



ΟΜΙΛΟΣ ΥΓΕΙΑ



MITERA CHILDREN'S
HOSPITAL



Balloon atrial septostomy

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BAS

1. The technique of atrial septostomy (BAS) was introduced in 1966 by Rashkind
2. The interventional procedure is performed in neonates that are significantly cyanosed with preductal O₂ saturations below 75% after birth or that need an atrial septal defect to offload the LA

“A technique for producing an atrial septal defect without thoracotomy or anesthesia is presented. It can be performed rapidly in any cardiac catheterization laboratory.” (William J. Rashkind, 1966)

History

“...The initial response to this report varied between admiration and horror but, in either case, the procedure stirred the imagination of the “invasive” cardiologists throughout the entire cardiology world and set the stage for all future intracardiac interventional procedures – the true beginning of pediatric and adult interventional cardiology.” (Charles E. Mullins, 1998)

HOW to CREATE AN ASD?

1. Septostomy Balloons
2. Low profile balloon (Tyshak)
3. Static balloon (Powerflex, Opta)
4. Cutting balloons
5. Blade septostomy catheter
6. Stenting

Transeptal puncture or RF perforation may occasionally be needed

Need for creation or enlargement of an ASD: WHEN?

1. TGA: In some units, an atrial septostomy is performed routinely after birth, **to ensure mixing of the blood at intracardiac level and discontinue the prostaglandin infusion.** However, most would not advocate this due to the potential risk of complications in neonates that are otherwise stable.
2. Tricuspid or mitral atresia
3. PA / IVS
4. TAPVD with restrictive septum
5. During hybrid procedures for HLHS syndrome
6. Pulmonary hypertension
7. ECMO

Need for creation or enlargement of an ASD

WHEN DO IT?

1. Sats and haemodynamic status
2. Bridge time to surgery
3. When ASD < 5mm or aneurysmal atrial septum in **Tricuspid** or mitral atresia, PA / IVS

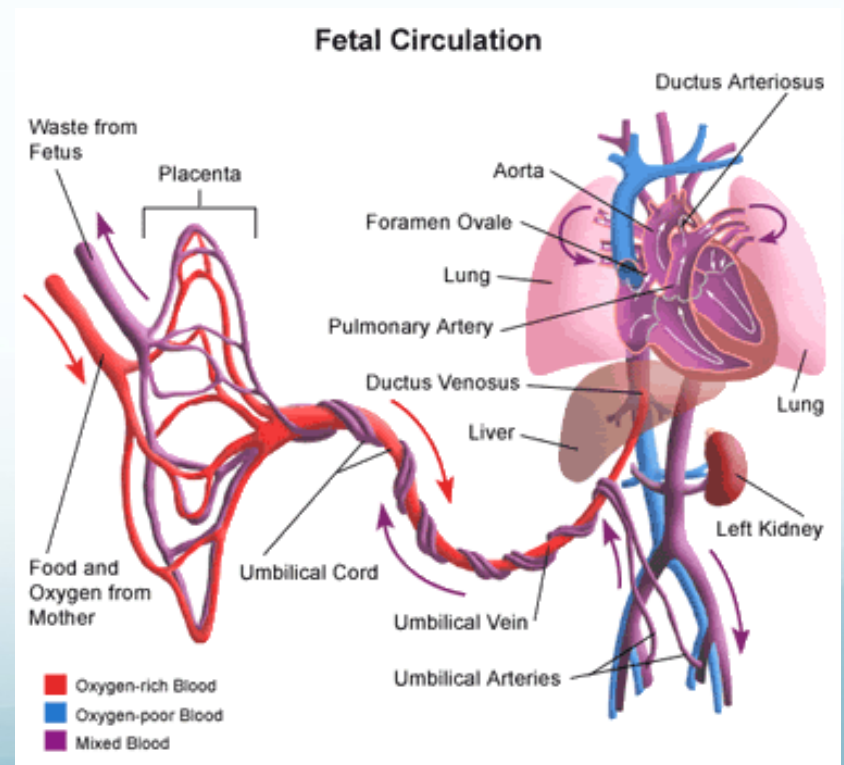
Tzifa A, Gauvreau K, Robert Geggel. Am Heart J. 2007

BAS: When do it?

1. Before 6 weeks of age: After that the septum thickens up
2. After 6 weeks of age: Static balloon septostomy, Blade septostomy, stenting etc.

US or X-Ray guided?

1. The BAS technique has evolved from an X-Ray guided to ultrasound guided procedure performed by the bedside in most centers.
1. It can either take place via the femoral or the umbilical route. Preference is given to the later within the first 24-48 hrs of life, but care should be taken to empty the cord from any existing clots



EQUIPMENT / MILLER CATHETER



Edwards

5Fr catheter with 1.8 ml (needs 6Fr sheath)

5Fr catheter, takes 4ml (needs 7Fr sheath)

Umbilical access

1. Umbilical route. Preference is given to the later within the first 24-48 hrs of life, but care should be taken to empty the cord from any existing clots, as these can be pushed into the circulation and cause embolic phenomena when the septostomy catheter is introduced.

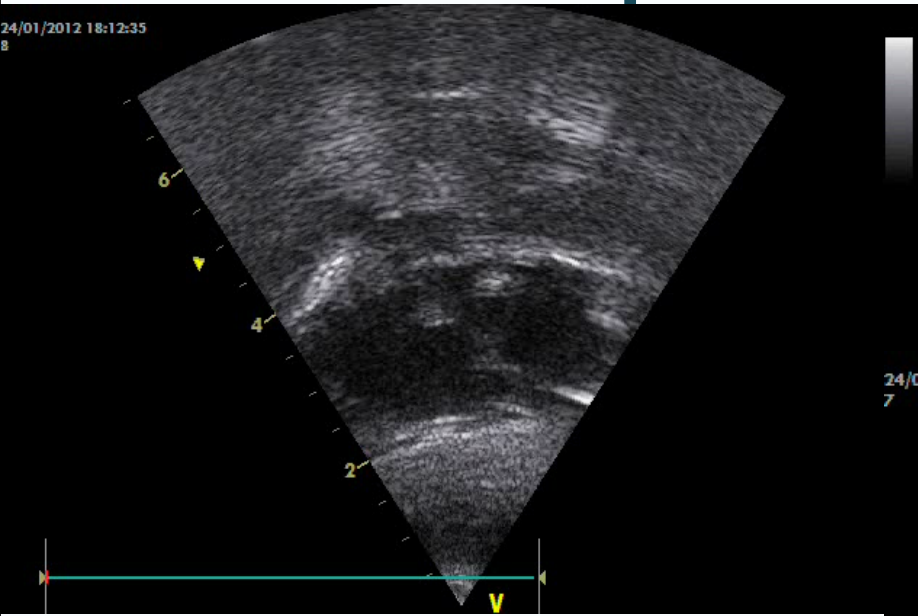
2. Use NG feeding tube to predilate vein

The septostomy catheter **DOES NOT NEED** to be advanced through an umbilical sheath...

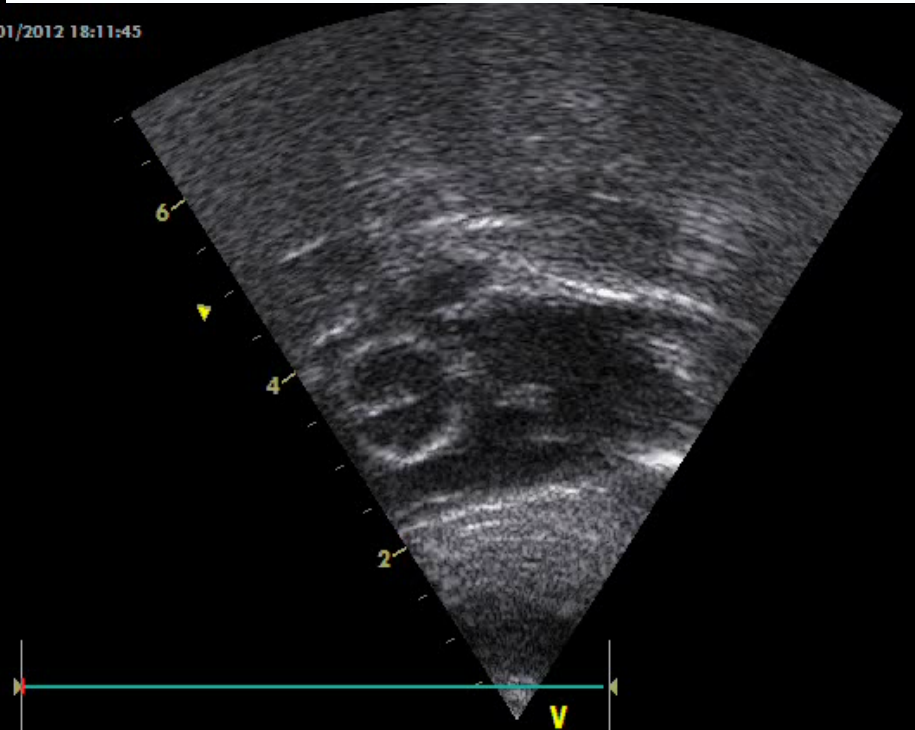
Echo views

1. Subcostal view for IVC / hep. Veins
2. Then, Subcostal view for atrial septum
3. Care to be away from MV
4. Do not inflate when catheter still in pulmonary vein

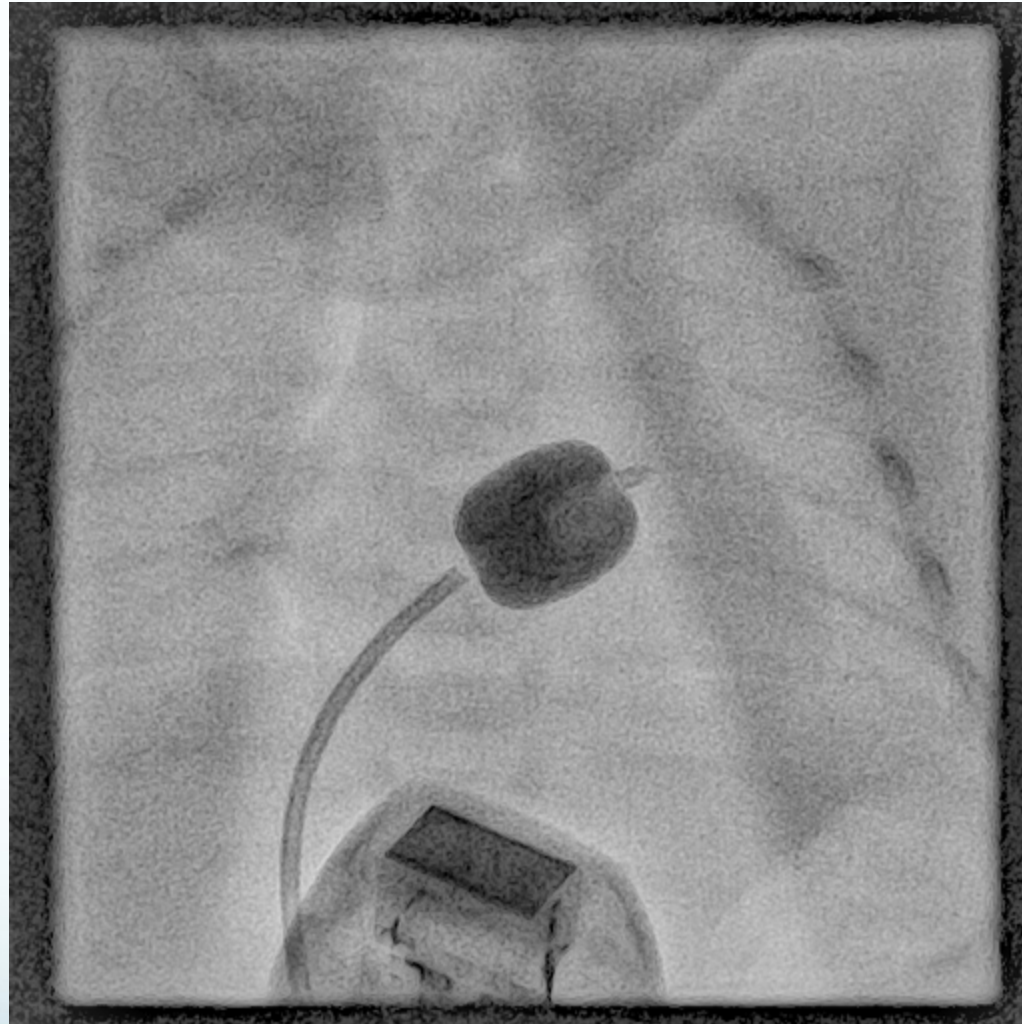
Septostomy procedure



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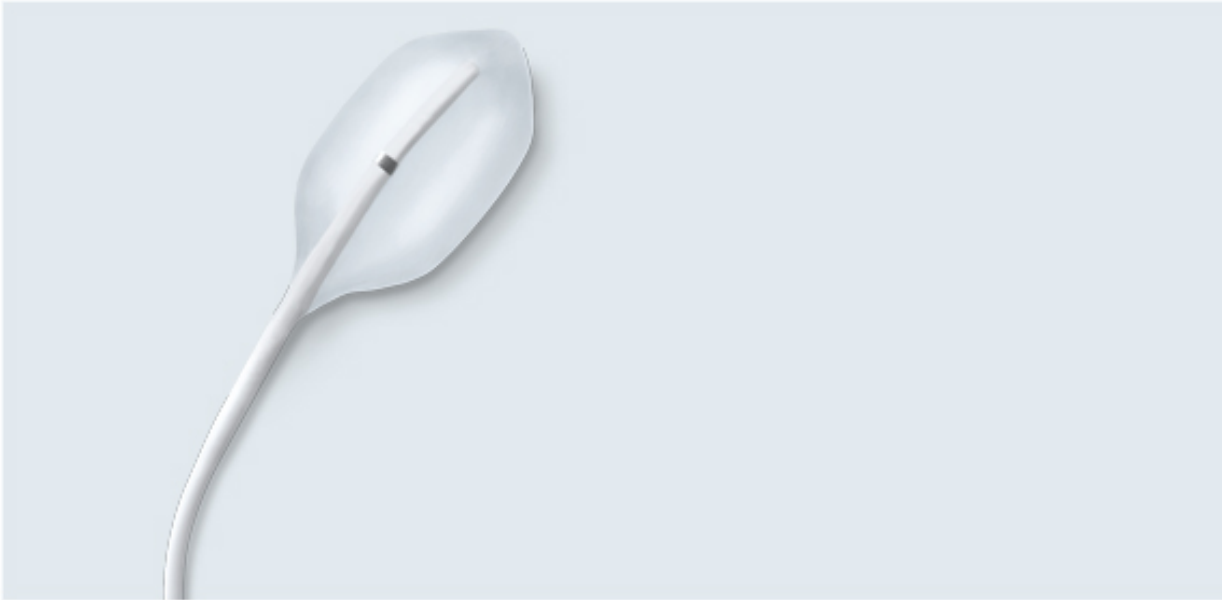


Septostomy procedure



Medtronic

OTHER EQUIPMENT / OVER THE WIRE BALLOON

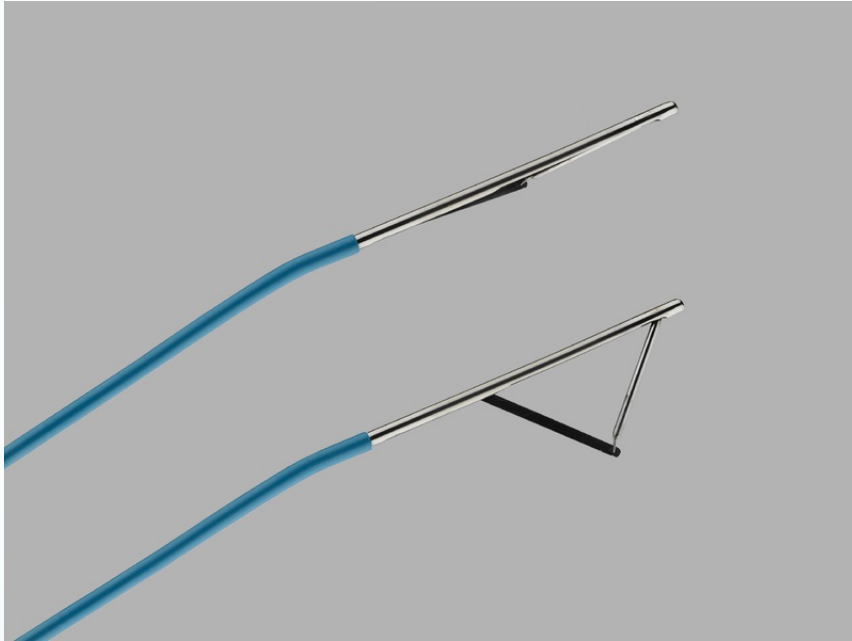


NuMED

Septostomy Catheter – Z-5

9.5 mm	0.014"	5 F
13.5 mm	0.021"	6 F

BLADE SEPTOSTOMY



COOK

Size of
Interatrial

Patient
Suggested
Age
Blade Catheter

Patient

Opening

Weight

<5 mm
(7Fr)

Under 5 months <4 kg

9.4mm

5-8 mm Young children

4-10 kg

Septostomy complications

1. Balloon Atrial Septostomy Is Associated With Preoperative Stroke in Neonates With Transposition of the Great Arteries

Patrick S. McQuillen et al

All patients with brain injury had BAS

The risk of injury was not modified by the cannulation site for septostomy (umbilical versus femoral) or by the presence of a central venous catheter

Conclusions—BAS is a major identifiable risk factor for preoperative focal brain injury in neonates with TGA. (Circulation. 2006;113:280-285.)

2. Preoperative Brain Injury in Transposition of the Great Arteries Is Associated With Oxygenation and Time to Surgery, Not Balloon Atrial Septostomy

Christopher J.

Conclusions—Preoperative brain injury in neonates with transposition of the great arteries is associated with hypoxemia and longer time to surgery.

We found no association between BAS and brain injury. (Circulation. 2009;119:709-716.)

Mechanical complications

1. Balloon rupture
2. Failure of balloon deflation
3. Inflation of the balloon in the wrong place / MR

Clinical complications

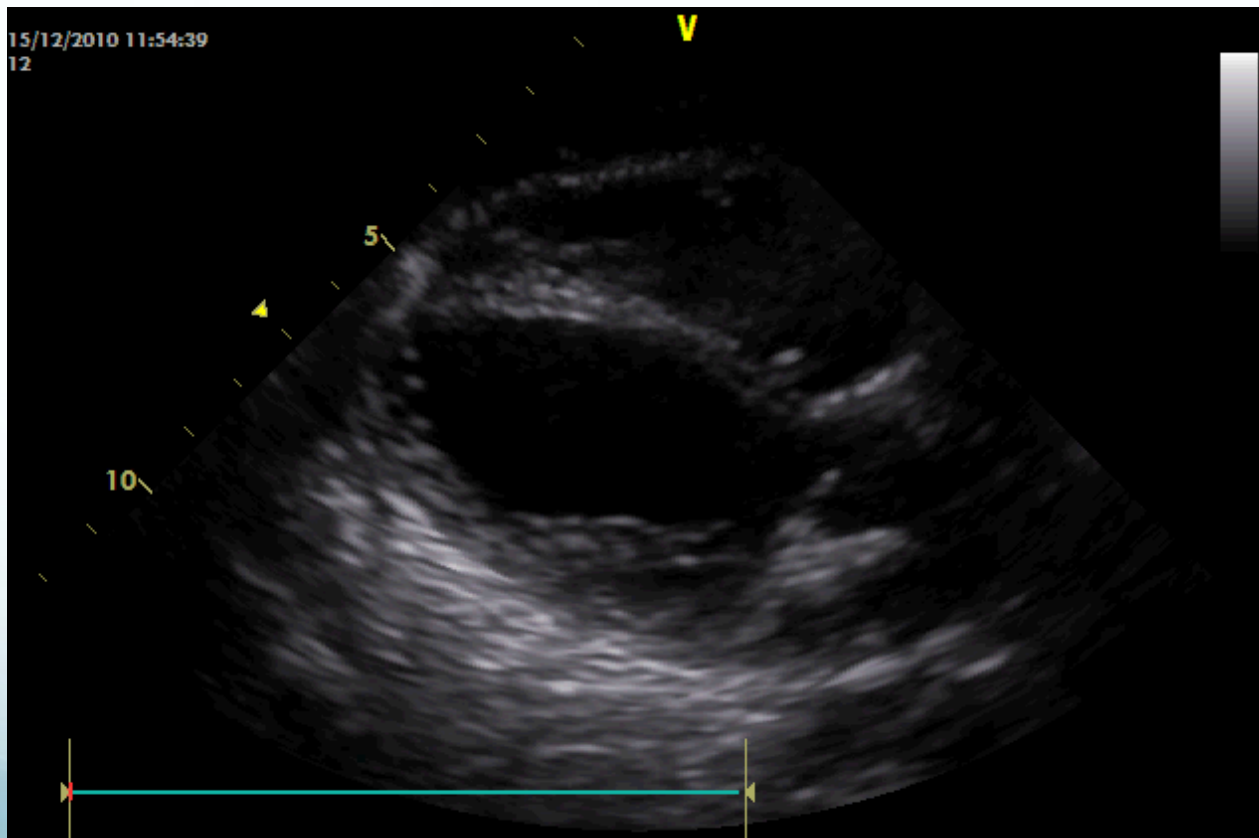
- Up to 11%
- *More common during on call hours*
- Rhythm disturbances (Flutter...)
- Tamponade
- Venous / IVC clot
- Femoral vein (max 7Fr sheath)
- Balloon fragment embolization
- Laceration of atrioventricular valves, systemic or pulmonary veins and
- STROKE (blade septostomy)

Septostomy complications during on call hours

1. 106 neonates In all, 64 infants had the procedure performed within routine hours (9 am to 6 pm), whereas 42 neonates underwent the procedure out-of-hours (6:01 pm to 8:59 am).
2. Procedure-related complications occurred in 30%, 18.8% in the routine-hours group and 47.6% in the out-of-hours group.
3. During further follow-up after surgery and including both major and minor adverse events, seven more infants (10.9%) suffered complications after balloon atrial septostomy in the routine-hours group and four more infants (9.5%) suffered complications in the out-of-hours group.
4. This totalled the complication rate in the routine-hours group to 19 infants **(29.7%)** and 24 infants **(57.1%)** in the out-of-hours group ($p = 0.001$). A higher overall mortality rate was also noted in the out-of-hours group.

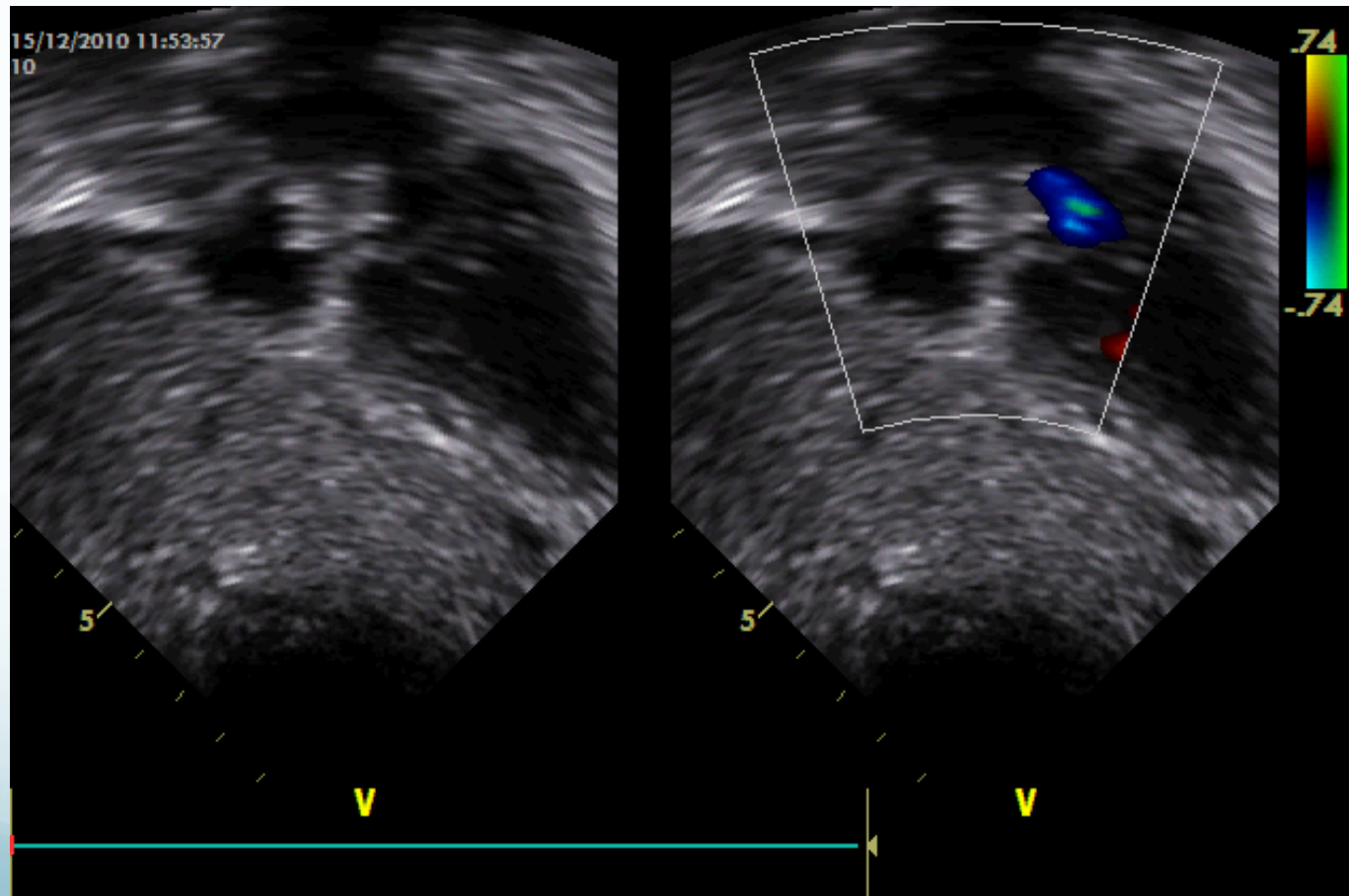
CREATION OF AN ASD

1. Transeptal + blade + ballooning
2. Stenting (with or without the need for transeptal)



Atrial septal stenting

9x19mm premounted Genesis



CONCLUSION

1. BAS is a life saving procedure but one that should be performed by senior Staff or under senior supervision
2. Preferably performed during routine hours
3. Atrial septal stenting ensures communication stays open in babies > 6 weeks
4. Be prepared for device failure and complications and how to deal with them

Thank you

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