intra-aortic balloon pump

indications

early inflation waveform

Afterload reduction still maintained if deflation timed well

Assisted peak systolic pressure not lower than unassisted

Increased balloon aortic end-diastolic pressure

Loss of diastolic augmentation

Whole of the diastolic notch visible

late inflation waveform

late deflation waveform

normal IABP trace 2:1

efficiency of IABP

causes of poor augmentation

causes of late deflation waveform

early deflation waveform

criteria to ensure optimal timing of an IABP

1. inflation occurs at the dicrotic 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

Key features visible on a well-timed balloon trace are:
• inflation just prior to the dicrotic 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.

balloon factors:
1. balloon too small
2. balloon too distal
3. inflation too late

patient factors:
1. hypovolaemia
2. low SVR
3. aortic dissection

Prophylactic
cardiac surgery
- two or 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

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)