Making a Difference with Improved Midline Outcomes

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This poster was presented at the AVA Annual Scientific Meeting in Denver, Colorado.

Disclosures

KP – Nothing to disclose, SG – Nothing to disclose
NM - Research consultant for Access Vascular

Purpose/Background

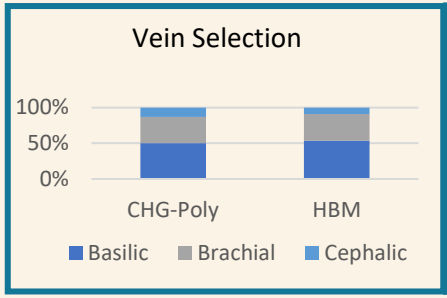
The goal of this quality evaluation was to assess the performance, and outcomes associated with using two types of Midline catheters following current practice of the Health System. Peripheral IV catheters, with a short dwell time of 3-4 days, often necessitate repeated insertions for medium and long-term IV therapies which could prompt the overuse of central venous catheters or PICCs.[1,2] Midline catheters (MCs), ranging from 8 to 20 cm and positioned in major upper arm veins, offer an alternative, especially for patients with difficult peripheral access. Current guidelines support MCs for medium-duration therapies.[2]

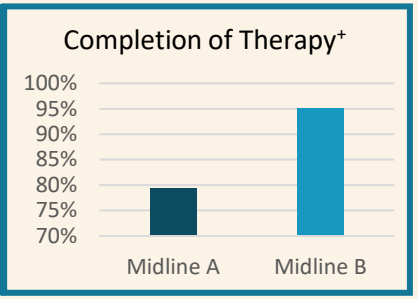
An evaluation was conducted after growing concerns over high failure rates and complications associated with Midline catheters. An interdisciplinary team performed a device evaluation and quality improvement comparing two midline catheters with two different materials: Midline A, a CHG-coated polyurethane catheter, 15cm MST inserted catheter and Midline B, a hydrophilic biomaterial catheter (HBM) 20cm MST inserted catheter. Data was collected until the patient was discharged or Midline was removed. Data collection included insertion vein location, length and size, drug(s) infused, discontinuation reason, insertion and removal or discharge dates, and complications.

Results

This prospective device evaluation was conducted for:

- Midline A (CHG Poly) n=154 sizes 4.5-5.5Fr
- Midline B (HBM) n=51 size 4Fr, 537 catheter days





Catheter	Avg. Dwell Time	Complications
Midline A	8.9 days Range 1-36 Days	25% (39/154)
Midline B	10.5 days Range 1-104+ Days	5% (3/51)

Complications	Midline A n=154	Midline B n=51
Leakage	27	
SVT/Pain/Swelling	9	1
Dislodgement	1	
Occlusion	1	1
Infiltration	1	
Fracture		1

+Completion of therapy tracked until Midline left the hospital or was removed.

Limitations

This evaluation was limited by tracking Midlines until discharge, which precluded a comprehensive assessment of dwell times. Post-discharge tracking could yield a more precise understanding of complete Midline dwell times. Additionally, direct comparison of all outcomes was hindered by measurement parameter changes that included Midline B blood return. Use of Midline A single and dual lumen CHG-polyurethane catheters versus Midline B single lumen HBM may have affected outcomes. To minimize limitations, future studies with equal and larger sample sizes are needed to draw stronger conclusions for comparisons of Midline A and B.

Conclusion

The goal of any VAD placement is to have it last until the end of therapy. Various factors affect the incidence of Midline complications, including catheter material, size, number of lumens, catheter-to-vein ratio, and patient factors.[2,3] The conclusions in this evaluation showed a reduction in Midline failure and complication rates. The data from Midline B made from hydrophilic biomaterial are trending towards a meaningful difference with significantly fewer complications as compared to the CHG polyurethane Midline A, though larger sample sizes are necessary to substantiate comparative conclusions.

References

1. Thomsen SL, Boa R, Vinter-Jensen L, Rasmussen BS. Safety and Efficacy of Midline vs Peripherally Inserted Central Catheters Among Adults Receiving IV Therapy: A Randomized Clinical Trial. *JAMA Netw Open.* 2024;7(2):e2355716. doi:10.1001/jamanetworkopen.2023.55716
2. Nickel B, Gorski L, Kleidon T, et al. Infusion Therapy Standards of Practice, 9th Edition. J Infus Nurs. 2024 Jan-Feb 01;47(1S Suppl 1):S1-S285.
3. Moureau, N. L., E. McKneally, and D. Hofbeck. Integrative review: complications of peripherally inserted central catheters (PICC) and midline catheters with economic analysis of potential impact of hydrophilic catheter material. *Int J Nurs Health Care Res* 2022 5:1347;10:17. https://doi.org/10.29011/2688-9501.101347