Complications Associated with Midline Catheters
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ABSTRACT
Midline catheters are relatively underutilized intravenous access devices, compared to central venous and short-term peripheral catheters. These catheters have unique properties that may be more suitable for specific populations. There is limited research published on the complication rates of midline catheters in hospitalized patients. Without complication rates, it is difficult to evaluate the advantages and disadvantages of midline catheters versus other vascular access devices, which is critical in making informed recommendations for appropriate patient selection for use.

METHODS
After IRB approval was obtained, a convenience sample of adult inpatients receiving a midline catheter, placed by the Vascular Access Team, were included in the study. Midline catheters were allowed to have a maximum dwell time of 30 days. Data was collected for one year.

Insertion data collected:
1. Percent of vein occupied by 5-French catheter as measured by ultrasound
2. Choice of brachial, cephalic or basilic vein
3. Catheter insertion location defined as distal, middle, and proximal third of upper arm
4. Nurse perception of insertion difficulty

Complication data collected:
1. Thrombosis
2. Insertion site leaking of infusate
3. Catheter occlusion

Miscellaneous data collected:
1. Dwell time
2. Number and types of medications infused
3. Demographic information

OBJECTIVE
This descriptive, prospective study aimed to determine the types and rates of complications associated with midline catheter use over a one year period. Secondary aims included a comparison between complications and patient demographics (age, sex), catheter location, insertion complications, dwell time, percent of vessel occupied, number and types of medications administered.
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RESULTS
Ninety-nine adult inpatients were enrolled into the study. A total of 13.1% had complications, with leaking from insertion site as the most common complication (9.1%). Eighty participants had the catheter inserted through basilic vein. The mean percent of the vessel area occupied by the catheter was 19.70 (SD = 8.20). The mean dwell time was 4 days (SD = 2.78) and the mean number of medications infused was 3.50 (SD = 2.56). There was a significant positive relationship between the presence of complication and percent of vessel occupied by catheter, r = 0.42, p < 0.001. There was a significant relationship between the presence of complication and location of the catheter (cephalic, basilic, brachial), X² (2, 99) = 13.96, p = .001, where the number of complications tended to be higher when the catheter was located in the cephalic vein (p = 0.003). There were no significant relationships between presence of complication with age, gender, dwell time, number of medications infused, location of catheter insertion, or difficulty of insertion.

LIMITATIONS
The primary limitation of this study is its small sample size. This was also a descriptive study and did not control for confounding variables. Confirming these results in a larger clinical trial would be desirable.

CONCLUSIONS
Study findings support that midline catheters have an acceptable rate and type of complications. However, appropriate vein selection in terms of size and location is important.

<table>
<thead>
<tr>
<th>Variables</th>
<th>Complication Presence</th>
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<tbody>
<tr>
<td>Age</td>
<td>.15</td>
</tr>
<tr>
<td>Percent of Vessel Occupied</td>
<td>.42*</td>
</tr>
<tr>
<td>Number of Dwell Days</td>
<td>-.06</td>
</tr>
<tr>
<td>Number of Medication Infused</td>
<td>.07</td>
</tr>
</tbody>
</table>

Note: Correlations marked with an asterisk (*) were significant at the 0.01 level (2-tailed).