To determine the incidence of venous thrombosis and/or stenosis after PICC placement and identify factors that increase the risk of venous thrombosis and/or stenosis after PICC placement in children" Shin et al (2017).

Abstract:

BACKGROUND: Peripherally inserted central catheters (PICCs) can lead to development of venous thrombosis and/or stenosis. The presence of venous thrombosis and/or stenosis may preclude children with chronic medical conditions from receiving lifesaving therapies, from hemodialysis in end-stage renal disease to total parenteral nutrition in short bowel syndrome. Several adult studies have found an association between PICCs and venous thrombosis and/or stenosis, but none has evaluated for this association in children.

OBJECTIVE: To determine the incidence of venous thrombosis and/or stenosis after PICC placement and identify factors that increase the risk of venous thrombosis and/or stenosis after PICC placement in children.

MATERIALS AND METHODS: We conducted a retrospective review of children ages 1-18 years

with a PICC placed between January 2010 and July 2013 at our center, and included those who had at least one vascular imaging study of the ipsilateral extremity (Doppler ultrasound, venogram or MR angiogram) after PICC placement. Logistic regression was applied to determine risk factors for development of venous thrombosis and/or stenosis.

RESULTS: One thousand, one hundred and ten upper extremity PICCs were placed, with 703 PICCs in the right and 407 PICCs in the left. Eight hundred fifty-one imaging studies (609 Doppler ultrasounds, 193 contrast venograms and 49 MR angiograms) were performed in 376 patients. The incidence of venous thrombosis and/or stenosis in the imaged cohort was 26.3%. PICC laterality, insertion site, duration, patient height to PICC diameter ratio, and number of PICCs per patient were not associated with development of venous thrombosis and/or stenosis. Additionally, primary diagnosis and symptoms at the time of imaging did not predict findings of venous thrombosis and/or stenosis. However, patients exposed to non-PICC central venous catheters (CVC) were more likely to develop venous thrombosis and/or stenosis (odds ratio 1.95, 1.10-3.45).

CONCLUSION: More than a quarter of the vascular imaging studies performed in this study cohort showed previously unknown venous thrombosis and/or stenosis, irrespective of PICC laterality, insertion site, duration and size and the number of PICCs. A history of CVC was associated with a nearly two-fold increase in risk of venous thrombosis and/or stenosis after PICC placement. We suggest that PICCs and CVCs should be placed judiciously in all children, but especially in those with lifelong medical conditions who are more likely to incur direct consequences from limited vascular access.

Reference:

Shin, H.S., Towbin, A.J., Zhang, B., Johnson, N.D. and Goldstein, S.L. (2017) Venous thrombosis and stenosis after peripherally inserted central catheter placement in children. Pediatric Radiology. July 6th. .

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