Objective: To use external anatomical landmarks to determine a new method for the estimation of appropriate insertion length of umbilical catheters, suitable for newborn infants of varying birth weight (BW) and gestational age.

Study design: Neonates who had umbilical venous (UVC) or arterial (UAC) catheters placed soon after birth were included in the study. Catheters were placed using formulas derived by Shukla (1986) and/or Wright (2007), and adjusted to appropriate positions confirmed radiologically: UAC tip between T6–T10 vertebral bodies and UVC at the level of the diaphragm±0.5 cms. Final catheter length was compared with the length estimated by Shukla/Wright formulas and to four additional morphometric measurements: umbilicus to nipple (UN), umbilicus to midpoint of inter-mammary distance, umbilicus to xiphoid process and umbilicus to symphysis pubis (USp).

Result: Of 216 infants, 32 were excluded; UVC was placed in 170 infants and UAC in 125 infants. Among the morphometric measurements, UN−1 cm ( UN distance minus 1 cm) provided the best estimate of accurate insertion length of UVC, (r=0.984, P<0.001) and estimated correct insertion length of 94% of UVCs compared with 57% accuracy with Shukla formula for all BW categories (P<0.001). Morphometric measurement UN−1+2 USp (UN distance minus 1 cm plus twice the distance from umbilicus to symphysis pubis) showed significantly better correlation with appropriate insertion length of UAC (r=0.985, P<0.001).
and estimated correct insertion length of 92% of UACs in all infants as compared with 57% accuracy with Shukla formula (P<0.001), and the correct insertion length in 94% of very low BW infants as compared with 68% accuracy with Wright formula (P<0.001).

Conclusion: Simple and intuitive morphometric measurements UN and USp provide more accurate estimates of appropriate insertion lengths for umbilical catheters in infants with all BWs than commonly used BW-based formulas.