Abstract:

OBJECTIVE: To evaluate the diagnostic accuracy and utility of bedside ultrasound (US) by neonatology residents to confirm position of umbilical venous catheter (UVC), umbilical arterial catheter (UAC), and peripherally inserted central catheter (PICC).

METHODS: In this prospective study, we included neonates who required UVC, UAC or PICC insertion. Two neonatology residents performed all bedside US examinations after a short period of training. Plain radiograph was taken as gold standard. Time taken for confirmation of catheter position by US and radiograph was recorded.

RESULTS: We recruited 71 neonates for UVC and UAC, and 40 neonates for PICC. Sensitivity and specificity of US in identifying a malpositioned catheter was good for UVC (94% and 66.7% respectively) and UAC (86.7% and 94.5%). Agreement between radiograph and US was good for UVC [0.718 (0.512, 0.861); p < 0.001] and UAC [0.857 (0.682, 0.953); p < 0.001]. Sensitivity (47.8%) of US in identifying a malpositioned PICC was low, though specificity (82.4%) was good. Agreement between radiograph and US in identifying PICC position was poor [0.25 (-0.084, 0.545); p 0.024]. This was due to incorrect interpretation of catheter position on radiograph in some infants, which was confirmed by the radiologist. The median time taken for US was significantly less than time taken for radiograph in confirming the position of UVC (50 vs. 155 minutes; p < 0.001)), UAC (45 vs. 128 minutes; p < 0.001), and PICC (60 vs. 136; p < 0.001).

CONCLUSION: US examination by neonatology residents has good diagnostic accuracy in confirming the position of UAC and UVC, and possibly PICC in neonates. The time taken to confirm catheter position by US is significantly less than radiograph.

Reference: