CLOSURE OF ASD

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Is it an ASD?
ASD Vs PFO

- Almost all newborns have a 3 mm PFO
- This does not have to be labeled an ASD & does not require f/u
- RA RV are dilated normally in newborns
- ≥4 mm is an ASD
PATENT FORAMEN OVALE
PFO

- Present in 25% of world population
- L to R shunt is normal
- R to L shunt is abnormal
POSSIBLE ASSOCIATIONS

• CRYPTOGENIC STROKE

• MIGRAINE

• DEEP SEA DIVERS
Cryptogenic stroke

- Association is there but not proven
- 33% of pts with Cryptogenic Strk have PFO
- After 1st stroke if no etiology found, pt is currently started on anticoagulation
- This is known to REDUCE the recurrence of stroke
- If strokes continue, closure is indicated
Cryptogenic Stroke

- If recurrence happens then the question really arises about PFO closure vs continuing anticoagulation.
- At this stage one option of PFO device closure is present.
- Device closure is NOT known to remove the risk of recurrence.
Respect trial

- Randomized Evaluation of Recurrent Stroke
  Comparing PFO Closure to Established Current Standard of Care Treatment
MIGRAINE

• Higher incidence PFO in pts with Migraine
• Assessment done with Transcranial Doppler (TCD)
• Closure of PFO shown to abolish Migraine in some pts
• Case report of closure of ASD resulted in Migraine in 1 pt
PREMIUM TRIAL

• 8-16 HEADACHES /MO
• US BASED TRIAL

• Prospective Randomized Investigation to Evaluate Incidence of Headache Reduction in Subjects with Migraine and PFO Using the AMPLATZER® PFO Occluder Compared to Medical Management
• MIST, the only prospective sham-controlled study of PFO closure for migraine with aura, did not reach its primary endpoint for migraine resolution.

• Until there is more evidence from ongoing large controlled trials, PFO closure should not be performed in clinical practice for the prophylaxis of migraine.
CLOSURE OF PFO HAS NOT BEEN PROVEN TO BE BENEFICIAL CANNOT BE BROUGHT INTO CLINICAL PRACTICE
Closure of ASD: Decision based on

- Size of ASD
- Age of patient
- Symptoms of the patient
- Modality of Closure
When Do I recc Closure of ASD

- Size of ASD
- Age of patient
- Symptoms of the patient
- Modality of Closure
SIZE OF ASD
ASD SIZE AND CLASSIFICATION

• <4 MM: PATENT FORAMEN OVALE

• 4-8 MM: SMALL ASD

• > 8-10 MM: ASD REQUIRING CLOSURE

J Am Coll Cardiol. 1993 Sep;22(3):851-3
ASD: NATURAL HISTORY

• 200 CONSECUTIVE PTS
• 0-13 YRS AGE Median 5 mo
• Size of ASD:

Pie chart showing the distribution of ASD sizes:
- 4-5 mm
- 6-7 mm
- 8-10 mm
- >10 mm

SIZE AND CLOSURE

• 2006 Study Pediatrics
  • Those betw 4-5 mm
    – 56% spont closure
    – 30% to dia < 3mm
    – NONE REQUIRED CLOSURE
  • >10 mm
    – None closed spont
    – 77% required surgical or device closure
SIZE AND CLOSURE

• 1993 Study JACC
  • 100% closure < 3 mm
  • 87% 3-5 mm
  • 80% closure 5-8mm
• None closed spont
  > 8mm
If ASD at diagnosis is >8-10mm it is very likely to require closure and not likely to close on its own

If < 8 mm it is unlikely to require closure
When Do I recc Closure of ASD

• Size of ASD

• Age of patient

• Symptoms of the patient

• Counseling starts at time of diagnosis
AGE OF PATIENT
Age of patient: Closure of ASD

- More than 2 yrs of age & before school
- OR any age after that whenever diagnosed
- Always an elective closure/never an emergency
- Usually children mildly symptomatic till this age
- Most common symptom: Failure to thrive
Age of Closure of ASD

• 10% of children with ASD will have significantly more symptoms < 1 yr of age
• Most common symptoms:
  – Sig Tachypnea; cardiac enlgmnt on xray
  – Sev Failure to thrive
  – Recc LOWER Chest Infections
  – Heart Failure
• 12 yrs; 24/160 infants < 1 yr; surg closure ASD

Age of patient

Helv Paediatr Acta. 1976 Jan;30(4-5):399-408
- 7 patients, aged between 2 weeks and 8 months (1 died)
- Presented with CHF

- 13/170 pts in 19 yrs < 2 yrs & symptomatic
- early surgical closure of the defect
- 1 death
- 6 patients who failed to respond and needed in 1st yr of life

Indian Pediatr. 1993 Sep;30(9):1079-83
- 12 infants with CHF w ASD 2 spont closure
Why do they present early?

- LSVC to coronary sinus: dilated CS above mitral valve makes the flow to RA easier
- A posteriorly placed defect closer to pulm veins
- Very Low PVR/ Increased LV diastolic fx
ASD CHF at 4 months
Management when CHF at < 1 yr

• **Digoxin**: heart rate control
• **Enalapril**: Ventricular relaxation
• **Diuretics**: preload reduction
• **INCREASE IN CALORIES** to 120 cal/kg/day (beyond 6 mo):
Management when CHF at < 1 yr

- Significant decrease in infections
- Currently this ASD child is 1 yr old
- Weighs 7 Kg and
- Looking at closure at this stage
ASD Closure < 1yr

- Device Closure performed at 9 mo
- Wt 6 kg
- Indication continued CHF, FTT and infections
- After closure: Significant improvement
When Do I recc Closure of ASD

• Size of ASD
• Age of patient
• Symptoms of the patient
• Modality of Closure
Device Vs Surgery: timing

- Surgery can be done safely at all ages.
- One may not be able to fit a device in a small heart (depending on septal length & ASD size).
- Eg: 10 mm ASD requires a septal length of 25 mm at least.
- So, infancy ASDs which are symptomatic: likely to be larger: and can they wait to accommodate the device?
Device Vs Surgery: timing

• Do ASD’s increase in size?
• Yes: this may happen while waiting
• And a margin which was acceptable may not be so later for device
• Reported risk of ASD device closure in infants is also higher
• Occasional case one maybe able to implant device in an infant: Dedicated device team
Device Vs Surgery:

- Device eligibility has to be met
- TEE during implantation essential
- Residual leak imperative to document
- If wt > 20 kg ICE maybe the method of choice
PROCEDURE PICTURES
ICE IMAGES OF DEVICE

The margins of the device are clearly visible.
The margins of the septum are very clearly visible.
No trigger detected – defaulting to 1 second capture(s)

1-COOLBLUE  Grey Scale
No trigger detected – defaulting to 1 second capture(s)

1-COOLBLUE  Grey Scale

PEDIATRIC CARDIOLOGY & CARDIAC SURGERY UNIT
TAKE HOME MESSAGE

• ASD closure decided on age: > 2 yrs
• On Size: Usually ASD’s more than 8-10 mm will require closure
• Occasionally < 2 yrs also will require closure
• Method of closure: If eligibility for device met: Device or else Surgical with ministernotomy
• Wt > 20 kg: ICE over TEE preference