

## Midline Catheters for Vesicant Medications

### Question:

We began using midline catheters a few months ago. Many nurses have differences of opinion about the types of therapy that can be infused through them. Can midline catheters be used to infuse vesicant medications? If not, why is it acceptable to infuse vesicants through a peripheral catheter but not a midline catheter?

### Answer:

First I want to make sure we are using the terms for catheter types to mean the same thing. A midline catheter is a catheter usually 3 inches or more in length inserted through the veins of the antecubital area. In an adult or child, the tip terminates in the upper part of the arm level with the axilla distal to the shoulder. It does not reach the axillary vein but resides within the basilic or cephalic vein of the upper arm. In a baby, the lower extremity could be used with the tip terminating in the upper portion of the leg. Most midline catheters are 6 to 8 inches long (15 to 20 cm). It is possible to insert less than 3 inches (6 cm) and still reach a midline tip location. This could occur in a small child, short adult, and venipuncture sites above the antecubital fossa.

Vein diameter in this tip location is larger than the veins of the hand or forearm. Veins of the hand and forearm range from 2 to 5 mm in diameter while the veins at the midline tip location are usually 6 to 8 mm in diameter. Larger veins indicate that there is a larger volume of blood flow around the catheter tip providing greater hemodilution of the medications being infused. 1

Vesicant infusion through the midline catheter tip location is usually not recommended. The reason for this is the depth of the vein. If an extravasation occurred in the hand or forearm, it would be possible to detect the swelling after a small amount of fluid and escaped. However, it is possible for a large amount of fluid to escape into the subcutaneous tissue around a midline tip location before any swelling would be noticed. If an extravasation did occur from a midline catheter, larger nerves and arteries could be damaged, possibly causing the loss of function in the entire extremity.

Vesicant medications include more than just cancer chemotherapy. Other drugs that could cause tissue damage if they escaped into subcutaneous tissue include calcium, potassium, nitroprusside, phenytoin, promethazine, and vancomycin. 2

The Standards of Practice from the Intravenous Nurses Society states ?Therapies not acceptable for midline catheters include continuous vesicant chemotherapy, parenteral nutrition formulas exceeding 10% dextrose and/or 5% protein, solutions and/or medications with pH less than 5 or greater than 9, and solutions/medications with a serum osmolarity greater than 500 mOsm/L.? 3

As stated continuous vesicant infusion causes the most concern. When a vesicant is given by IV push, the nurse can frequently assess for blood return, the site condition, and patient complaints of pain or burning. The medication could be immediately stopped. However, with a continuous infusion, the nurse would not always be present for a constant assessment of the site, thus creating the potential for a large volume of fluid to escape.

Another factor that influences the clinical decision to use a midline catheter for a vesicant medication includes the dwell time of the catheter. Was the catheter inserted within the past few hours or has it been indwelling for several days? Are there any signs and symptoms of complications?

I might decide to use the catheter for a vesicant medication if

- \* The catheter was recently inserted
- \* The insertion was nontraumatic and easy
- \* A brisk blood return was easily obtained from the catheter and
- \* Constant monitoring of the catheter, the infusion, and the patient during the administration time was possible.

If I could not accomplish all these criteria, I would decide not to use the midline for vesicant medications. This means that a thorough assessment of the patient and their potential therapies must be performed before choosing a midline catheter.

#### References

1. NAVAN. Position paper: Tip location of peripherally inserted central catheters. *Journal of Vascular Access Devices*. 1998;3.
2. Gahart BL, Nazareno AR. *Intravenous Medications*. . 15th ed. St. Louis: Mosby; 1999.
3. INS. *Intravenous Nursing Standards of Practice*. *Journal of Intravenous Nursing*. 1998;21., page S49.

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