#ASEchoJC Twitter Chat
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- Recommendations for the Adult Cardiac Sonographer Performing Echocardiography to Screen for Critical Congenital Heart Disease in the Newborn: From the American Society of Echocardiography

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Introduction and Welcome: Welcome to #ASEchoJC Tonight we will be discussing the @ASE360 guidelines on scanning for critical congenital heart disease in the newborn Baby w authors @MelisWasserman @bifflandeck & my co moderators @PushpaShivaram @DrJenniferCo_Vu @edwardagill #echofirst

Tweetorial: https://twitter.com/iamritu/status/1382081584006889473?s=20

Q1: What determines if Congenital Heart Disease (CHD) is ‘critical’?

A1 Notable Responses:

@iamritu: A1. Critical means it MUST be picked up or else these neonates can suffer irreversible damage from hypoxemia

@bifflandeck: C-CHD is a congenital heart defect requiring intervention in the first year of life

@DrJenniferCo_Vu: A1. Agree with answers @iamritu and @bifflandeck Determination of Critical Congenital Heart Disease (C-CHD) is crucial in patient’s outcomes and is could be time sensitive. Communication with #CHD experts is key

@DavidWienerMD: 100%. The guideline has sections on storage and transmission of images and on structured communication

@bifflandeck: Structured communication is key. The pediatric cardiologist is your friend when you’re struggling with what you’re seeing on a new baby with C-CHD. Don’t hesitate to pick up the phone and call!

@MelisWasserman: CHD that cause severe hemodynamic instability at birth and requires a surgical or interventional procedure to live

@pushpashivaram: Also critical heart disease is where the neonates are dictaphone dependent for pulmonary or systemic circulation.. it’s critical we pick up these lesions and manage

@Bravo_MD: Critical CHD: those requiring surgery or intervention in the first YEAR of life. Neonatal screening using pulse-oximetry after 24h life and before discharge is effective detecting these patients. Developed countries have widespread use but what about developing countries?

@JohnJairoArauj1: CHD that cause severe hemodynamic instability at birth and requires a surgical or interventional procedure to live
Q2: What are some types of Critical CHD that can be reliably detected by pulse oximetry screening (POS)? What are drawbacks of pulse oximetry screening?

A2 Notable Responses:

@iamritu: A2. Some of the drawbacks include can’t identify obstructive lesions such as coarctation of aorta or aortic valve stenosis which require hypoxemia for diagnosis

@edwardagill: Sensitivity only 70%, but specificity excellent at 99%

@iamritu: Still widely used as it’s a cost effective simple first step screening #ASEchoJC False-positive screens that required further eval happen in only 0.05% of infants screened after 24 hours

@bifflandeck: Pulse ox isn't perfect, and it's a challenge in high altitude (like Denver where I work), but it has helped identify a lot of disease early in life, which helps outcomes

@MelisWasserman: d-TGA, TAPVR, pulmonary atresia, coarctation. Drawbacks are POS also detects hypoxemia due to non-CHD causes

Q3A: What can be done to improve image quality on a newborn?

A3A Notable Responses:

@iamritu: A3A. Make sure you have the right transducer frequency: Near-field imaging high-frequency transducer, typically b/w 10 - 12 MHz & for anatomy need depth so use mid range-frequency transducers 6-9 MHz

@rajdoc2005: I have scanned children back home in India and during @ASE360 global outreach events. But never scanned a newborn!!! Sounds tricky - So I am eager to learn!!

@DrJenniferCo_Vu: A3. Swaddle the baby as suggested by @MelisWasserman. There is a 2 swaddle technique to expose the chest while doing the neonatal #echo!

Q3B: What are the nonstandard views obtained in performance of a new neonatal or pediatric echocardiogram?

A3B Notable Responses:

@iamritu: A. Adult sonographers need to get familiar w these views: Subcostal SAX, Ductal, abdominal
@MelisWasserman: non-standard views

@bifflandeck: Suprasternal notch and subcostal/subxiphoid. These can be tough. The key is slow, deliberate sweeps.

@DrJenniferCo_Vu: Especially tough with moving/crying/uncooperative babies and kids!!

Q4: Why are subcostal views so helpful to image a newborn for critical CHD?

A4 Notable Responses:

@iamritu: A. Subcostal view is free from lung artifact, & can see relational orientation more readily

@MelisWasserman: Free from lung artifact!!

@DrJenniferCo_Vu: A4. Sometimes, you can identify the #CHD with a single subcostal view sweep! Saves valuable time to call for #CHDexpert help if needed!

@iamritu: Sweep is 10-20 seconds generally- any major impact on storage space? #ASEchoJC

@bifflandeck: It will impact storage space, but it's worth the impact because structural relationships are the keystone of CHD and sweeps are the best way to show them

@DrJenniferCo_Vu: 100% agree with @bifflandeck ! Worth the storage space especially in diagnosing complex #CHD and identifying segmental anatomy. For experienced sonographers/imagers, 5-10 second sweeps can be informative.

@bifflandeck: Subcostal views show cardiac position in the chest and a slow sweep can show all the structures without lung artifact. You can find any associated defects

@Hragy: If the baby is not sedated subcostal views should be kept to the end, because that's when they are more likely to start crying. #TipsForNewSongraphers

Q5: Is right to left shunting across the atrial septum concerning? Why?

A5 Notable Responses:
@DrJenniferCo_Vu: A5. Some Differential diagnosis for R-L shunting in newborns

- Anatomical heart Tricuspid atresia
- Anatomical heart Pulmonary atresia intact ventricular septum
- Anatomical heart Pulmonary hypertension
- Anatomical heart “Hypoplastic Right Heart” Variants

@rskk86: Total anomalous pulmonary veins

Q6A: What is the best view to identify all pulmonary veins?

A6 Notable Responses:

@iamritu: A6. A. #crabview legs of crab 🦀 =Pulm veins & body of crab 🦀 =Left atrium #ASEchoJC

@PushpaShivaram: Make sure you don’t see a chamber behind the left atrium.. sometimes they can form a confluence behind left atrium and drain somewhere else

@rajdoc2005: Don’t want to miss anything in a new-born!! Just call for help - if unsure!

@MelisWasserman: Crab view!

Q6B: What are typical features of echocardiography in Tetralogy of Fallot?
A6B Notable Responses:

@iamritu: VsD, overriding aorta, RVH, some degree of PS/subpulmonic stenosis w L to R shunting in branch PA

@MelisWasserman: Over-riding aorta, VSD, RVH, Pulmonary stenosis

@rajdoc2005: That looks clear on the PLAX view! Have come across many adults with un-repaired TOF while in training. These days we don't see these in adults - most are already repaired!

@AntonioBarros_: AVSD+ TOF Old examination, performed on a newborn patient with trisomy 21. (Video here: https://twitter.com/AntonioBarros_/status/1382137583405256710?s=20)
@cardiopedhnn: Very nice study showing the common AV junction w IA (ASD I) & IV communication (PM-inlet VSD) typical of #AVSD.

Also, the VSD has an outlet extension w anterior malignation of infundibular septum (#TOF).

TOF w AVSD is a very rare association in patients non-trisomy 21.

@DrJenniferCo_Vu: A6B: You can also remember the features of Tetralogy of Fallot with the mnemonic PROVE:

P- Pulmonary stenosis
R- RVH
O- Overriding Aorta
V – VSD

@Siwa23288585: VSD → RL shunt

Q6C: What are the typical features of echocardiogram findings in D-transposition of aorta?

A6C Notable Responses:

@iamritu: A. #ASEchoJC Side-by-side (parallel) great vessels
AoV - anterior & rightward, Pulmonary valve - posterior & leftward
PFO w L/R shunting
MPA arising from LV

@MelisWasserman: PLAX of d-TGA - side-by-side great vessels
Q7: What is a common pitfall when performing spectral Doppler on the abdominal aorta to evaluate for coarctation?

A7 Notable Response:

@iamritu: If you place doppler PW sample gate on SMA or celiac artery you’ll get a false positive “sawtooth” pattern

@MelisWasserman: Making sure the sample volume is parallel to flow
@DrJenniferCo_Vu: A7. Spectral Doppler Pattern on the abdominal aorta in normal versus Coarctation of the aorta. Note the diastolic flow continuation aka “sawtooth pattern”. *H/T @garvankane for slide

**Abdominal Aorta PW Doppler**

- **Normal**
- **Abnormal**
- **Coarctation**

@bifflandeck: The key here is getting low on the abdomen and aiming cranially to get a parallel angle for PW Doppler - and don't be fooled by the SMA!

@bifflandeck: An obstructive pattern in the abd aorta looks like a sawtooth (diastolic continuation) - but if there's an open ductus it can look falsely reassuring.

@PushpaShivaram: https://twitter.com/i/status/1382133352505999360

Q8: What is the differential diagnosis in the finding of retrograde filling of the ascending aorta from the PDA?

A8 Notable Responses:

@DrJenniferCo_Vu: A8. Differential diagnosis of retrograde filling of the ascending aorta from PDA:

- Aortic Atresia
- Critical Aortic Stenosis
- Hypoplastic Left Heart Syndrome

@Slwa23288585: HLHS
Q9: What does ‘ductal dependent’ mean?

A9 Notable Responses:

@bifflandeck: If the patient needs a ductus as their only source of pulmonary or systemic blood flow, they're ductal dependent.

@DrJenniferCo_Vu:

- Ductal dependent lesion means that CHD type depends on -a patent ductus arteriosus (PDA) for pulmonary or systemic flow.
- Typically, the PDA will normally close within hours-5 days in normal newborns.
- IV prostaglandins (PGE1) is needed to keep PDA open

@Slwa23288585:

1. Pulmonary flow decrease, such as TOF
2. Mix, artery and vein blood such as d-TGA
3. Keep being renal flow, such as Coarctation

Q10A: Side-by-side great vessels are seen in which forms of Critical CHD?

A10A Notable Responses:

@DrJenniferCo_Vu: A10. Side-by-side great vessels are see in:

- D-transposition of great arteries
- DORV with malposed great arteries/“Taussig Bing” anomaly
Q10B: What CHD lesions can be missed with just a 4 chamber view scan?

A10B Notable Responses:

@MelisWasserman: d-tga, interrupted aortic arch, coarctation

@DrJenniferCo_Vu: A10B: Some #CHD lesions missed with 4 Chamber echo view scan:

- Tetralogy of Fallot
- D-TGA
- Coarctation of the Aorta
- Interrupted Aortic Arch
- Truncus Arteriosus
- Double Outlet RV
- Aortic Stenosis/Atresia
- Pulmonary stenosis/Atresia
- Etc

Q11: How to identify normal chamber and great vessel size in neonatal/pediatric population?

A11 Notable Responses:

@iamritu: Z score can calculate @ChildrensPhila has a great calculator online

@bifflandeck: The infamous Z-score (or zed score for my friends across the pond)! Measurements are indexed to BSA, Z is the number of SD away from the mean.

@MelisWasserman: z-scores! the deviation of a given measurement form the mean
@DrJenniferCo_Vu: A11. Due to variations of pt sizes fr neonates to young adults, it’s imp to use Z-scores to determine normal valve, chamber, artery & vein dimensions.

Normal fall into the [-2 or -2.5 to +2 or +2.5] range:

< -2 or 2.5 is Hypoplastic

> +2 or 2.5 is Dilated

@Slwa23288585: Boston children calculator https://zscore.chboston.org

Q12: How to identify the ventricle(right or left) while scanning for Critical CHD?

A12 Notable Responses:

@MelisWasserman: Moderator band in RV is helpful! Important to remember the RV is not always on the patient’s right

@bifflandec: RV features - coarse trabeculations, moderator band, septal papillary muscle for TV

LV features - smoother walls, bullet shape, septophobic papillary muscles for MV

@iamritu: valves always go w ventricles, sequential segmental analysis starts w Atrial appendages

Shape: L= map of India upside down, R= snoopy’s ear

Junction: broad R, narrow neck L

Extent pectinate muscles only inside LAA(LA wall smooth)Squared vs RAA pectinate extend into RA

https://bit.ly/2BgCeZn

@DrJenniferCo_Vu: I also use Snoopy’s Ear, Snoopy’s Nose analogy for atrial appendages