

Syllabus	
Topic	Neurological complications of cardiac bypass

a)

List i) 5 central and ii) 2 peripheral neurological complications of on-pump coronary artery bypass graft surgery (7 marks)

Central neurological complications:

1.
2.
3.
4.
5.

Peripheral neurological complications:

1.
2.

b)

List 3 patient and 3 surgical risk factors for central neurological complications (6 marks)

Patient risk factors:

1.
2.
3.

Surgical risk factors:

1.
2.
3.

c)

Suggest 2 imaging modalities which may identify those at higher risk of central neurological complications (2 marks)

1.

2.

d)

List 5 intraoperative methods of reducing the risk of central neurological complications (5 marks)

1.

2.

3.

4.

5.

Syllabus	
Topic	Neurological complications of cardiac bypass

Q	Answer	Mark	Guidance
a)	<p><u>Central complications:</u></p> <ul style="list-style-type: none"> • Cognitive impairment • Delirium/agitation • Visual field defects • Stroke/TIA • Seizure • Paraplegia (cord ischaemia) • Emergence of primitive reflexes <p><u>Peripheral complications:</u></p> <ul style="list-style-type: none"> • Brachial plexus injury (retractor) • Ulnar neuropathy (positioning) • Phrenic nerve palsy (ice to cool heart and IMA harvest) • Intercostal nerve injury if MIDCAB (incision between ribs) • Saphenous nerve injury from vein harvest 	<p>5</p> <p>2</p>	
b)	<p><u>Patient factors:</u></p> <ul style="list-style-type: none"> • Proximal aorta atheroma • Old age • Diabetes • Past CVA • Carotid stenosis • Male sex • Preoperative cognitive impairment <p><u>Surgical factors:</u></p> <ul style="list-style-type: none"> • Long duration of surgery • Cardiopulmonary bypass microemboli (dose-response) • Previous cardiac surgery • Use of intra-aortic balloon pump • Rapid rewarming impairs autoregulation and causes cerebral oedema • Failure to maintain CPP intra-op • Prolonged deep hypnotic time 	<p>3</p> <p>3</p>	

c)	<ul style="list-style-type: none"> • Carotid Doppler • CT head • MRI brain 	3	
d)	<ul style="list-style-type: none"> • Modify technique for minimal cross clamps/proximal aorta handling • Image proximal aorta to avoid cannulating atheroma site • Modify bypass: <ul style="list-style-type: none"> ○ minimise exposure/avoid ○ avoid air entrainment/use bubble traps and embolus filters ○ membrane oxygenator to reduce microemboli ○ maintain pressure and flow for CPP ○ temperature control – cool intraop and avoid rapid rewarming and hyperthermia • Glucose control • Use neurological monitoring (transcranial doppler, NIRS, EEG) • Avoid over-anaesthetising (BIS) to avoid delirium • Pharmacological neuroprotection (Mg, propofol, steroids, lidocaine) • Adequate heparinisation ACT >4x baseline 	5	

References: