



To describe the learning curve and provide an estimate of the accuracy of physicians' US examinations (US skills) and self-confidence when examining umbilical catheter tip placement" Kaae et al (2019).

Abstract:

**BACKGROUND:** The training required for accurate assessment of umbilical catheter placement by ultrasonography (US) is unknown.

**OBJECTIVE:** To describe the learning curve and provide an estimate of the accuracy of physicians' US examinations (US skills) and self-confidence when examining umbilical catheter tip placement.

**METHODS:** Twenty-one physicians with minimal experience in US completed a 1.5-hour eLearning module. Ten piglets with catheters inserted in the umbilical vessels were used as training objects. Following eLearning each physician performed up to twelve 10-min US examinations of the piglets. Expert examinations were reference standards. Sensitivity and specificity of physicians' skills in detecting catheter tip placement by US was used to describe the learning curve. Self-confidence was reported by Likert scale after each examination.

**RESULTS:** Physicians' detection of a correctly placed and misplaced umbilical artery catheter tip increased by an odds ratio of 1.6 (95% CI: 1.1, 2.3) and 3.6 (95% CI: 1.7, 7.8) per

examination performed. A sensitivity of 0.97 (95% CI: 0.80, 0.99) and specificity of 0.95 (95% CI: 0.84, 0.99) was reached after 6 examinations. For the venous catheter, US skills in detecting a misplaced catheter tip increased with an odds ratio of 2.4 (95% CI: 1.2, 4.8) per US examination. Overall, performance and self-confidence plateaus were reached after 6 examinations.

**CONCLUSION:** We found steep learning curves for targeted US examination of umbilical catheter placement. eLearning followed by 6 examinations was found to be adequate training to perform with a sufficiently high accuracy and self-confidence to allow for point-of-care use.

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### Reference:

Kaae, R., Kyng, K.J., Frederiksen, C.A., Sloth, E., Rosthøj, S., Kernn-Jespersen, S., Eika, B., Sørensen, J.L. and Henriksen, T.B. (2019) Learning Curves for Training in Ultrasonography-Based Examination of Umbilical Catheter Placement: A Piglet Study. *Neonatology*. October 29th. doi: 10.1159/000503176. .

