

PERIPHERALLY INSERTED CENTRAL CATHETERS (PICC):

How limb position affects line tip position (a review of literature and the experience of a single centre)

Presenter: Sydnie Harris- Campbell, 4th year medical student, School of Medicine, University of Leeds

Authors:

Sydnie Harris-Campbell, Erin Frankel (medical students)

-Review of literature and single-centre experience

-Supervising consultant Dr Nicola Mullins and Co-supervising Post- CCT Fellow: Dr Ourania Pappa

Background: The Neonatal Unit of Leeds Teaching Hospitals has a dedicated Central Venous Catheters (CVC) Quality Improvement (QI) team, whom has been working on CVC- related training, ongoing management and patient safety. The standardisation of limb position before imaging, was found to be beneficial towards the correct line tip position decision, as the variability in limb arrangement resulted in migration.

Method: A traffic light system of line tip confirmation was created as part of the ongoing QI work. All PICC lines categorised as 'red' (in unacceptable position) were isolated out of eight-month worth of data.

A literature search was also conducted as there is a topic specific guideline gap, both regionally and nationally.

Results: Four papers were identified. *Srinivasan et al.* found that 47% of upper limb PICCs in their cohort experienced migration at 24hours, with 32.6% migrating towards the heart ⁽¹⁾. *Ali et al* suggested that adduction of arm moved the line closer to arm when placed in the basilic vein and away from heart when in the cephalic vein ⁽²⁾, a finding which was also confirmed by *Connolly et al* without focusing on vein of insertion but mainly on limb arrangement ⁽³⁾. An observational study on lower limb PICCs using ultrasound, noted that straight legs 'pulled the line out' in comparison to knee-chest position which moved it towards the heart ⁽⁴⁾.

In our unit, we identified 23 'red' PICCs, out of which 11 (~50%) moved from 7 to 32 mm depending on degree of limb movement.

Conclusion: Locally, we decided on placing the limbs on as natural position as possible: arms with "shoulders abducted at 30°" and lower limbs on "frog leg position". However regardless local practice, when interpreting the chest radiograph the clinician must always take into consideration the position of the limb.

References:

1. Migration Patterns of Peripherally Inserted Central Venous Catheters at 24 Hours Postinsertion in Neonates, *Hari B. Srinivasan, MD et al.*, Am J Perinatol 2013;30:871–874.
2. Changes in Upper Extremity Position Cause Migration of Peripherally Inserted Central Catheters in Neonates, *Ali M. Nadroo, MD et al*, Pediatrics Vol. 110 No. 1 July 2002
3. Influence of arm movement on central tip location of peripherally inserted central catheters (PICCs), *Bairbre Connolly et al*, *Pediatr Radiol* (2006) 36: 845–850

4. Determination of range of movement of peripherally inserted central catheters in lower extremities of neonates by ultrasound, *N Shalygin et al*, 10.1136/jim-2017-000663.59.