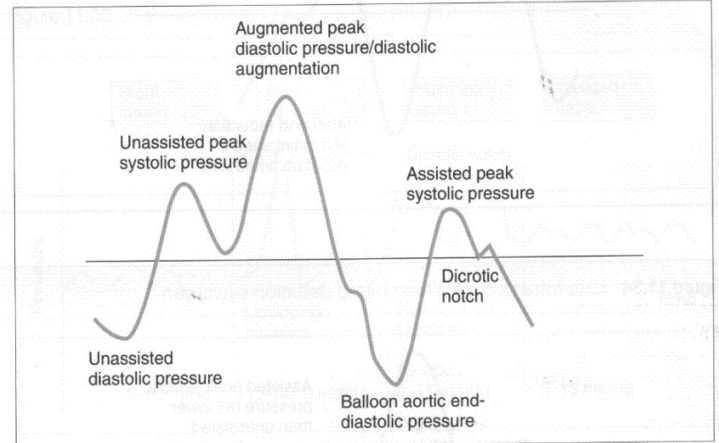


intra-aortic balloon pump

indications

- Prophylactic cardiac surgery
 - two of: left main >70%, LVEF <0.4, unstable angina, re-operation
 - non-cardiac procedures
 - severe LV impairment, unstable angina
 - Failure to wean from cardiopulmonary bypass
 - Cardiogenic shock
 - reversible myocardial depression
 - support for re-perfusion, re-vascularization
 - bridge to transport
- LVEF = LV ejection fraction

normal IABP trace 2:1

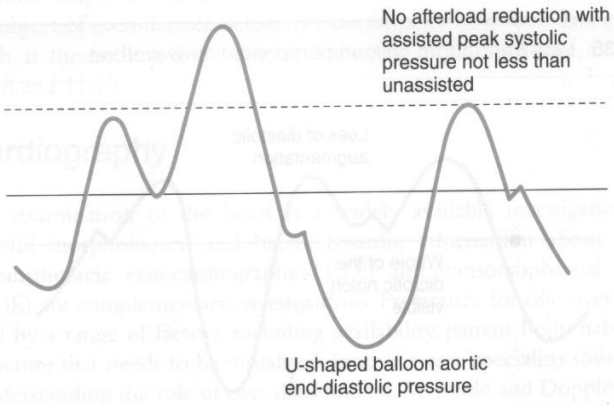


- Key features visible on a well-timed balloon trace are:
- inflation just prior to the diastolic notch
 - balloon aortic end-diastolic pressure less than the patient aortic end-diastolic pressure
 - assisted peak systolic pressure less than the unassisted peak systolic pressure.

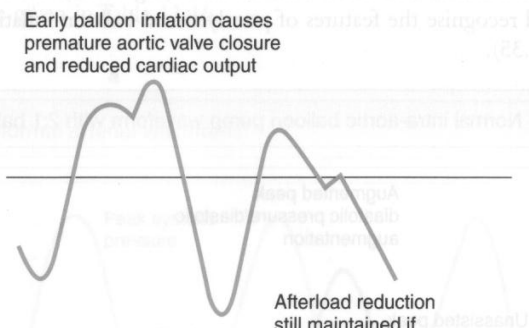
criteria to ensure optimal timing of an IABP

1. inflation occurs at the diastolic notch
2. the slope of the rise of the augmented waveform is straight & parallel to the systolic upstroke
3. augmented diastolic pressure should exceed or at least equal end systolic pressure
4. end diastolic pressure at balloon deflation is lower than preceding unassisted end diastolic pressure by 15-20mmHg
5. systolic pressure following a cycle of balloon inflation (assisted systolic pressure) is lower than the previous unassisted pressure by approximately 5mmHg

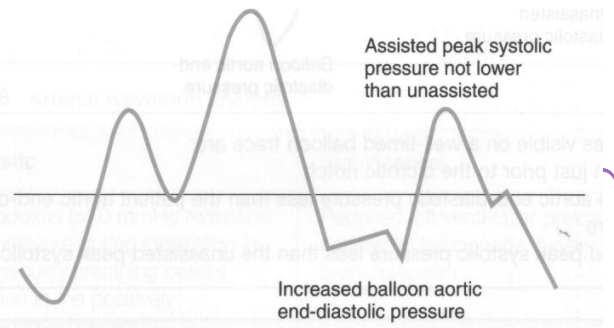
early deflation waveform



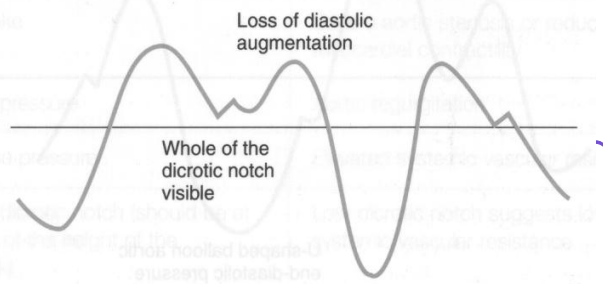
early inflation waveform



late deflation waveform



late inflation waveform



efficiency of IABP

- depends on:
1. timing of inflation & deflation
 2. assist ratio
 3. heart rate (if heart rate is greater than 130 benefit decreases)
 4. gas loss from the balloon
 5. cardiac index (a minimum cardiac index of 1.2-1.4L/min/m2 is required)

causes of poor augmentation

- balloon factors:
1. balloon too small
 2. balloon too distal
 3. inflation too late
- patient factors:
1. hypovolaemia
 2. low SVR
 3. aortic dissection