DEVICES FOR LESS INVASIVE SURFACTANT THERAPY: A MANIKIN STUDY

Vincent Rigo[1], Christian Debauche[2], Pierre Maton[3], Isabelle Broux[1], David Van Laere[4].

1 CHU de Liège- CHR Citadelle, Neonatology division, Liège, Belgium (vincent.rigo@chu.ulg.ac.be)
2 UCL St-Luc, Neonatology division, Brussels, Belgium
3 CHC - St Vincent, Neonatology division, Liège, Belgium
4 Universitair Ziekenhuis Antwerpen, Neonatology division, Antwerp, Belgium

Service de Néonatologie
Université de Liège

Background and aim:

"Less invasive surfactant therapy" (LIST), or tracheal instillation of surfactant through a small catheter in spontaneously breathing infants, is gaining popularity.

Different catheters are used for this purpose: a nasogastric tube inserted with (Köln, Kl) or without (Ankara, Ak) Magill forceps, a 13 cm long 16G angiocath (Hobart, Hb), a 30 cm angiography catheter (Stockholm, St) and a centre specific device using an umbilical catheter attached to a stylet (Liège, Lg).

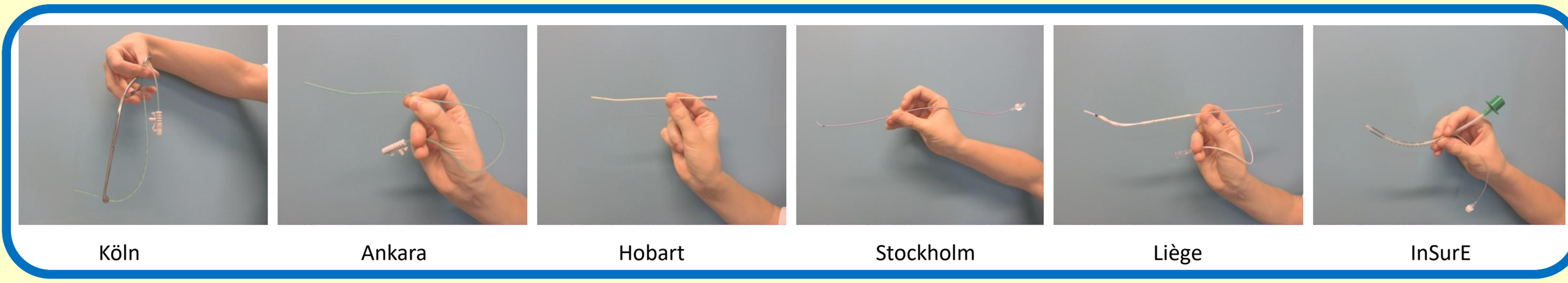
This study aims to assess the effectiveness of those LIST techniques in comparison with InSurE method (Intubation-Surfactant-Extubation,IS).

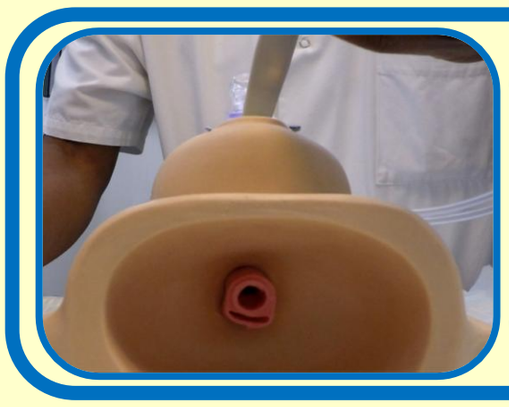
Intervention:

A video recorded study performed by 20 neonatologists simulating different LIST techniques and InSurE on 2 different size manikin heads.

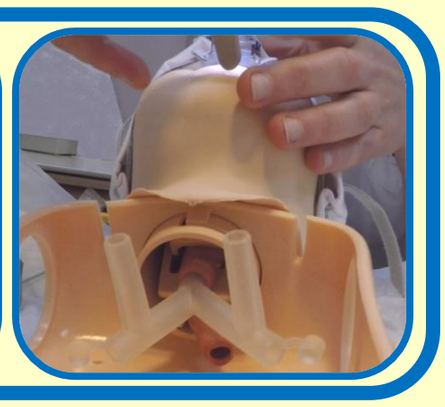
Main outcome measures:

Procedure effectiveness was defined as procedural time and failure rates. Procedural time ran from laryngoscope blade insertion to appearance of "surfactant" at tracheal orifice. Ease of use was evaluated by a user specific score (difficult>easy: range 1>9).





Model 1 (left): Laerdal Neonatal Intubation Trainer
Model 2 (right): Laerdal ALS Baby Trainer



Results : Failure

All 40 InSurE procedures were successful. The failure rates were similar between the different LIST methods (p= 0.25). There were 3 failed attempts for the Liège and Stockholm devices, and the procedure failed on 6, 7 and 8 occasions for the Ankara, Köln and Hobart methods respectively. The failure rates of LIST and InSurE were statistically different (p=0.02).

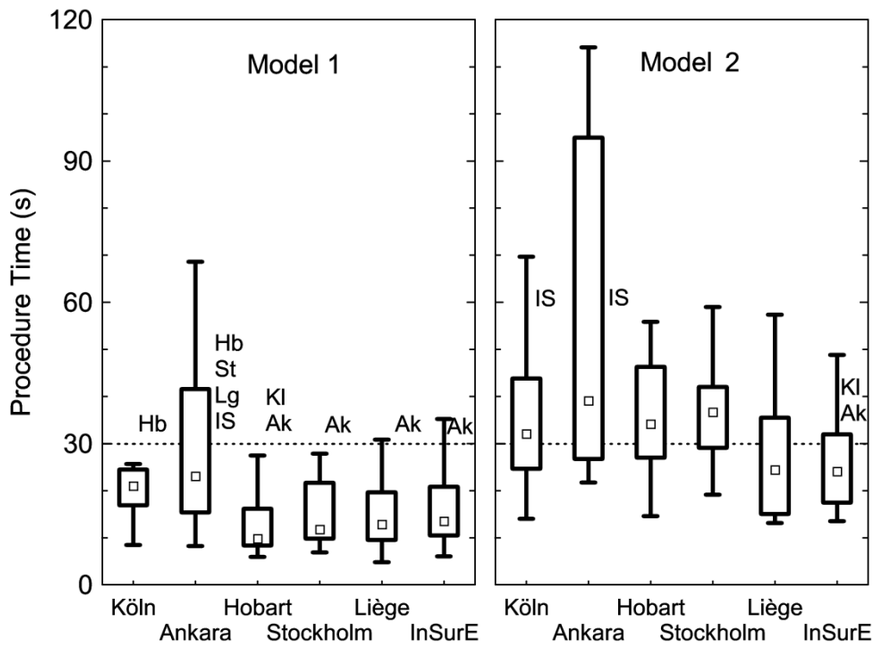
Results : Procedural Times

Procedural Times of successful attempts varied significantly with the different devices (Model 1: p<.001 and Model 2: p<.002).

For Model 1, durations of the procedures according to the Ankara method were significantly longer than all other techniques but Köln's. Using the Hobart angiocath led to shorter times than the Köln feeding tube.

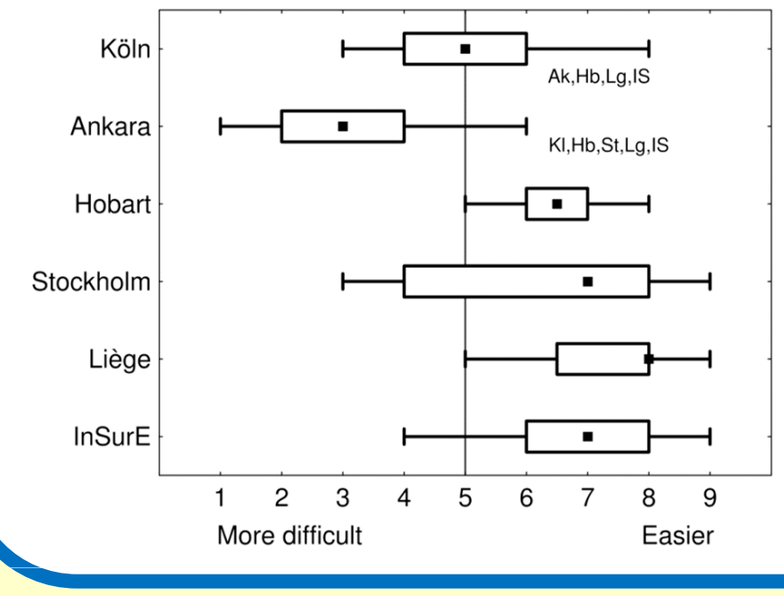
For Model 2, both unguided soft catheters (Köln and Ankara) required longer times than InSurE.

Procedural Times exceeding 30 seconds occurred in 15% and 52% of successful LIST attempts on Model 1 and 2 respectively (for InSurE: 15% and 25%).



Letters indicate significant difference (p<.05) from Kl: Köln, Ak: Ankara, Hb: Hobart, St: Stockholm, Lg: Liège and IS: InSurE.

Results : Subjective evaluation



Subjective evaluations for each device, on a 1-9 scale.
Letters indicate significant difference (p<.05) from Kl: Köln, Ak: Ankara, Hb: Hobart, St: Stockholm, Lg: Liège and IS: InSurE.

Conclusions:

Limiting the duration of a noxious procedure in non- or lightly sedated infants is important.

The catheter used for a LIST procedure affected its effectiveness. More rigid or guided catheters were associated with shorter durations of simulated LIST procedures and were reported as easier by neonatologists.