Peripherally Inserted Central Catheters (PICC) placed “blindly” at the bedside have historically required a chest x-ray to confirm central tip placement. Chest x-rays result in radiation exposure, require a radiologist to interpret, delay immediate use of the PICC line and are costly to an institution. Real time tip location navigation and ECG tip confirmation bedside technology allows vascular access nurses to insert and immediately confirm accurate PICC placement without the use of radiology films.

PURPOSE

To implement real time navigation and ECG PICC tip confirmation bedside technology to eliminate unnecessary patient radiation exposure, decrease cost and increase efficiency of the vascular access nursing team.

PROJECT

December 2013:
◊ A CNS led team evaluated the current literature surrounding ECG guided bedside PICC placement and confirmation
◊ Evaluation of current FDA approved ECG devices by Vascular Access Team/CNS
◊ The CNS conducted a cost benefit analysis that was submitted and approved – ECG technology purchased

February 2014:
◊ The CNS developed an educational plan which included online modules, didactic training and clinical competency check off
◊ Following initial implementation and observation of clinical competence, the CNS led team reviewed ECG strips for a period of 3 months to ensure continued accuracy of placement
◊ The number of PICCs inserted, confirmatory chest x-rays performed and cost of supplies was evaluated by the CNS pre and post implementation

RESULTS

◊ February 2014 thru February 2015, 959 PICC’s have been placed at the bedside, of which 636 were confirmed by ECG
◊ There was an 83.6% reduction in chest x-rays
◊ Implementation of ECG technology has reduced cost and radiation associated with confirmatory chest x-rays
◊ Allowed for immediate use of PICC lines by nursing staff and eliminate time spent by Vascular Access Team for confirmatory follow up
◊ Eliminated 833 Stat CXR reads

PICC Tip Confirmation

- ECG, 74.60%
- X-Ray, 25.40%

Reduction in chest x-rays

<table>
<thead>
<tr>
<th></th>
<th>CXR/Pt pre ECG</th>
<th>CXR/Pt post ECG</th>
</tr>
</thead>
<tbody>
<tr>
<td>Value</td>
<td>1.14</td>
<td>0.27</td>
</tr>
</tbody>
</table>

Todd Olrich RN, MS, Medical Surgical Clinical Nurse Specialist
Renee Butts RN, MS, CNS, Nurse Manager Vascular Access Team
**IMPLICATIONS**

The implementation of real-time navigation and ECG tip confirmation technology reduced cost and radiation associated with confirmatory chest x-rays at the bedside. The technology costs more than previous methods, however, the cost was offset by the reduction in chest x-rays.

**CONCLUSIONS**

During the training period for real-time navigation and ECG confirmation technology we were limited to training 2 nurses at a time. This resulted in the dual use of ECG and X-ray confirmation for the first 3 months of the data collection period. Overall success rate for tip confirmation with ECG was less during the training period and should be accounted for when doing future cost benefit analysis.

As an unexpected benefit, the PICC trained nurses began working closer as a team. They became the voice for proper tip placement and took more ownership over PICC insertions. Overall, it enhanced their clinical practice and critical thinking.

Prior to roll out, the development and utilization of a QI form would have been helpful for data collection. This would have assisted with identification of why tip placement could not be confirmed by ECG and used to identify individual success rates.

**REFERENCES**


