

Does specific labelling of chest radiographs to confirm the position of peripherally inserted central venous catheters decrease turn around time?

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Background

Standard guidelines for peripherally inserted central catheter (PICC) positioning recommend that the tip be in the lower superior vena cava (SVC) near the cavoatrial junction (Figure 1A). If a PICC is not appropriately positioned in the SVC (Figure 1B), it may not be used for its intended use. The incidence of central catheter malpositioning ranges from 3-14%, hence it is vital to correctly identify incorrectly placed catheters. The most common method for PICC confirmation is a portable chest radiograph (CXR). Delays in interpretation of these studies can result in unnecessary delays in chemotherapy administration, parenteral nutrition, or antibiotic infusion compromising the quality of patient care.

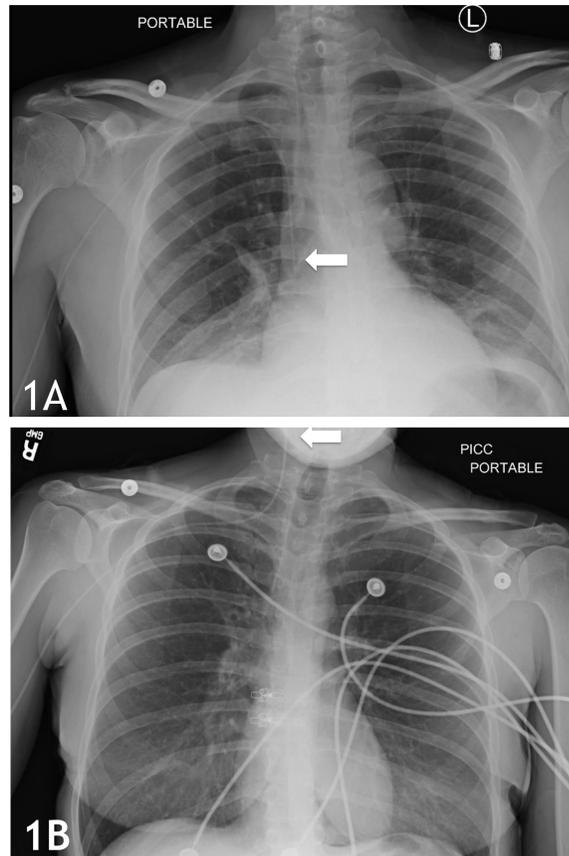


Figure 1A. PICC in appropriate position with its tip (arrow) overlying the lower SVC near the cavoatrial junction. B. PICC inappropriately positioned directed cranially (arrow) into the right internal jugular vein.

Objectives

The primary objective of the current study was to decrease the turnaround time (TAT) of PICC CXRs. TAT was defined as the time from completion of the study to finalization of the report by the interpreting radiologist.

Methods

IRB approval was obtained for this HIPAA-compliant retrospective study. A multidisciplinary team including radiologists, PICC nurses, ordering providers, technologists, and EPIC representatives was convened to address ways to decrease TAT. Previously, PICC CXRs were not specifically labelled and were difficult to discern from other CXRs in the Radiologist's Picture and Archiving Communication System (PACS). Therefore, an Epic order called "X-ray PICC verification" was created (Figure 2A). These studies were in turn labelled "XR CHEST PICC VERIFICATION" for the interpreting radiologists in PACS (Figure 2B). Radiologists were encouraged to prioritize PICC CXRs. These changes were then implemented on 02/01/2018. We reviewed the study data for trends in TAT and number of CXRs ordered from 04/2017 to 02/2019.

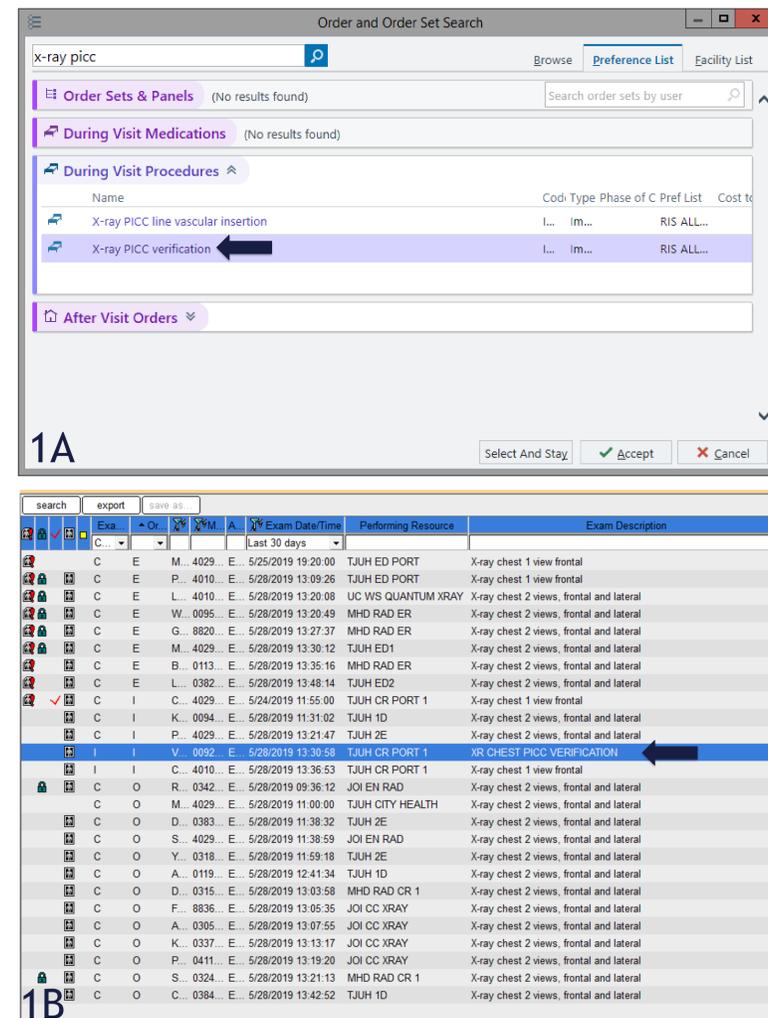


Figure 2A. Epic order created for PICC CXRs (arrow). Figure 2B. Specific PACS labelling of PICC CXRs (arrow).

Results

Over the period of our initiative, there was an overall decrease in the TAT for PICC CXRs (Figure 3). Prior to implementation, the mean of the TATs per month from 04/2017-01/2018 was 65 minutes (range 34-88 minutes). After implementation, the mean of the TATs per month from 02/2018-02/2019 was 27 minutes (range 19-31 minutes). The mean number of PICC CXRs per month decreased from 190 prior to implementation to 173 after implementation.

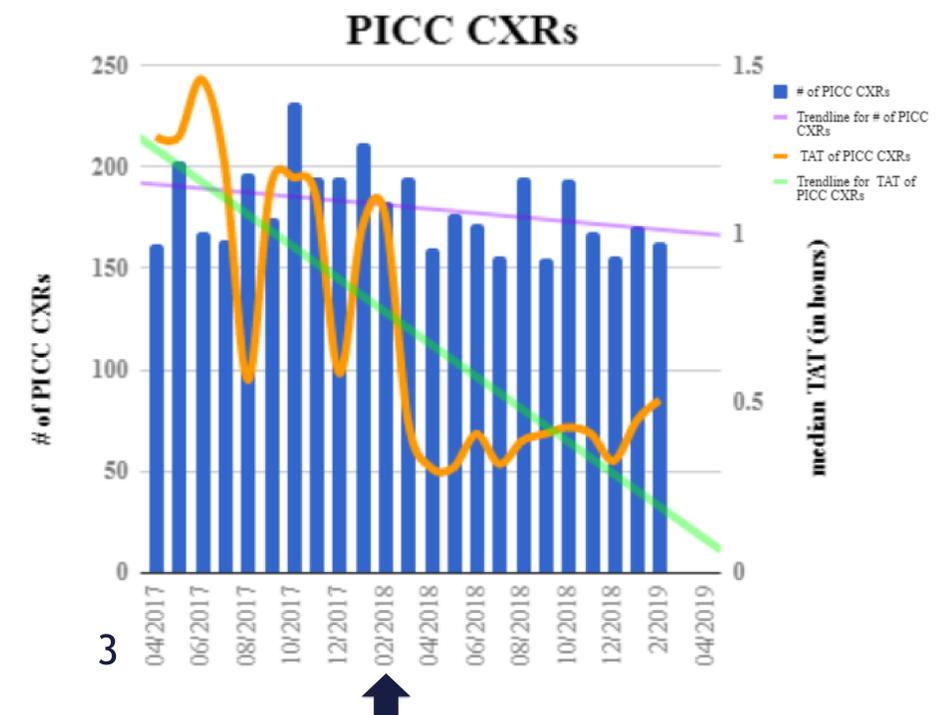


Figure 3. Results with implementation beginning 02/2018 (arrow).

Conclusions

Labelling PICC CXRs in PACS was effective in decreasing TAT, with reduction in the mean TAT of approximately 38 minutes. Radiographic confirmation of catheter positioning is also required for central venous catheters, nasogastric tubes, and enteric tubes prior to usage. Confirmatory radiographs have been shown to prevent rare, but catastrophic events. Unfortunately, many electronic medical records and PACS do not readily distinguish these confirmatory studies from other diagnostic studies, which lead to delays in patient care that are unbeknownst to the interpreting radiologist. As shown with our initiative, simple solutions exist for addressing these common problems.