

Syllabus	CT_IK_14
Topic	Intra-aortic balloon counterpulsation

a)
Where is an intra-aortic balloon pump (IABP) ideally placed in relation to the branches of the aorta? (1 mark)

.....

b)
What gas is the balloon filled with and what is the significance of this? (2 marks)

Gas:

Significance:

c)
Complete each sentence with increases or decreases to summarise the haemodynamic effects of IABP. (3 marks)

..... diastolic blood pressure

..... systolic blood pressure

..... left ventricular end-diastolic pressure (LVEDP)

d)
List 3 indications for the insertion of an IABP. (3 marks)

1.

2.

3.

e)
List 3 absolute contraindications for the insertion of an IABP. (3 marks)

1.

2.

3.

f)
When, during the cardiac cycle, is the initiation of inflation triggered? (1mark)

.....

g)
What are the commonly used triggers for initiating the inflation and deflation of the balloon? (2 marks)

Inflation:

Deflation:

h)
List 5 complications of IABP insertion. (5 marks)

1.

2.

3.

4.

5.

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Q	Answer	Mark	Guidance
a)	<ul style="list-style-type: none"> Distal to the left subclavian artery 	1	
b)	<ul style="list-style-type: none"> Helium It is used because of its lower density to allow rapid movement of the gas in and out of the balloon. 	1 1	(Note: It is less soluble compared with CO ₂ or air, therefore higher risk of gas emboli)
c)	<ul style="list-style-type: none"> <u>Increases</u> diastolic blood pressure <u>Decreases</u> systolic blood pressure (by decreasing afterload) <u>Decreases</u> LVEDP (reducing myocardial oxygen demand and consumption) 	1 1 1	
d)	<ul style="list-style-type: none"> Cardiogenic shock secondary to an acute MI (AMI) Acute MI Acute MR and VSD Catheterisation and angioplasty Sepsis Refractory ventricular arrhythmias Refractory unstable angina Decompensated heart failure Cardiac surgery Weaning from CPB 	Any 3	
e)	<ul style="list-style-type: none"> Significant aortic regurgitation Aortic dissection Aortic stent End-stage disease/futility 	Any 3	Do not accept relative contraindications: <ul style="list-style-type: none"> Major arterial reconstructive surgery e.g. fem-pop bypass, Peripheral vascular disease Coagulopathy Tachyarrhythmias
f)	<ul style="list-style-type: none"> Early diastole 	1	
g)	<ul style="list-style-type: none"> Inflation: After the aortic valve closure Deflation: Immediately before the opening of the aortic valve 	1 1	<ul style="list-style-type: none"> Corresponds to the dicrotic notch on the arterial waveform Corresponds to the point just before the upstroke on the arterial pressure waveform

h)	<p><u>Vascular:</u></p> <ul style="list-style-type: none"> • Limb ischaemia • Aortic dissection • Local vascular injury • Spinal cord/visceral injury • False aneurysm <p><u>Balloon:</u></p> <ul style="list-style-type: none"> • Misplacement/migration leading to occlusion of subclavian/renal • Balloon perforation - gas emboli • Thrombocytopenia • Anaemia 	Any 5	<p>Accept renal injury secondary to occlusion</p> <p>Accept PE or stroke secondary to gas emboli</p>
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References:

- 1) Krishna M, Zacharowski K. Principles of intra-aortic balloon pump counterpulsation. CEACCP (2009) 9(1)24-28 <https://academic.oup.com/bjaed/article/9/1/24/466259>