Using “MAGIC” to Facilitate Appropriate PICC Use: Implementation of a PICC Appropriateness Assessment Tool

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Background

- Peripherally inserted central catheters (PICC) are increasingly used for vascular access in hospitalized patients due to convenience of placement and long term viability.
- PICCs also associated with multiple complications including upper extremity thromboses (2–5%) and central line blood stream infections (CLABSIs) (1–5%), which increase as the size and number of PICC lumens increase.
- Michigan Hospital Medicine and Safety Consortium (HMS) is a state wide quality collaborative focused on improving PICC utilization and decreasing PICC related complications in hospitalized patients.
- Recent study across ten HMS hospitals showed significant variation in PICC insertion indications and patterns of use not explained by patient acuity or hospital size.
- Review of our hospital’s HMS data showed that over 25% PICCs were removed within 5 days of insertion pointing towards potentially inappropriate use.

- The recently released “Michigan Appropriateness Guide for Intravascular Catheters” (MAGIC) provides clinicians a framework to consider appropriateness of PICC use in various clinical scenarios.

Aim

- Our goal was to decrease inappropriate PICC utilization by implementation of a “PICC assessment tool” developed using the MAGIC criteria.

Intervention

Table 1. Appropriate Indications for PICC Use (MAGIC)

<table>
<thead>
<tr>
<th>Indication</th>
<th>Appropriate Indications</th>
<th>Assessment Tool</th>
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<tbody>
<tr>
<td>Delivery of peripherally compatible infusates when the proposed duration of use ≥ 6 days</td>
<td>Delivery of peripherally compatible infusates, e.g., irritants or vesicants, regardless of proposed duration of use</td>
<td>MAGIC</td>
</tr>
<tr>
<td>Delivery of cyclical or episodic chemotherapy that can be administered through a peripheral vein in patients with active cancer, provided that the proposed duration of such treatment is ≥ 3 months</td>
<td>More frequent phlebotomy and/or venous access in a critically ill patient, provided the proposed duration of such use is ≥ 15 days</td>
<td></td>
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<tr>
<td>For infusates or palliative treatment during end-of-life care.</td>
<td>Intermittent infusions or infrequent phlebotomy in patients with poor/difficult peripheral venous access, provided that the proposed duration of such use is ≥ 6 days</td>
<td></td>
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<tr>
<td>Delivery of peripherally compatible infusates for patients residing in skilled nursing facilities or transition from hospital to home, provided that the proposed duration of such use is ≥ 15 days</td>
<td>Delivery of peripherally compatible infusates when the proposed duration of use ≥ 6 days</td>
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</table>

Table 2. PICC and Midline Utilization, Pre and Post Implementation

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<tr>
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<tbody>
<tr>
<td>Overall PICCs/Month</td>
<td>112 (±57)</td>
<td>77 (±8)</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Triple Lumen PICCs/Month</td>
<td>37 (±8)</td>
<td>15 (±6)</td>
<td>&lt;0.0002</td>
</tr>
<tr>
<td>Single Lumen PICCs/Month</td>
<td>20 (±7)</td>
<td>13 (±5)</td>
<td>&lt;0.01</td>
</tr>
<tr>
<td>Midlines/Month</td>
<td>6 (±5)</td>
<td>14 (±4)</td>
<td>&lt;0.008</td>
</tr>
<tr>
<td>Patient-Days/Month</td>
<td>13,238 (±582)</td>
<td>12,750 ± 461</td>
<td>&lt;0.2</td>
</tr>
</tbody>
</table>

Results

- Decision to order PICC line was often made without thoughtful consideration to other vascular access devices. The screening process empowered vascular access providers to insert a device based on appropriate clinical indication.
- Decrease in PICC placements placed for provider/patient convenience.
- PICCs requested for difficult vascular access re-directed towards midlines (usage increased by 50%).
- Decrease in triple lumen PICC lines which were often requested for having “back-up” lumens.
- Review of HMS data shows significant decrease in PICC utilization < 5 days. Impact on U/E VTE and CLABSI rates pending.
- Patients requiring frequent phlebotomies and those with difficult blood draws still pose a challenge as alternative devices have not been well studied and have varying success rates.

Discussion

- Choosing wisely campaigns have identified PICC utilization as an opportunity to improve practice especially to decrease PICCs placed for patient or provider convenience.
- A simple PICC assessment tool to assess PICC appropriateness prior to insertion can reduce inappropriate PICC utilization, decrease # of lumens and can be replicated at other institutions.
- Further studies are needed to assess the impact of decrease in utilization on PICC related complications.

Conclusions

- Decrease in inappropriate PICC utilization by implementation of a “PICC assessment tool” developed using the MAGIC criteria.

References