

Syllabus	
Topic	Effects of smoking

You review Nigel, a 62 year old man, in the preoperative assessment clinic 1 month prior to planned colorectal surgery. He is a lifelong smoker. You advise him to stop smoking and refer him to the smoking cessation service.

a)
Give two reasons why smoking affects blood oxygen carriage and delivery (2 marks)

- 1)
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- 2)
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b)
State 4 effects of smoking on the **cardiovascular system** (4 marks)

- 1)
- 2)
- 3)
- 4)

c)
List 5 perioperative complications of smoking related to the **respiratory system** (5 marks)

- 1)
- 2)
- 3)
- 4)
- 5)

d)

Give a pharmacological effect of smoking relevant to anaesthesia (1 mark)

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e)

List 3 benefits of abstaining from smoking in the 24 hours prior to surgery (3 marks)

1)

2)

3)

f)

List 3 benefits of smoking cessation in the long term (3 marks)

1)

2)

3)

g)

State 2 general postoperative complications smokers are at an increased risk of experiencing. (2 marks)

1)

2)

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	Answer	Mark	Guidance
a)	<ul style="list-style-type: none"> • Carbon monoxide has a greater affinity for Hb than oxygen – decreasing oxygen carriage • CO shifts the oxyhaemoglobin dissociation curve to the left/reduces ability of Hb to release oxygen to tissues 	<p>1</p> <p>1</p>	<p>CO has 300-fold greater affinity for Hb than oxygen, forming COHb. In people who smoke, the % of COHb in arterial blood is 2-12% vs. <1.5% in non-smokers.</p>
b)	<ul style="list-style-type: none"> • 3-4x fold increase in coronary artery disease/IHD - accelerated atherosclerosis formation and prothrombotic state (due to polycythaemia, increased fibrinogen and enhanced platelet action) • Increased incidence of dysrhythmias/tachycardia • Increased myocardial work with reduced oxygen supply – increased risk of perioperative ischaemic event • Increased risk of PVD/thromboembolic disease/stroke • HTN • Heart failure 	Any 4	<p>Smoking is the largest preventable cause of cardiovascular morbidity & mortality.</p> <p>The sympathomimetic effects of nicotine and the reduction in oxyhaemoglobin caused by carbon monoxide adversely affect oxygen supply and demand to the myocardium.</p> <p>Smoking is an independent risk factor. (Also strong link to SAH, especially in women).</p> <p>Raised circulating catecholamines and accelerated atherosclerosis formation increases LV afterload. Results in LVH, diastolic dysfunction and heart failure.</p>
c)	<ul style="list-style-type: none"> • Hypoxaemia • Laryngospasm • Breath-holding • Bronchospasm • Atelectasis • Sputum retention • Pulmonary oedema • Pneumonia • Respiratory failure • Reintubation after planned extubation/unplanned intubation • PE (due to hypercoagulability) 	Any 5	

d)	<ul style="list-style-type: none"> • Nicotine induces cytochrome p450 system (CYP1A1, CYP1A2, CYP2E1) so drug metabolism altered • Greater postoperative opioid requirement 	Any 1	<p>Drugs affected – theophylline, haloperidol, propranolol, volatiles</p> <p>N.b. smoking associated with reduced risk of PONV but not strictly pharmacological</p>
e)	<ul style="list-style-type: none"> • Clearance of CO • Nicotine levels return to normal • Improved oxygen delivery • Reduced myocardial oxygen demand/reduction in HR • Improved physiological reserve to cope with perioperative periods of hypoxia 	Any 3	Half-life of CO is 4 hours and nicotine 30 minutes.
f)	<ul style="list-style-type: none"> • Decreased symptoms of cough and wheeze • Improved mucociliary clearance • Reduced lung inflammation • Reduced mortality in those with CAD (by a third) • Reduced risk of IHD and stroke • Slower decline in FEV1 (approaches that of non-smokers) 	Any 3	<p>Occurs within weeks</p> <p>After 7-14 days</p> <p>Takes several months</p> <p>Approaches the risk of non-smokers within 10-15 years</p> <p>The younger the patient at the time of quitting, the slower the rate of decline</p>
g)	<ul style="list-style-type: none"> • Poor wound healing • Anastomotic breakdown • ICU admission • Longer inpatient stay • Emergency readmission to hospital • Thrombotic events 	Any 2	

References

1) Carrick MA, Robson JM, Thomas C. Smoking and anaesthesia. BJA education (2019) 19(1)1-6 [https://bjaed.org/article/S2058-5349\(18\)30116-1/fulltext](https://bjaed.org/article/S2058-5349(18)30116-1/fulltext)