Hybrid Room Anesthesia

TAVR [2-3 hours]

Anesthesia Goals — 'slow, full, tight'

- maintain baseline BP, avoid bradycardia, maintain SVR
- ACT >250***
- Can go into complete heart block after valve deployment - vigilance/communication
- pericardial effusion — persistent hypotension usually first sign — alert surgeon
- requires breath holds — keep this in mind when choosing/timing drugs
- Coylewright prefers patients very awake
    - consider 1-2mg Versed, 25-50mcg Fentanyl for local +/- precedex boluses
- if doing GETA, consider placing OGT after induction to decompress stomach for TEE

Essentials

- blood in OR
- hot sticks
- upper/downer gtts
- volume line***
- a-line — typically prior to induction, occasionally can use their arterial access***

Pathophysiology of Aortic Stenosis

- HR x SV = CO
    - SV is fixed due to stenotic valve so HR is the only way to maintain CO
- Even mild hypotension causes a significant drop in coronary perfusion pressure
    - coronaries are perfused during diastole so avoid increased HR

Procedure Details

- local at access sites (can be stimulating, but Coylewright localizes very well)
- R & L FA access (R usually primary, L is back-up site)
- FV access
- TVP to RV
- sheath in FA
- cardiologist doing TTE/TEE
- guidewire up through native valve (usually when they ask for "LAO" fleuro)
- valve deployment device up through valve
- Pacemaker ready — breath hold
- BP will drop during pacing — short lived & usually doesn't require treatment
- Time Out #1 — breath hold, pace 180, valvuloplasty under fleuro ("cine")
- Time Out #2 — breath hold, pace 180, deploy valve
- ECHO
- angiogram to check for paravalvular leaks, TTE/TEE to check for effusion
- protamine/closure of femoral sites
    - primary site closed then angiogram via back-up site to assess closure at primary site

*** *always discuss with surgical team if you can attach to their arterial or venous (volume) lines prior to case. Sometimes this is appropriate for the procedure and sometimes it is not, never assume.*

*** *clarify if you should draw ACTs or if surgical team will — typically anesthesia draws it if we placed the a-line, surgery draws it if we use their arterial access. This is subject to change. Ask surgeon preference on heparin time notifications — ex: 5 mins after first dose, then every 15? every 30?*

please add any additional notes here and the sheet will be updated to maintain up to date information

WATCHMAN (LAA CLOSURE) [1-2 hours]

Anesthesia Goals

- usually MAC — 1-2mg Versed, 25-50mcg Fentanyl for local, +/- Precedex boluses
- Coylewright's goal is to have them home the same day, keep this in mind
- don't let the patient snore — changes intrathoracic pressures and causes movement
- Coylewright often requests 500mL IVF in by start of case to increase LA pressures
    - this decreases the chance of air entrainment. Clarify with her first.
- pericardial effusion — persistent hypotension usually first sign — alert surgeon

Essentials

- a-line — can insert prior to induction if necessary, otherwise use theirs***
- volume line - not usually, they can give us one if needed***
- 'filters' on all cases that go from R —>L side of heart — in workroom
    - drugs get 'stuck' in them so be sure to flush line very well when using
- ACT >300*** — Heparin 100units/kg is typical dose

Pathophysiology

- a-fib patients are at risk for clot development due to pooling of blood in LAA
- goal of procedure is occlusion of LAA so patients no longer require blood thinners

Procedure Details

- Access (usually R FV)
- ICE catheter
- Transeptal Catheter (septal puncture)
- ICE Catheter through septal puncture into PA — measurements
- Pigtail catheter into LAA
- device deployed
- fleuro again to check for leaks
- if in good position with no leaks, safety tether released and wires pulled out
- protamine — usually requests 40mg

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MITRAL CLIP [2-3 hours]

Anesthesia Goals — 'full, fast, forward'

- maintain BP at baseline
- avoid increases in pulmonary vascular resistance caused by:
  - acidosis, hypercarbia, hypoxia, N20, trendelenburg position, hypothermia, pain
  - all of these make it harder for R side to get blood over to L side
- limit IVF — around 2L of fluid is infused by the delivery device throughout the case
- ACT >250*** — usually 100u/kg of Heparin
- pt cannot move — very large, rigid delivery device & very large sheath in FV - can tear if pt moves

Essentials

- a-line***
- volume line ready***
- 'filters' on all cases that go from R —>L side of heart — in workroom
  - drugs get 'stuck' in them so be sure to flush line very well when using
- cardiology typically does ECHO
- place magnet on pacemaker/defibrillator if present
- Plan B, if torrential MR present after manipulation with clip, is IABP

Pathophysiology of Mitral Regurgitation

- regurgitation occurs during systole, so decrease time spent in systole by maintaining/increasing HR
- increased preload helps compensate for lost volume from LV that stays in the LA
- decrease afterload — path of least resistance, make it easier to go forward rather than back into LA
- pulmonary vascular resistance is affected by pH, $PaCO_2$, PaO_2, position, temp — see the big picture

Procedure Details

- FV access
- guidewire and dilator advanced into RA
- septal puncture, into LA

[[much larger septal puncture than other procedures — occasionally have to close the septostomy at the end of the case if it creates a R to L shunt - 1/100 cases, so 1% chance. Will present as oxygenation issues so be vigilant!]]

- clip delivery device advanced through dilator
- lots of fleuro to ensure good placement of clip — may clip on, assess MR, remove clip, reposition, clip on, remove clip.... every time they clip the BP will increase typically by 15-20 (due to less regurgitation into LA and more forward flow into LV), this is expected and acceptable.
- once clipped in good position, safety strings removed
- close/protamine

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LEAD EXTRACTION [1-3+ hours]

Anesthesia Goals

- ask about need for L arm IV
- GETA — very rarely MAC if device hasn't been in long, discuss with surgeon
- 2 large bore IV's

Essentials

- blood in room. CV surgeon on standby because Plan B is CPB
- a-line — place prior to induction if appropriate, otherwise can use theirs***
- volume line***
- make plans for alternate way to pace/defibrillate since their device will be non-functional
- defib pads on patient
- hot sticks

Pathophysiology

- considered an 'extraction' if it's been in place >1yr. If <1 year it's considered an 'explant'
- consider the patient population — why do they have the device? — often very sick
- although it can vary, leads are typically attached to generator in L chest pocket, then tunneled up into L subclavian vein, into SVC, then into the heart
- single chamber = 1 lead in RA or RV
- dual chamber = 1 lead in RA and 1 lead in RV
- Bi-V = 1 lead in RA, 1 lead in RV, 1 lead in LV (via coronary sinus vein)
- new leadless pacemakers coming onto market — only in RV — inserted via R FV

Procedure Details

- goal = take old leads out & place new leads, sometimes new generator
- main concern = when lead is 'gently tugged on,' it creates a hole in the myocardium
- how exciting (or not) this case is depends largely on how long the leads have been in place. If they have not been in long, they likely are not adhered to anything and typically come off easily and without any damage to surrounding structures. If they have been in a while, anything can happen — damage to SVC, TV, myocardium, L SCL....
- occasionally need to do venogram to see the vein the leads are in — requires L arm IV
- open pocket, detach leads, FV or subclavian access, locate leads, remove
- Manyam is usually pretty fast, but these cases can be tedious and lengthy

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