



To compare chest X-ray with echocardiogram (ECHO) in the localization of an umbilical venous catheter (UVC) tip in very low birth weight infants (VLBW)” Karber et al (2017).

Abstract:

OBJECTIVE: To compare chest X-ray with echocardiogram (ECHO) in the localization of an umbilical venous catheter (UVC) tip in very low birth weight infants (VLBW). Secondary objectives determined the association between techniques for tip placement by the vertebral body level on X-ray, as well as the length of the thoracic inferior vena cava-right atrial (TIVC-RA) junction by ECHO.

STUDY DESIGN: Prospective, sequentially enrolled, masked, single regional perinatal center study. Shortly after birth, one or more anterior-posterior X-rays were ordered by the clinical team to verify that the UVC tip was fixed in the central right atrium (cRA) or at the TIVC-RA junction. An echocardiogram was performed as soon as possible after the last X-ray and UVC tip location was interpreted by a pediatric cardiologist. The pediatric radiologist and cardiologist were masked with regard to each other’s reading.

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**RESULTS:** The newborns (n=51) were 27 ( $\pm 3$ ) weeks by gestational age with birth weights of 1029 ( $\pm 288$ ) grams (mean $\pm$ SD). The radiologist read 50 UVC tips (98%) in the cRA or TIVC-RA junction and 1 (2%) in the LA. The cardiologist read 22 (43%) in the cRA or TIVC-RA, 21 (41%) in the LA and 8 (16%) tips could not be located in the heart. When the UVC tip was interpreted by X-ray as located in the TIVC-RA junction 8/29 (28%) were in the LA by echocardiogram. There was no agreement between vertebral level and tip position in the TIVC-RA junction, RA or LA. The TIVC-RA junction measured  $6\pm 1$  mm and correlated with birth weight  $r=0.54$  ( $p<0.001$ ).

**CONCLUSION:** In VLBW newborns, placement of the UVC tip into the cRA or TIVC-RA junction by X-ray does not avoid misplacement in the left atrium as demonstrated by echocardiography. For VLBW infants, it is suggested that echocardiography may be helpful in verifying that the original placement or migration of the UVC tip into the LA has not occurred.

Reference:

Karber, B.C., Nielsen, J., Balsam, D., Messina, C. and Davidson, D. (2017) Optimal radiologic position of an umbilical venous catheter tip as determined by echocardiography in very low birth weight newborns. *Journal of Neonatal-Perinatal Medicine*. March 16th. .

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