CARDIOLOGY 2023

TETRALOGY OF FALLOT

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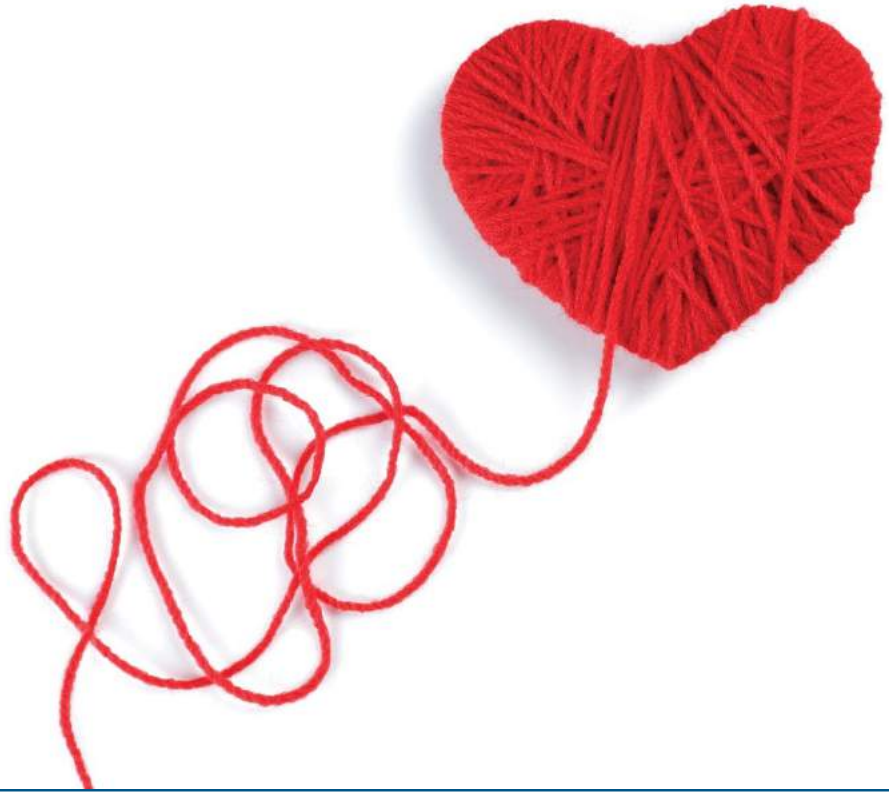
February 25, 2023



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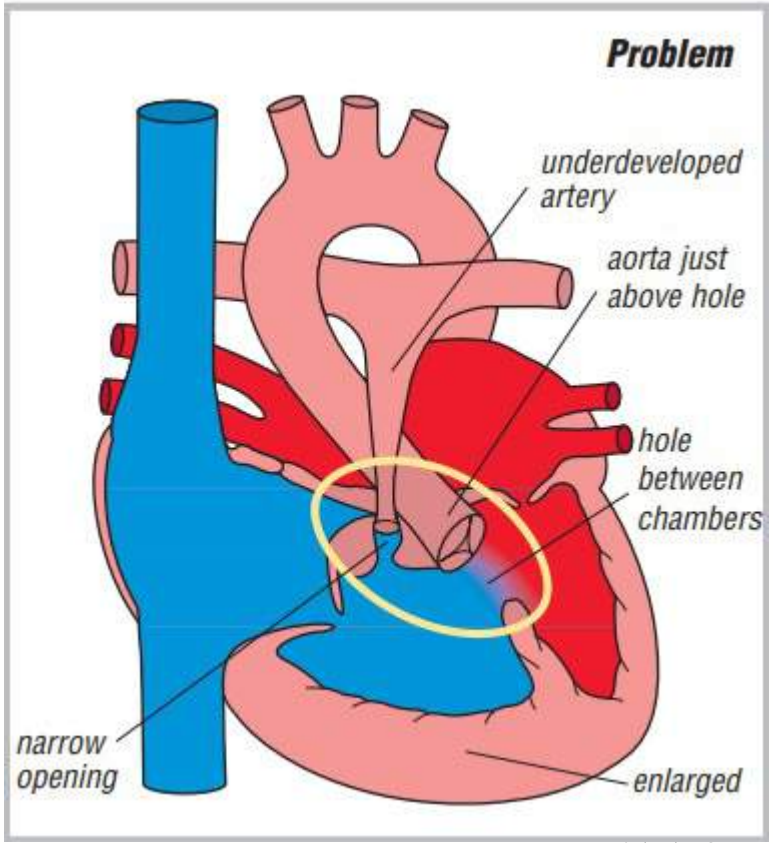
YOU ARE ADMITTING THE POST-OP HEART

- 5-month-old with TOF
- Had BTT Shunt as newborn
- Complete repair
  - VSD Closure
  - Transannular patch
- Vasoactive support
  - Milrinone 0.5mcg/kg/min
  - Epi 0.02mcg/kg/min

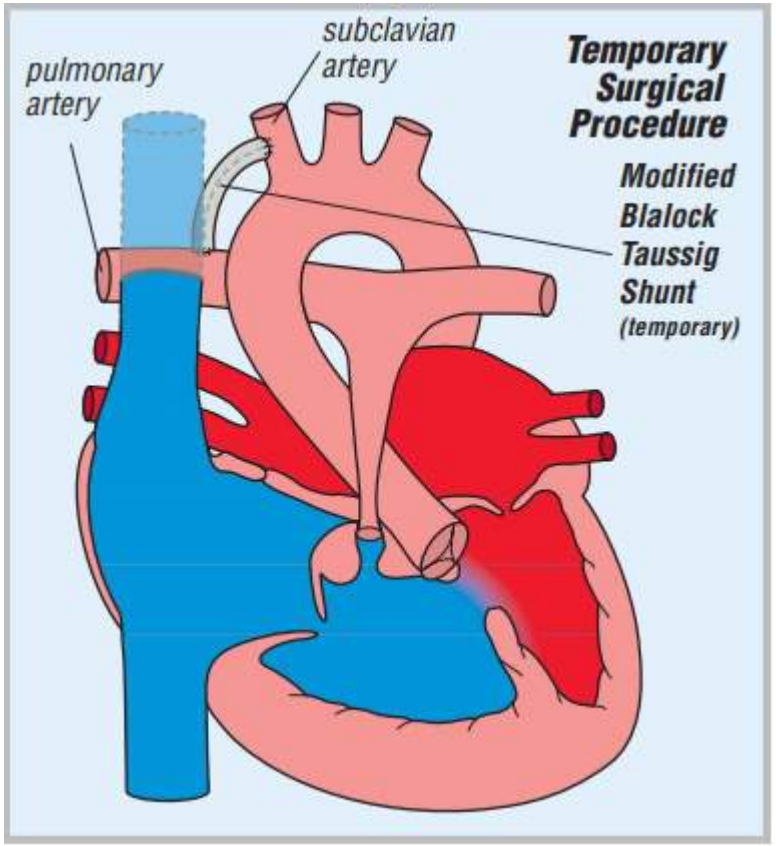
TETRALOGY OF FALLOT

- Overriding aorta
- Ventricular septal defect
- Pulmonary stenosis
  - Pink vs Blue TET
- RV hypertrophy
- Most common form of cyanotic CHD
- 7-10% of all CHD



BTT SHUNT

- Risk of TET spells/cyanosis
- Placement of 3-4mm shunt
  - Subclavian artery to RPA

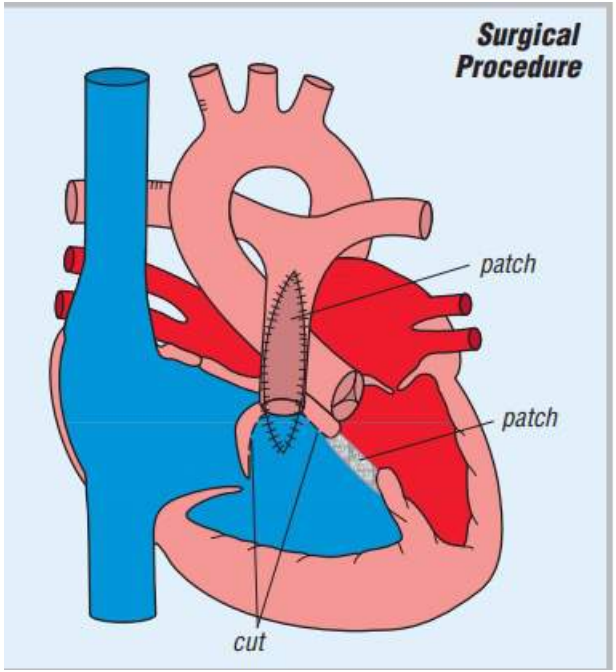


TOF REPAIR

Closure of the VSD

- Accessed via right atrium

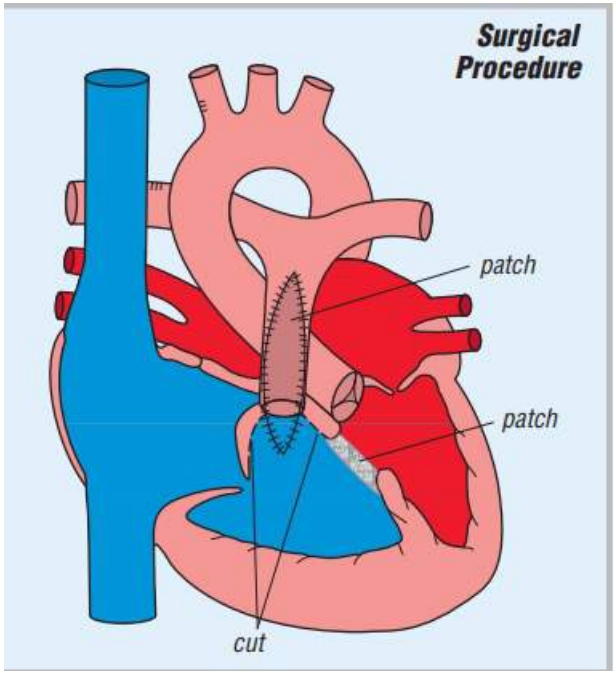
Open RVOT with transannular patch



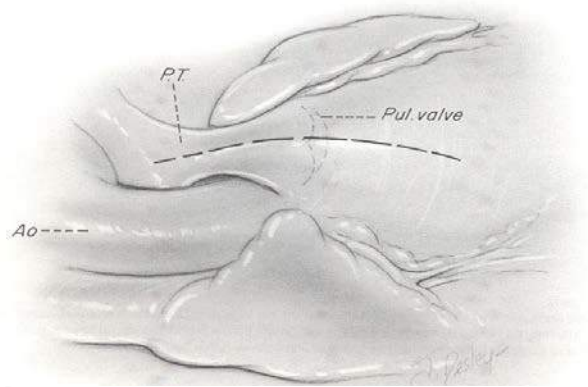
TRANSANNULAR PATCH

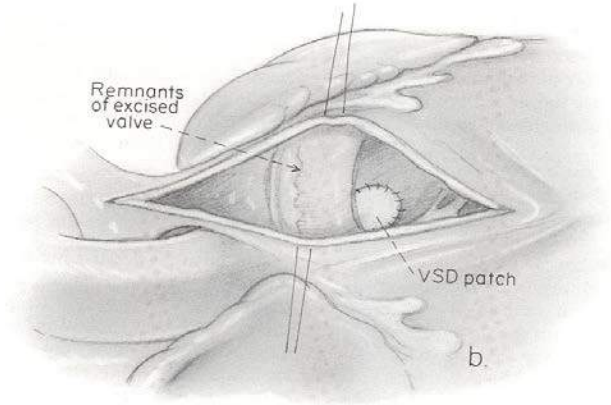
What is a transannular patch?

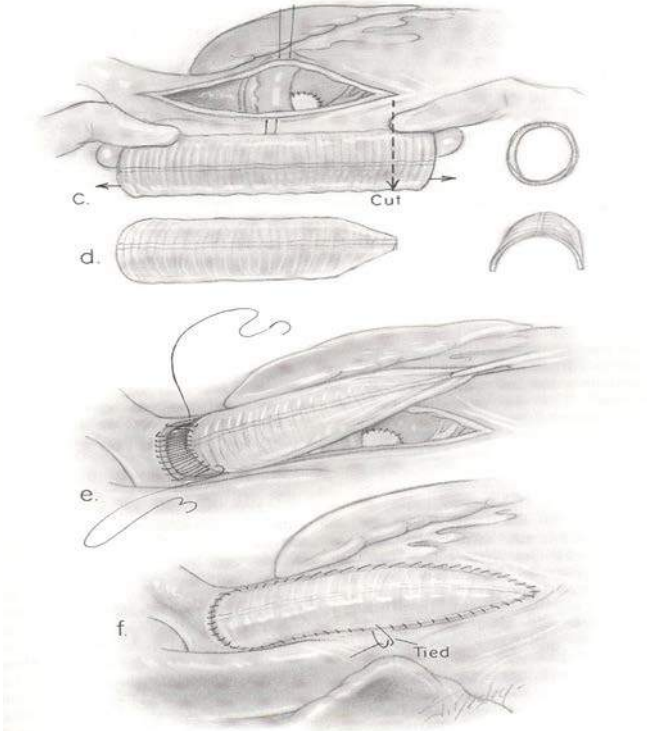
- Pulmonary annulus is not sufficient
- Incision in annulus of pulmonary valve and main pulmonary artery
- Monocusp valve
- Allows for “pop off” of RV
- Can result in moderate to significant pulmonary valve regurgitation



TRANSANNULAR PATCH







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WHAT SHOULD YOU EXPECT IN THE POST-OP PERIOD?

- What was the actual repair?
- What did the post-op TEE show?
  - Do they have any VSD patch leak?
  - Any residual right ventricular outflow tract obstruction?
- Low cardiac output syndrome?
- Systolic or diastolic dysfunction?
- Any arrhythmias or being paced?
- Any other issues in the OR?

LOW CARDIAC OUTPUT SYNDROME

- Transient decrease in systemic perfusion secondary to myocardial dysfunction
  - Imbalance between oxygen delivery and oxygen consumption ~ metabolic acidosis
- Causes include poor contractility, arrhythmias, post-operative bleeding, systolic or diastolic dysfunction, residual lesions
- 25% of patients will experience after bypass
- Occurs 6-18 hours after surgery

LOW CARDIAC OUTPUT SYNDROME

Causes

- Tamponade
- Systolic dysfunction
- Diastolic dysfunction
- Residual lesions
- Arrhythmia

Signs

Tachycardia

Hypotension

Narrow pulse pressure

Poor perfusion

Oliguria or anuria

TREAT THE CAUSE….

- Why are they tachycardic?
  - Arrhythmia
  - Bleeding/tamponade
- Why are they hypotensive?
  - Arrhythmia
  - Bleeding/tamponade
  - Any dysfunction?
- All can lead to poor perfusion and end organ dysfunction

DIASTOLIC DYSFUNCTION IS A BIGGER CONCERN

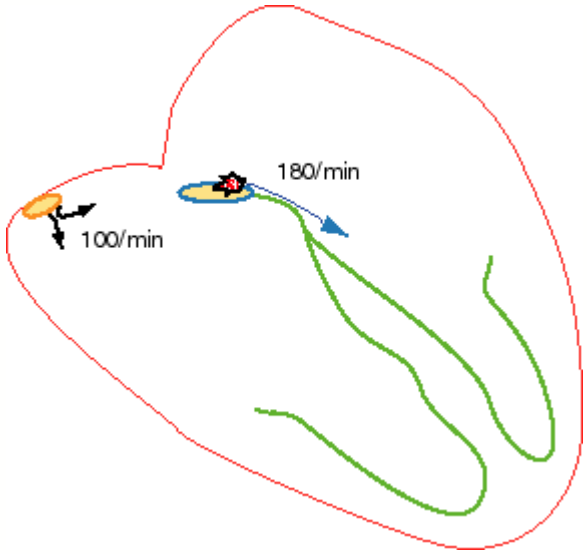
- Hypertrophied and stiff RV that will not relax
- D/T pulmonary stenosis
- Can contribute to decreased CO and increased cvp
- Treatments include
  - Increase preload
  - Lusitropy (Milrinone)
  - Beta Blockers

ARRHYTHMIAS

- Junctional ectopic tachycardia (TET – JET)
- Heart Block
- Bundle Branch Block
- Ventricular arrhythmias

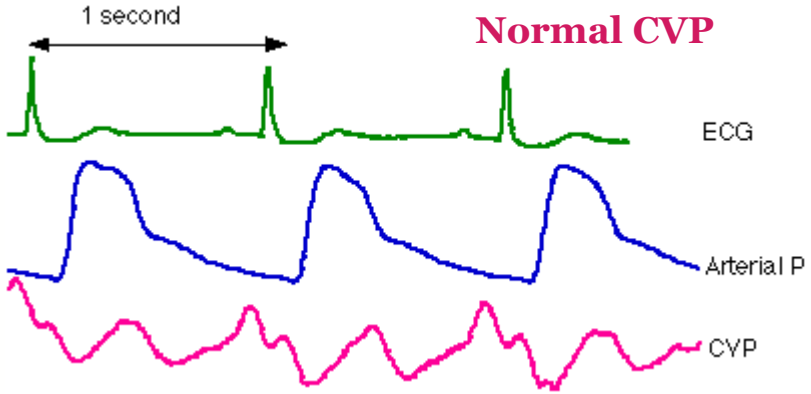
JUNCTIONAL ECTOPIC TACHYCARDIA (JET)

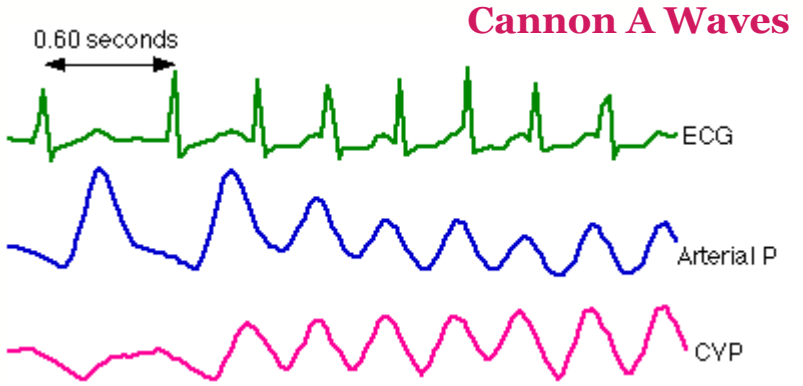
- Occurs 8-10%
- Within 24 hours of surgery
- Causes
  - Abnormal automaticity
  - Edema
  - Injury from suture lines
  - Long ischemic times
  - Long cross-clamp and bypass times
  - Need for inotropic support
- 15-25% decrease in CO
  - Lack of AV synchrony



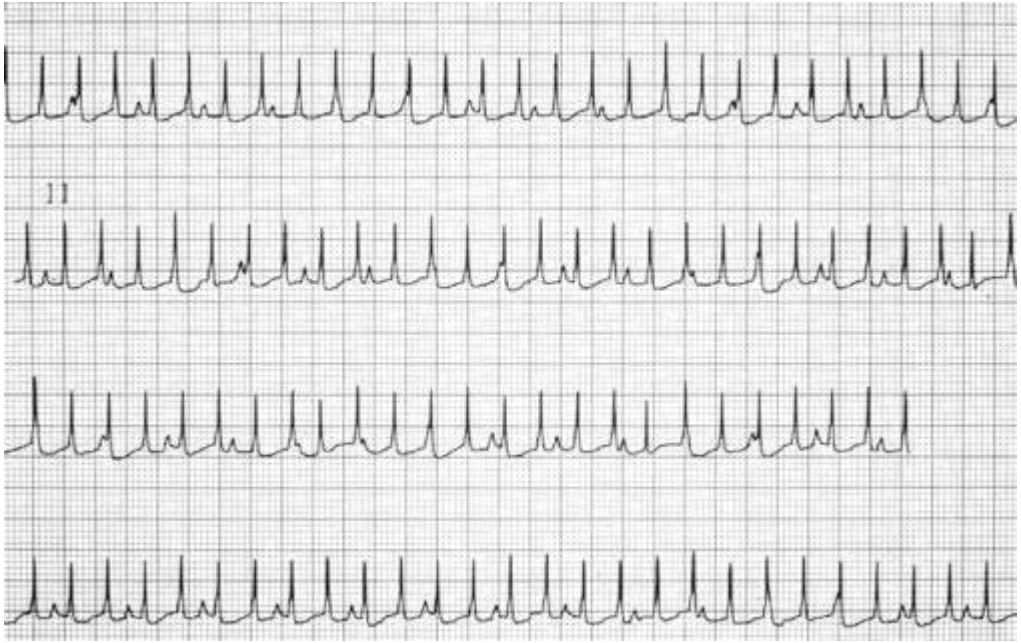
CLINICAL SYMPTOMS OF JET

- Warm up pattern
  - HR gradually increases
  - Absence of p-waves
  - Atrial electrogram
- HR 160-220
- Hypotension
- Cannon a waves on CVP





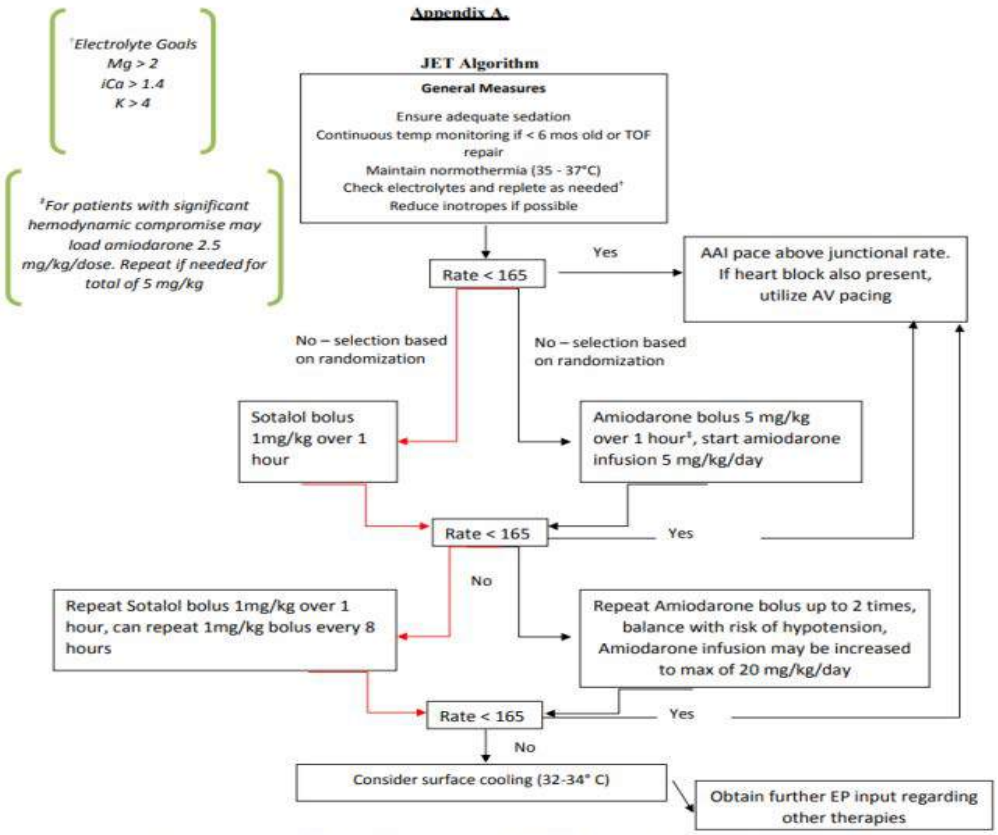
JET



MANAGEMENT OF JET

- Overdrive pacing
  - Restore AV synchrony
- Medications
  - Amiodarone or Sotalol
  - Dexmedetomidine
  - Decrease inotropic support as tolerated
- Correct electrolyte imbalance
- Core temperature cooling

JET



** If the clinical team feels that other treatment beyond the study protocol is needed, the clinic team can bypass the study protocol if they believe it is clinically necessary.

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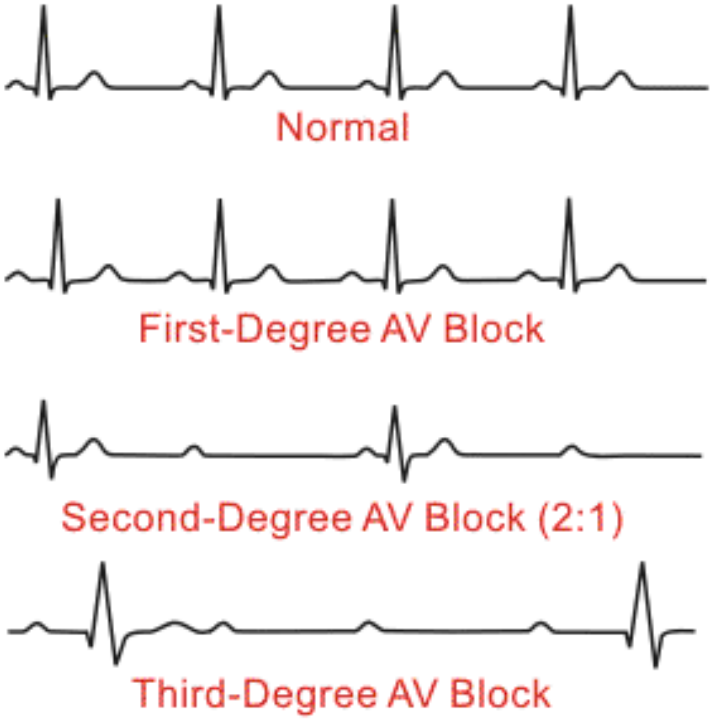
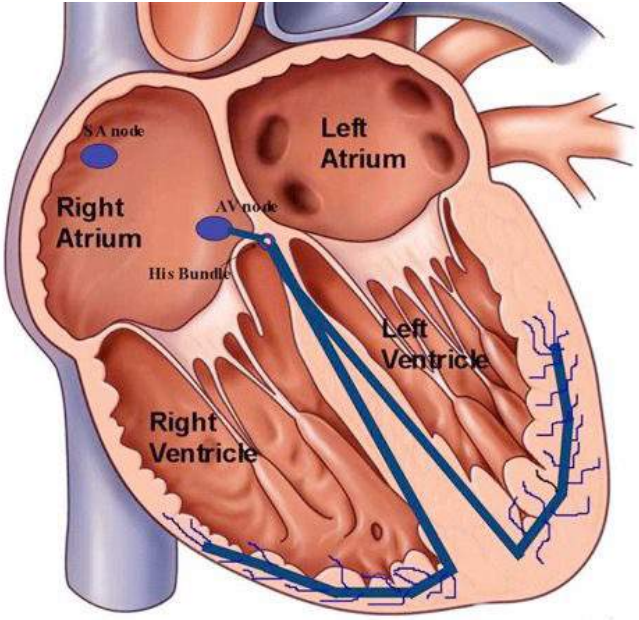
AV BLOCK


Normal
First-Degree AV Block
Second-Degree AV Block (2:1)
Third-Degree AV Block


SA node
Left Atrium
Right Atrium
AV node
His Bundle
Left Ventricle
Right Ventricle

SYMPTOMS OF AV BLOCK

Symptoms

- Lack of AV synchrony
- Decreased filling time
- Hypotension
- Decreased cardiac output
- Elevated CVP
- Venous Congestion
- Hypoxia

Treatment

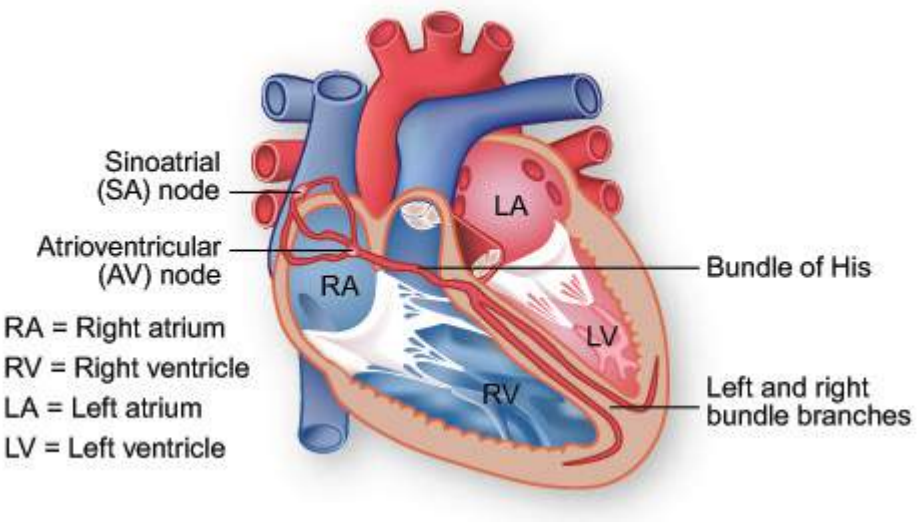
Tincture of time

Temporary pacing

Permanent pacemaker

BUNDLE BRANCH BLOCK

- Prolonged QRS
- Normal QRS 0.02ms-0.08s
- D/T injury or swelling of the area
- Very high incidence post op
- No treatment necessary



VENTRICULAR ARRHYTHMIAS

- Late onset
- Related to scarring of RVOT, ventriculotomy, **pulmonary regurgitation, right ventricular dilation and hypertrophy**
- Risk for SCD
- Pulmonary valve replacement has been shown to reduce risk

POST OP CONSIDERATIONS/BIG PICTURE

- Early extubation
- Residual lesions
  - RVOT obstruction
  - Residual or unrecognized VSD
  - Branch PA stenosis
  - Coronary Issues
  - PFO or residual ASD
- Diastolic dysfunction
  - Slow recovery
  - Ileus and poor oral intake
- Pleural effusions

LONG TERM

- Perioperative mortality is low
- Branch PA stenosis
- Pulmonary Insufficiency with TAP
  - RV dilation
  - Ventricular ectopy and SCD
  - Worsening exercise intolerance
- Will need PV replacement

QUESTIONS

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