



Session Information

Session Title: *Introduction to Functional Echocardiography
for the Neonatologist*

Session Number: Workshop D

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Faculty Disclosure Information

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Functional Echocardiography for the Neonatologist

Introduction

1. BP, HR and O₂ saturation are the continuously monitored hemodynamic parameters in absolute numbers
2. BP = Flow x Resistance (flow and resistance are the physiologically regulated parameters)
3. Assessing flow while measuring BP provide more accurate and useful hemodynamic information
4. fECHO

Functional Echocardiography for the Neonatologist

fECHO

1. Bedside use of cardiac ultrasound allows to longitudinally follow changes in
 - a) cardiac function
 - b) systemic and pulmonary blood flow and
 - c) clinically relevant organ perfusion
2. Hemodynamic data may provide clinical information that is different to the assumed underlying cardiovascular physiology

Functional Echocardiography for the Neonatologist

To Fulfill Its Potential

1. fECHO needs to be available at any time in the NICU
2. Neonatologists need to develop appropriate echocardiographic skills

Functional Echocardiography for the Neonatologist

MAJOR ISSUES

1. Training and accreditation
2. Maintenance of skills
3. Potential for misdiagnosis

Functional Echocardiography for the Neonatologist

Major Issues: Training & Accreditation (1)

1. Existing ECHO training programs train cardiologists
2. Australasian Society of Ultrasound in Medicine:
 - a) focused clinician-centred courses on point of care U/S for non-cardiology subspecialties
 - b) ongoing accreditation and competence requirements
3. United States: no structure for fECHO training

Functional Echocardiography for the Neonatologist

Major Issues: Training & Accreditation (2)

1. Example for fECHO training for neonatologists at Childrens Hospital Los Angeles and the University of California:
 - a) Mandatory for neonatology fellows:
 - ✓ 1-week fECHO course provided annually
 - ✓ 2½ months of one-on-one training with echocardiographer during the fellowship
 - ✓ Ongoing skills assessment using standardized exams
 - b) Pediatric cardiologist-sign off on all neonates followed by fECHO
2. Pediatric cardiologists are members of the neonatology fECHO research team

Functional Echocardiography for the Neonatologist

Major Issues: Skills Maintenance

1. Recommended by the Australasian Society of Ultrasound in Medicine:
 - a) Audit of performance and competency assessment by use of logbooks and review of scans
 - b) If different levels of training is offered for the neonatologist - audit needs to be tailored to the level of expertise

Functional Echocardiography for the Neonatologist

Major Issues: Potential for Misdiagnosis (1)

1. Neonatologists performing fECHO must be able to differentiate between a structurally normal and abnormal heart.
 - a) Diagnosis of certain forms of congenital heart disease may be difficult even for the pediatric cardiologist (TAPVR, PAVR, coarctation, etc)
 - b) fECHO in neonates with unrecognized with CHD may lead to
 - ✓ Delay in provision of appropriate treatment
 - ✓ Treatment directed at a non-CHD condition may cause harm
 - indomethacin to close PDA in a preterm neonate with an unrecognized duct-dependent lesion
 - iNO administration to a term neonate with unrecognized TAPVR; etc

Functional Echocardiography for the Neonatologist

Major Issues: Potential for Misdiagnosis (2)

1. Close collaboration with pediatric cardiologist is clearly necessary
2. Formal system to rule out CHD by a pediatric cardiologist may be considered for all neonates followed by fECHO:
 - a) Example for this notion presently exists at CHLA/USC
 - b) However, a system like this may be difficult to set up in a hospital not affiliated with a medical center
3. *Neonatologists must have a high level of suspicion for CHD if patient's clinical course unusual/unexpected*