filter during priming to allow the vented side of the housing to fill before flowing to the patient side of the device.
9. To avoid occluding the filter during set up, consider priming a small volume of ILE to flow through the administration tubing, allowing the ILE to enter the filter. Close the clamp on the ILE administration set. (Optional)
10. Prime the dextrose-amino acid admixture through the administration tubing completely filling the tubing and filter to the distal end of the tubing. This will dilute the ILE present in the filter to avoid occluding.
11. Connect the filter to the hub of the patient's VAD. When administering the dextrose-amino acids component of the PN and the ILE as separate infusions, attach the filter below the Y-site where the infusions meet.
12. Release all clamps and initiate the infusion.
13. Schedule filter changes to coincide with the initiation of a new PN admixture and administration set.

Appropriate Response to High Pressure Alarms or a Potentially Occluded Filter

1. Verify that appropriate pressure setting has been used on the infusion pump.
2. Rule out mechanical or thrombotic causes of high-pressure infusion pump alarms:
 - a. Trace the administration tubing from the pump to the VAD, checking for kinks.
 - b. Confirm that all administration tubing clamps are open.
 - c. Assess the patency of the VAD according to organizational policies.
 - d. Inspect the dressing on the VAD to ensure that the catheter is not kinked or twisted under the dressing material.
3. Verify that correct size (1.2 micron) filter has been used.
4. If correct size filter is in place, assume that particulate matter is the cause.
5. Remember that precipitates can occur hours after compounding.
 - a. Remove the occluded filter and replace it with a new filter of the same pore size.
 - b. Be alert for repeated episodes of occlusion.
 - c. Never allow an unfiltered PN admixture to continue to infuse.
6. Conduct a pharmaceutical review of the PN formulation to determine the underlying cause of the occlusion and identify actions to prevent further occurrences.

This material was compiled by the ASPEN Parenteral Nutrition Safety Committee. For the full publication see Worthington P, Gura KM, Kraft MD, Nishikawa R, Guenter P, Sacks GS; ASPEN PN Safety Committee. [Update on the Use of Filters for Parenteral Nutrition: An ASPEN Position Paper.](#) *Nutr Clin Pract.* 2021;36(1):29-39.

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