Background

Traditional non-EKG guided PICC line insertion at the bedside requires a chest x-ray for central catheter tip termination identification. However, 3 to 31% of PICC line placements are malpositioned on the first insertion attempt. Unfortunately, some patients are exposed to radiography only to reveal tip location in the internal jugular vein; which is the most common site of PICC line malposition. A quick and convenient procedure to ascertain internal jugular malposition after routine bedside PICC line insertion is to perform an ultrasound assessment of the patient’s internal jugular vein on the ipsilateral side of the PICC line placement.

Purpose

The purpose of this project was to evaluate the benefits of performing an internal jugular vein ultrasound (IJVU) assessment after traditional PICC line insertion at the bedside and prior to chest x-ray confirmation of PICC line tip location.

Methods

A total of 50 patients (22 males and 28 females) at two medical facilities (a 50 bed acute-care hospital and a 60 bed acute-care rehabilitation hospital) who were scheduled to undergo traditional PICC line insertion at the bedside had their internal jugular veins assessed on the ipsilateral side via ultrasound. The (IJVU) assessment to determine PICC line malposition was made after catheter insertion and prior to obtaining a chest x-ray.

Results

Eight internal jugular malpositions occurred (16%). The time required to perform an (IJVU) assessment ranged from two to ten seconds. All eight malpositions were diagnosed by visualizing an echogenic dot (Positive PICC Malposition Sign) via IJVU assessment (Figure 3) and successfully repositioned (into the superior vena cava) prior to the chest x-ray. The wait time for a portable chest x-ray ranged from ten to 45 minutes. The wait time for an available attending physician to read the chest x-ray ranged from eight to 22 minutes. The cost of a portable chest x-ray at these particular institutions was $200.00.

Conclusions

The findings from this simple project indicate that IJUV assessment to determine PICC line internal jugular vein malposition after a traditional bedside PICC line insertion saves time and money. It is a safe, quick, non-invasive, inexpensive and easy procedure to perform. It also reduces the patient’s exposure to unnecessary radiation (multiple x-rays) and can decrease total PICC line procedure time by determining UV malposition before the chest x-ray is ordered and obtained. The results of this clinical project suggest that an (IJVU) assessment be routinely performed after traditional PICC line insertion at the bedside prior to chest x-ray tip confirmation.

References

Figure 1. To assess the IJV, the US (ultrasound) probe was placed at the apex of a triangle (formed by the two heads of the sternocleidomastoid muscle and the clavicle) on the ipsilateral side of the PICC line insertion site.
Figure 2. Negative PICC Malposition Sign: No echogenic dot in the IJV
Figure 3. Positive PICC Malposition Sign: Echogenic dot (PICC Catheter) present in the IJV