

Syllabus	CT_IK_21, CT_IK_22
Topic	One lung ventilation

a)

Give 3 absolute indications for one-lung ventilation (OLV) (3marks)

- 1)
- 2)
- 3)

b)

Describe the anatomical difference between the left and right main bronchi (1 mark)

.....

c)

Compare and contrast Dual Lumen Tube (DLT), Bronchial Blocker (BB), Single Lumen tube (SLT) advanced into bronchus for lung isolation (6 marks)

	Advantage	Disadvantage
Double lumen tube
Bronchial blocker
Single lumen tube into bronchus

d)

What FEV₁ result is needed to proceed with a pneumonectomy? (1 mark)

.....

e)

How do you calculate a predicted post-operative FEV₁ following lung resection (1 mark)

.....

If the predicted percentage FEV1 or DLCO was <40% then further testing is advised for suitability for surgery

f)

What further test would be carried out? (1mark) what parameter would be measured (1 mark) and what result would suggest high-risk but suitable for surgery? (1 mark)

Test:

Parameter:

Result:

A patient develops hypoxaemia during OLV. Initial management has included; increasing inspired oxygen to 100%, appropriately checking delivery of oxygen and causes associated with high airway pressure.

g)

List 5 ways you would manage physiological hypoxaemia in this instance? (5 marks)

1)

2)

3)

4)

5)

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	Answer	Mark	Guidance
a)	<p><u>Prevent damage or contamination to the healthy lung:</u></p> <ul style="list-style-type: none"> • Lung abscess • Pulmonary haemorrhage <p><u>Control distribution of ventilation:</u></p> <ul style="list-style-type: none"> • Bronchopleural fistula • Major cyst or bulla • Traumatic bronchial disruption <p>Facilitate single lung lavage:</p> <ul style="list-style-type: none"> • Cystic fibrosis • Pulmonary alveolar proteinosis 	Any 3	
b)	<p><u>Left main bronchus</u></p> <ul style="list-style-type: none"> • 5cm long • More horizontal • 45 degrees off midline <p>Right main bronchus</p> <ul style="list-style-type: none"> • 2.5cm long • Straight • ~25 degrees off midline 	1 for any difference	
c)	<p><u>DLT Advantages</u></p> <ul style="list-style-type: none"> • Quickest to place • Suction + Bronchoscopy (FOB) to isolated lung • CPAP to operated lung • Can alternate OLV to either lung • Can insert even if bronchoscope not available <p><u>DLT Disadvantages</u></p> <ul style="list-style-type: none"> • Limited sizes available • Difficult to place in abnormal/distorted airways • Not ideal for postoperative ventilation • Potential airway trauma risk • Intraoperative displacement 	6 marks total (1 mark for each box)	

<p><u>BB Advantages</u></p> <ul style="list-style-type: none"> • Easy size selection • Easily used with standard tracheal tube • Selective lobar lung isolation possible • Postoperative dual lung ventilation possible by withdrawing BB <p><u>BB Disadvantages</u></p> <ul style="list-style-type: none"> • More time for insertion and accurate positioning • FOB essential • Slow and incomplete collapse of lung • Suction not possible • Bronchoscopy of isolated lung impossible • Difficult to alternate OLV to either lung* <p><u>SLT Advantages</u></p> <ul style="list-style-type: none"> • Easier placement in emergencies and difficult airways <p><u>SLT disadvantages</u></p> <ul style="list-style-type: none"> • Bronchoscopy, suction and CPAP impossible to isolated lung • Difficult for left OLV 		<p>*Possible with Rusch EZ-Bifid blocker</p>
<p>d)</p> <ul style="list-style-type: none"> • 2L 	<p>1</p>	<p>Must specify units</p>
<p>e)</p> <ul style="list-style-type: none"> • PPO = pre-op FEV1 x remaining segments/total segments 	<p>1</p>	
<p>f)</p> <ul style="list-style-type: none"> • CPET • VO₂ Max • >15ml/kg/min 	<p>3</p>	<p>Must specify units</p>
<p>g)</p> <ul style="list-style-type: none"> • Oxygen insufflation to non-ventilated lung • CPAP to non-ventilated lung • Intermittent two-lung ventilation • PEEP to ventilated lung • Encourage early clamping of pulmonary artery to non-ventilated lung (during planned resection) • Optimise cardiac output • Optimise Hb 	<p>Any 5</p>	<p>Accept decrease PEEP to ventilated lung as this relieve compression of pulmonary capillaries if excessive</p>

	<ul style="list-style-type: none">• If total lung collapse not required and if prevention of cross-contamination is not an issue, application of high-frequency jet ventilation to both lungs may be considered		
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References

- 1) Ashok V, Francis J. A practical approach to one-lung ventilation. BJA Education (2018) 18(3)69-74 [https://bjaed.org/article/S2058-5349\(17\)30204-4/fulltext](https://bjaed.org/article/S2058-5349(17)30204-4/fulltext)
- 2) Ng A, Swanevelder J. Hypoxaemia during one-lung anaesthesia. CEACCP (2010) 10(4)117–122, <https://academic.oup.com/bjaed/article/10/4/117/381145>