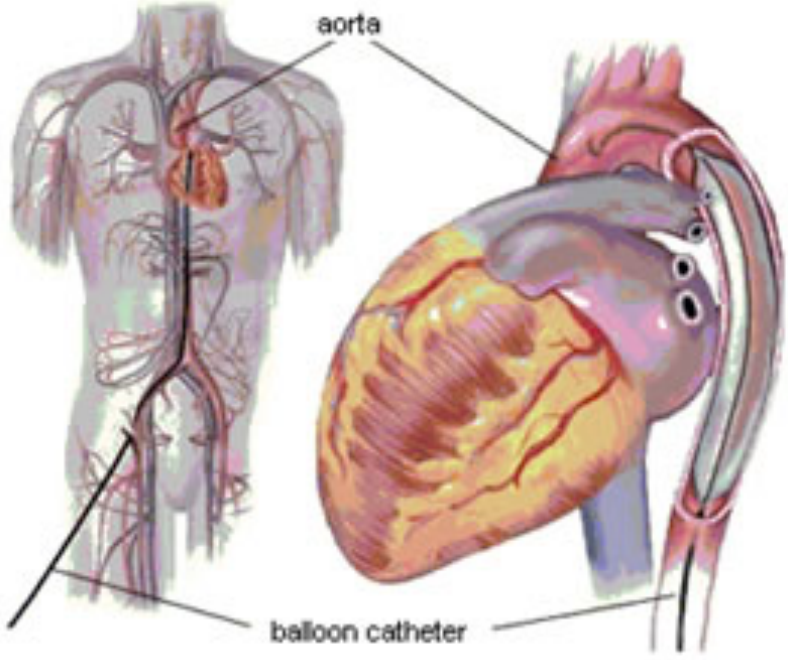
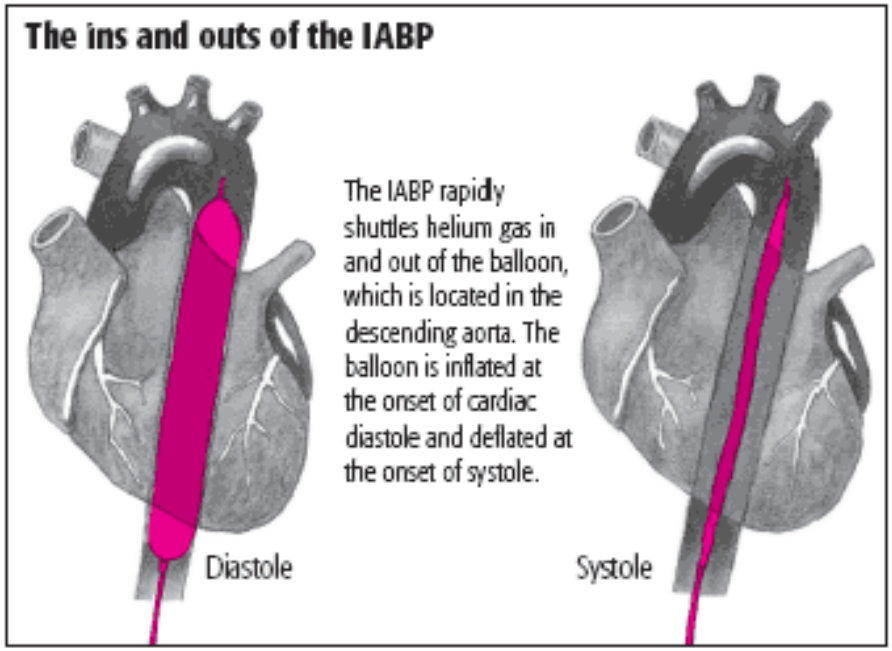
Intra-Aortic Balloon Pump (IABP)

- Mechanical device used to decrease ventricular afterload in systole and increase coronary perfusion pressure in diastole
- Inserted via femoral or axillary artery
- Balloon positioned 2-3 cm distal to origin of LSC artery (position confirmed with echo)



IABP

- IABP balloon actively deflates in systole increasing forward blood flow (decreasing afterload) and actively inflates in diastole increasing blood flow to the coronary arteries.
- This decreases myocardial oxygen demand and which leads to improved cardiac function and output



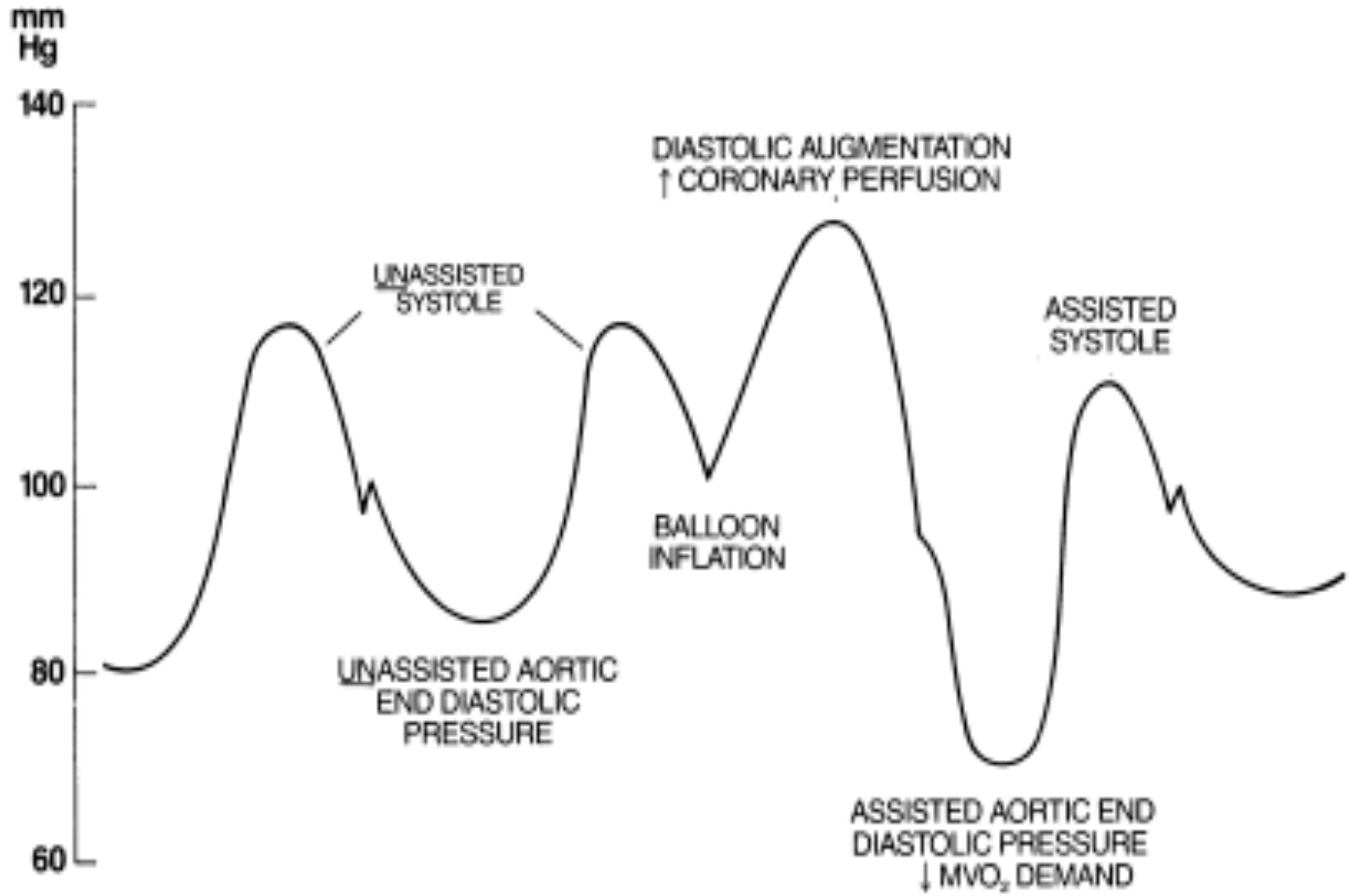
Triggering

- Balloon inflation / deflation is synchronized with either the patient's ECG signal or arterial waveform
- The balloon is set to inflate in the middle of the T-wave and to deflate prior to the ending QRS-complex
- If the ECG signal is poor then the arterial waveform is used

Timing and Weaning

- Important: IABP inflation must occur at the beginning of diastole (noted by the dicrotic notch on the arterial waveform)
- Deflation of the balloon should occur immediately prior to the arterial upstroke
- Balloon synchronization usually starts at a beat ratio of 1:2 which facilitates comparison between the pt's own ventricular beats and augmented beats to determine ideal IABP timing
- Errors in timing of the IABP may result in different waveform characteristics and a various number of physiologic effects

Waveform Characteristics



IABP Indications

1. Failure to wean from CPB
2. Low pre-op cardiac output
3. Post-infarction angina
4. Ventricular support in addition to a VAD

IABP Contraindications

1. Severe aortic atheromatous dz
2. Severe aortic insufficiency
3. Very irregular rhythm or significant tachycardia
4. Aortic aneurysm / dissection

Complications of Timing

- “Early” Inflation
  - AI & LV strain
- “Late” Inflation
  - Suboptimal coronary perfusion pressure
- “Early” Deflation
  - Inappropriate afterload reduction
- “Late” Deflation
  - Increased LV work by increased afterload

Anesthetic Maintenance Helpful Hints

- Multiple inotropes typically infusing prior to IABP insertion
- Judiciously wean down inotropes on IABP initiation
- Optimize Hemodynamics:
  1. Maintain Augmented MAP~ 90-110
  2. Treat acidosis / hypoxia / hypercarbia
  3. Maintain Hematocrit (25-30)
  4. Maintain NSR (HR ~ 90)
  5. Maintain Euvolumia

Weaning

- **NOT ALL AT ONCE!**
  - Adjust inotropic support slowly
- 1:1 -> 1:2 -> 1:3 -> 1:4
- Check **HEMODYNAMICS**
- Discontinue IABP when appropriate
- Coagulation status?
- Do NOT turn IABP off for prolonged periods