Lung maturity prediction by quantitative ultrasound analysis

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Non-invasive assessment of fetal lung maturity

Objective
To evaluate the performance of a novel method to predict neonatal respiratory morbidity based on quantitative analysis of fetal lung ultrasound.

Maeda 1999
Lung vs liver grey-level

Prakash 2002
Ultrasound image features.

Tekesin 2004
Quantitative US features

Cobo 2012, Palacio 2013
Texture Analysis

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Methods

Quantus FLM
(texture analysis method)

- N=144
- Singleton pregnancies
- 29.0 - 38.6 w
- Axial thoracic section

Neonatal Respiratory Morbidity (*):
- Respiratory Distress Syndrome
- Transient tachypnea of newborn

(*) RDS: Respiratory symptoms (eg, grunting, flaring, tachypnea, retractions), O2 requirement + chest Rx + NICU admission
TT: chest Rx impression + clinical diagnosis by clinician in charge.
JAMA 2010

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Results

Respiratory Morbidity
20.1 % (29/144)

Patients | 144  
---|---
Maternal age, y | 32.8 (5.7)  
Nuliparity | 86 (59.7)  
Corticosteroids | 52/144 (36.1)  
GA at scan, w (d) | 36.0 (3.3)  
28.0 to < 33.6 | 38/144 (26.4)  
≥ 34.0 | 106/144 (73.6)  

Sensitivity 86,2  
Specificity 86,9  
PPV 62,5  
NPV 96,2
Conclusions

• Quantitative ultrasound fetal lung maturity analysis predicted neonatal respiratory morbidity with an accuracy comparable to current tests using amniotic fluid.

• Results being validated in international multicenter trial (n>1,000)