BACKGROUND/FRAMWORK

Problem Statement: Lack of standardized practices with IV placement in adult patients and inconsistent availability of advanced-skilled vascular access nurses were identified at a 275-bed public district hospital in August 2017.

Background: Patients are frequently subjected to repeated IV attempts, placing them at risk for vascular access device (VAD) complications. Established criteria to identify patients with difficult venous access (DVA) were called upon to assist with DVA patients. The INS standards included: a) Limiting the number of nurses; b) Selection based on skill and an evidence-based vascular access protocol; c) The importance of immediate assistance; and guidelines when to seek assistance from nurses specially trained in vascular access device (VAD) placement were lacking. In addition, inconsistent availability of advanced-skilled vascular access nurses occasionally led to depletion of viable peripheral vein options. Vein depletion resulted in use of a central line (PICC or CVC) which would otherwise not have been medically indicated and further increased costs and risks to the patients. To address the gap in practice, a performance improvement project was piloted on four medical/surgical units using the standard plan-do-check-act method of quality improvement and Donabedian’s theory of quality assurance in healthcare.

PURPOSE STATEMENT

The aim of the project was to determine if, in an adult population with difficult venous access, would the use of an evidence-based vascular access protocol and development of a specialized nurse team affect first-time success rates, cost, catheter dwell times, and complications of peripheral vascular access placement.

IMPLEMENTATION

The Infusion Nurses Society (INS) 2016 Infusion Therapy Standards of Practice were incorporated into a nurse-driven protocol and workflow for the identification of patients with DVA. The standards were combined with an evidence-based practice (EBP) VAD selection algorithm to guide nursing actions and improve clinical outcomes. The INS standards included: a) Limiting the number of nurses and number of attempts to place a peripheral IV (PIV), and; b) utilizing advanced-skilled nurses to place difficult IVs with specialty guidewire-associated PIV catheters (GAPIV) and vein-enhancing equipment. Thirty-three nurses in various units and on differing shifts were trained to insert the GAPIVs with ultrasound and were called upon to assist with DVA patients.

NURSE-DRIVEN PROTOCOL

Identification of Difficult Venous Access Patients

STEPS

1. Patient with history of difficult venous access, inability to place IV, difficult-to-access veins, challenging circumstances or patient condition

2. History of difficult venous access, inability to place IV, difficult-to-access veins, challenging circumstances or patient condition

3. Contact an advanced-skilled vascular access nurse via call or in person

OUTCOMES

- Decreased time from the call for assistance to successful placement of difficult IVs when advanced-skilled nurses were available (1.41 versus 1.06 hours).
- Higher first-time attempt success rates with GAPIV over standard PIV catheters (1.50 versus 1.71).
- Longer catheter dwell times with GAPIV catheters than standard PIVs (3.87 versus 2.01 days) requiring fewer PIV restarts.
- Opportunities for cost savings were identified by decreasing the number of attempts required to place an IV, fewer IV restarts, and prevention of advancement to more invasive lines. The cost analysis provides preliminary support that can be used when considering hiring additional staff to provide VAD placement after-hours and on weekends. Calculation of the final costs for each VAD type is represented in Table 1.
- Nursing time is included in the calculation and increases the cost associated with VAD insertion above the price of the catheter and supplies alone.

<table>
<thead>
<tr>
<th>VAD Type</th>
<th>Product</th>
<th>Definition</th>
<th>Acceptable</th>
<th>Non-acceptable</th>
<th>Nature of Access</th>
<th>Final Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>PIV</td>
<td>No</td>
<td>No</td>
<td>Yes</td>
<td>No</td>
<td>Peripheral</td>
<td>$51.65</td>
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<tr>
<td>CVC</td>
<td>Yes</td>
<td>No</td>
<td>No</td>
<td>No</td>
<td>Central</td>
<td>$297.50</td>
</tr>
<tr>
<td>GAPIV</td>
<td>Yes</td>
<td>Yes</td>
<td>No</td>
<td>No</td>
<td>Central</td>
<td>$297.50</td>
</tr>
</tbody>
</table>

Cost Analysis for VAD Placement

- Cost of insertion for a 4.6-day LOS was $251 for a PIV, $175 for a standard PIV, and $130 for a GAPIV (includes restarts and dwell times per VAD).
- Strategic trade-offs are demonstrated by the decreased use of PICCs and the increased use of the less expensive PIV and GAPIV catheters.
- One can infer that these findings translate to less pain and patient dissatisfaction, reduced cost associated with resource expenditure, and fewer delays in care (receipt of IV medications, fluids or studies requiring IV access or IV contrast) which may decrease morbidity/mortality rates.

IMPLICATIONS

The results demonstrate the value of translating evidence in VAD placement into practice and leveraging technology to improve patient outcomes through the use of EBP in vascular access. Implementation of nursing protocols for VAD selection and placement allows nurses to make decisions at the bedside to ensure patients receive optimal IV therapy-related care.

Recommendations for further study include expanding the project hospital-wide and repeating PDCA cycles. The nurse-driven protocol can be implemented at other similar organizations where nurses are primarily responsible for placing peripheral vascular access devices.

REFERENCE


Infusion Nurses Society (INS), 2016. Infusion Therapy Standards of Practice. Journal of Infusion Nursing, 39(1Suppl), Standard 33, S64-S65.
