

Syllabus	
Topic	Right ventricular (RV) failure

a)

The table below shows the normal range of pressures in the right ventricle and pulmonary artery, and the pulmonary vascular resistance, with equivalent values on the left side of the heart for comparison. Complete the missing values. (4 marks)

	Systolic (mmHg)	Diastolic (mmHg)
Right ventricle	1-7
Pulmonary Artery	
Left ventricle	90-140
Pulmonary vascular resistance (dyne s cm ⁻⁵)	

b)

List 3 causes of right ventricular failure. (3 marks)

1.
2.
3.

c)

Right ventricular (RV) failure can be broadly caused by increased RV afterload. Describe the 3 pathophysiological changes that occur in the RV and lead to RV hypertrophy as a result of increased RV afterload. (3 marks)

1.
2.
3.

d)

List 2 ways right ventricular hypertrophy impairs the function of the left ventricle? (2 marks)

1.
2.

e)

A patient with stable right ventricular failure presents for surgery for a fractured neck of femur. List the main perioperative goals when anaesthetising patient with right ventricular failure. (4 marks)

1.
2.
3.
4.

f)

List 2 triggers for increased pulmonary vascular resistance that should be avoided in those with right ventricular failure. (2 marks)

1.
2.

g)

Aside from standard AAGBI monitoring, what additional monitoring should be considered when anaesthetising a patient with right ventricular failure and pulmonary hypertension? (2 marks)

1.
2.

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Q	Answer	Mark	Guidance
a)	<ul style="list-style-type: none"> • Right ventricle: systolic pressure 15-25mmHg • Pulmonary artery: diastolic pressure 8-12mmHg • Left ventricle: diastolic pressure 5-15mmHg • PVR: 100-250 	<p>1</p> <p>1</p> <p>1</p> <p>1</p>	
b)	<ul style="list-style-type: none"> • RV infarction • Pulmonary embolus • Mitral valve disease with pulmonary hypertension • Congenital heart disease/ASD/VSD • ARDS • Obstructive sleep apnoea 	Any 3	
c)	<ul style="list-style-type: none"> • Increased RV afterload leads to prolonged isovolumetric contraction time • This leads to increased myocardial wall stress • Compliant RV dilates to maintain stroke volume, becoming hypertrophied over time 	<p>1</p> <p>1</p> <p>1</p>	
d)	<ul style="list-style-type: none"> • As RV expands + dilates, the interventricular septum bulges into LV cavity • Septal shift impairs filling of LV and thus LV function 	<p>1</p> <p>1</p>	Remember the pericardium limits the space available for cardiac expansion, thus an increase in RV volume must be accommodated by a decrease in LV volume
e)	<ol style="list-style-type: none"> 1. Optimise/maintain/avoid reduction in preload 2. Maintain sinus rhythm 3. Aim normal heart rate/avoid tachycardia/avoid bradycardia 4. Preserve myocardial contractility 5. Avoid increases in PVR 6. Avoid reduction in SVR/maintain BP at preoperative value 7. Minimise catecholamine release 8. Correct electrolyte disturbances 	Any 4	

f)	<ul style="list-style-type: none"> • Hypoxia • Hypercarbia • Hypothermia • Pain • Acidaemia • High airway pressures/high PEEP • Use of nitrous oxide 	Any 2	
g)	<ul style="list-style-type: none"> • Invasive blood pressure monitoring/arterial line • Cardiac output monitoring • CVC in SVC • BIS monitoring 	Any 2	To reduce amount of anaesthetic and its deleterious effects

References:

- 1) Kevin LG, Barnard M. Right ventricular failure. BJA Education article (2007) 7(3)89-94
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- 2) Murphy E, Shelley B. The right ventricle: structural and functional importance for anaesthesia and intensive care. BJA Education (2018) 18(8)239-245
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