



Lung ultrasound in the diagnosis of neonatal respiratory failure prior to patient transport

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Aim

- utility of LUS prior to transport of neonates with respiratory failure
- concordance between LUS, CXR and final clinical diagnosis (gold standard)
- impact of LUS on clinical decision making before transport

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Method

Inclusion criteria

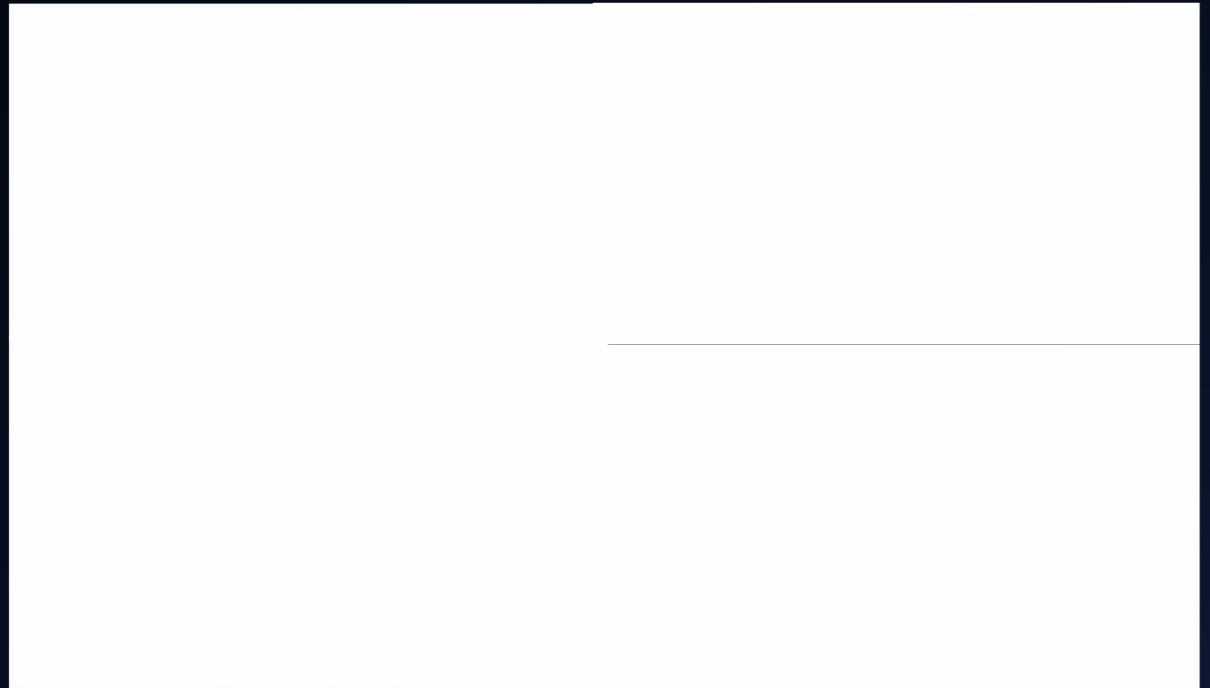
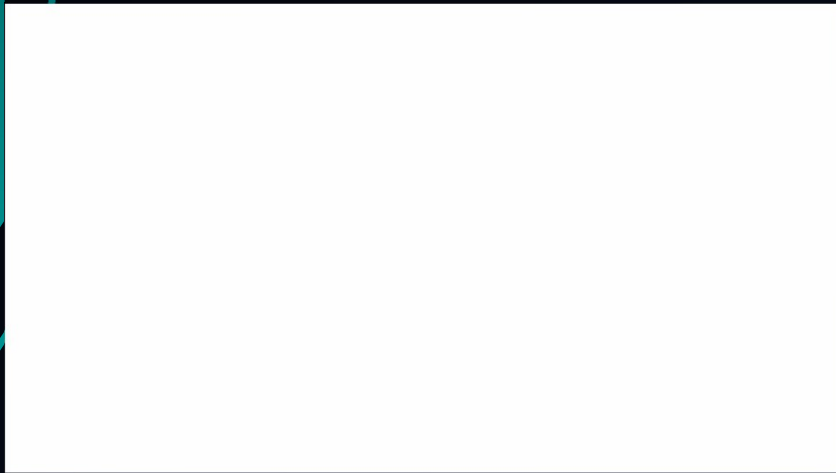
- chest X ray
- pO₂ <50 mmHg or pCO₂ >50 mmHg
- MV or NIV required prior to and during transport

LUS was carried out by the neonatologist using a portable ultrasound device equipped with a linear probe L 5-12 MHz

Observation included

- pleural line
- A-lines
- B-lines
- interstitial syndrome
- white lung
- lung consolidation with air/fluid bronchograms
- lung point
- pleural effusion

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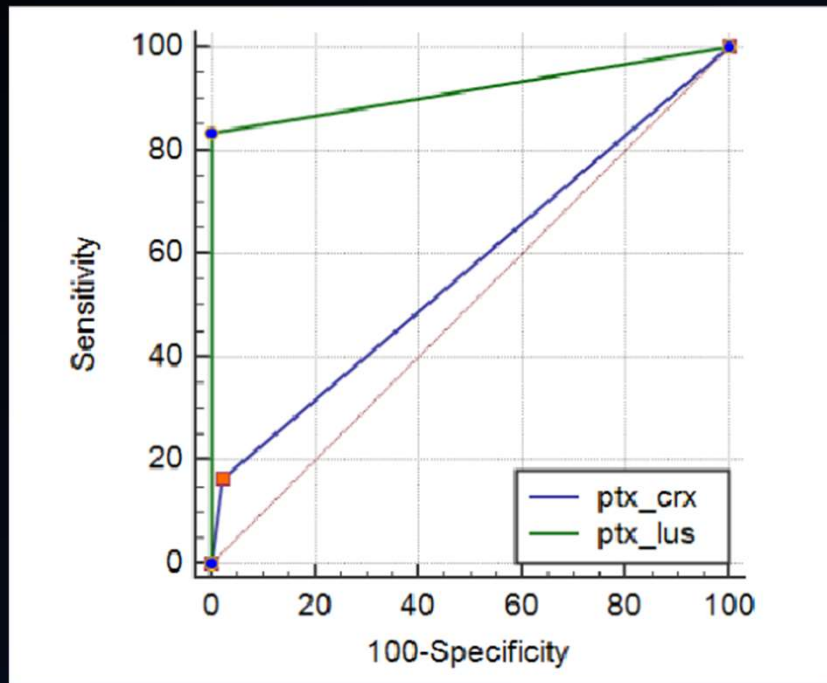
Results

Demographic/clinical data	Value
Gestational age [weeks] mean (range)	33.2 (23-41)
Birthweight [g] mean (range)	2304 (530-4150)
Male gender, number (%)	26 (52 %)
AS* 1 st min, median (IQR)	7 (5-8)
AS* 5 th min, median (IQR)	8 (6-9)
SNAPPE II †, median, (IQR)	22 (9-32)
Mechanical ventilation, number (%)	28 (56 %)
pO ₂ ‡/FiO ₂ §, mean (range)	169 (66-277)
pCO ₂ , mean (range)	55 (30-77)

Diagnosis	n (%)
RDS, number (%)	23 (46 %)
Pneumonia, number (%)	8 (16 %)
PTX, number (%)	6 (12 %)
Atelectasis, number (%)	4 (8 %)
CDH, number (%)	3 (6 %)
MAS, number (%)	2 (4 %)
TTN, number (%)	2 (4 %)
CCAM, number (%)	1 (2 %)
PM, number (%)	1 (2 %)

Results

LUS vs CXR



		AUC (95%CI)	AUC p
RDS n=23	LUS	0.92 (0.81-0.98)	0.029
	CXR	0.77 (0.63-0.88)	

		AUC (95%CI)	AUC p
PTX n=6	LUS	0.92 (0.80-0.98)	0.001
	CXR	0.57 (0.42-0.71)	

		AUC (95%CI)	AUC p
Pneumo n=8	LUS	0.93 (0.81-0.98)	0.566
	CXR	0.91 (0.80-0.97)	

		AUC (95%CI)	AUC p
Atelect n=4	LUS	0.88 (0.75-0.95)	1.0
	CXR	0.88 (0.75-0.95)	

Results

LUS vs CXR

LUS vs final diagnosis

- LUS vs CXR

Cohen's kappa coefficient
 $\kappa = 0.66$ (95% CI 0.49-0.83)

- LUS vs final diagnosis

Cohen's kappa coefficient
 $\kappa = 0.92$ (95% CI 0.83-1.0)

- LUS change the course of clinical management in 21 (42%) neonates

- decompression of PTX (n=3)
- ETT adjustment (n=6)
- ventilator setting adjustment (n=7)
- surfactant administration (n=5)

Conclusions

- LUS may be a reliable tool for diagnosing respiratory failure

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- We recommend LUS as a part of the standard neonatal ultrasound device as a portable ambulance equipment



...ts during neonatal

ultrasound device as a portable ambulance equipment