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Safety and effectiveness of midline catheters for chemotherapy administration in hematology patients: a retrospective cohort study

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Background and Objective

Totally implantable venous access devices (TIVADs) are the preferred vascular access in oncology and hematology. However, in clinical practice, Central Venous Catheter may be contraindicated or unavailable.

The use of midline catheters (MC) for chemotherapy remains controversial due to concerns about delayed detection of extravasation.

Objective:

To evaluate the safety and effectiveness of midline catheters for administration of selected chemotherapy regimens in hematology patients.

Methods

Retrospective observational study conducted in a tertiary academic center in Warsaw, Poland.

- **Population:** 799 hematology patients (2022–2025)
- **Chemotherapy subgroup:** 359 patients
- **Analysis cohort:** 684 patients with complete data

Monitoring:

- assessment every 12 h
- VAT review every 48 h

Outcomes:

- dwell time
- blood withdrawal
- reasons for catheter removal

Medications Administered via Midline Catheters		
Active Ingredient	pH	(mOsm/L)
Metotreksat	7.0-9.0	250-300
Rytuksymab	6.5	308
Arabinozyd cytozyny	7.0-7.5	290
Cyklofosfamid	3.0-7.5	30-50
Wincristyna	3.5-5.5	200-300
Doksorubicyna	3.0-4.5	250-300

Results

Mean dwell time:

- chemotherapy: **14.17 days**
- non-chemotherapy: **14.68 days** ($p > 0.05$)

Full catheter functionality (withdrawal time = dwell time):

- **81.6% vs 77.9%** ($p > 0.05$)

Thrombosis rate:

- **5.01% vs 5.23%** ($p > 0.05$)

Duration of blood withdrawal:

- **13.06 vs 13.71 days** ($p > 0.05$)

Most common reason for removal:

- **end of therapy (~60%)**

No significant differences in complication rates between groups.

Reason for removal:		Chemotherapy:		Total:
		Yes	No	
Other	N	341	308	649
	%	94.99%	94.77%	94.88%
Thrombosis	N	18	17	35
	%	5.01%	5.23%	
Statistical significance:	χ^2= 0.0165199, p= 0.89773			

% - percentage; p – Statistical significance; * - $p < 0.05$; χ^2 – chi-square test

Conclusions

In a carefully selected population of hematology patients receiving chemotherapy compatible with peripheral administration:

Midline catheters demonstrated a safety profile comparable to their use in non-chemotherapy indications.

MC may represent a **viable alternative vascular access option** when central access is contraindicated or not available, provided that:

- strict protocols are followed
- intensive nursing surveillance is ensured

Further prospective studies are required.

KEY MESSAGE

Chemotherapy via midline catheters did not increase complication risk in a controlled clinical setting.

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Disclosure

The authors declare no conflicts of interest related to this study.

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