

Question 14 : Retrieval/Ventilation

You are the duty consultant in a Tertiary Emergency Department. A 72 year old man with body weight of 70kg and height 180cm has been intubated in a rural ED for likely Covid lung infection. He requires retrieval to your Emergency Department.

This question is about

- "Protective lung ventilation/ARDS"
- Things to do if patient remains hypoxic

a. Prior to the arrival of the retrieval team, what phone advice would you give to the doctor in the rural department regarding ventilator settings in terms of protective lung ventilation in the setting of ARDS. **(6 marks)** Need 4/6 to pass

a. Ventilator settings (3 marks)

- Use predicted body weight PBW
 - Adult male $50 + 0.91 (\text{height cm} - 152.4) = 75\text{kg}$ predicted
- TV 4-8ml/kg**
 - = 280 to 560ml if using actual weight
 - = 300 to 600ml if using PBW
- Increase PEEP** (5-24 cm H₂O) sliding scale
- Plateau pressure <30cm H₂O
- RR 16+
- If using Pressure Controlled vent
 - RR 16++
 - Pmax <40 Pplat <30
 - Peep 5-14
 - Pinsp 20 and titrate to VT (420)
 - I:E 1:1.5+

Happy to accept Pressure control or Volume control
Gave weight and height to allow calculation of PBW
Low TV, relatively high RR
Increasing PEEP with increasing FiO₂

Can't get marks for putting this same thing in part a. and b.

b. Endpoints (goals) (3 marks)

- Permissive hypercapnoea
- Aim for Sats 88-95% (PaO₂ 55-80)
- pH 7.3 to 7.45

GUIDE FOR INITIAL SETTINGS FOR VOLUME CONTROLLED VENTILATION FOR DRAEGER OXYLOG 3000 PLUS

Assumes patient is apnoeic from sedation & nursed at 30° to minimise aspiration

	LUNG PROTECTIVE STRATEGY (all other patients >1yo if cuffed tube)	OBSTRUCTIVE STRATEGY (asthma/COPD if cuffed tube >1yo)																						
Mode	SIMV (default)	SIMV (default)																						
VT	6ml/kg ideal body weight- see chart	6ml/kg ideal body weight- see chart																						
RR	16-18 breaths/min then titrate to normal pCO ₂ /pH	6-8 breaths/min then examine EXPIRATORY FLOW CURVES . If breath stacking, ↓ RR (min: 4 breaths/min) -permissive hypercapnoea (pH> 7.1)																						
Pmax(alarm)	≥40 (if alarms, follow instructions below)	≥40 (if alarms, follow instructions below)																						
FiO ₂	titrate using FiO ₂ /PEEP scale → SpO ₂ of 88-95%	minimal FiO ₂ for SpO ₂ 88-95%																						
PEEP	<table border="1" style="display: inline-table; border-collapse: collapse;"> <tr> <td>FiO₂</td> <td>40</td> <td>40</td> <td>50</td> <td>50</td> <td>60</td> <td>70</td> <td>70</td> <td>70</td> <td>80</td> <td>90</td> </tr> <tr> <td>PEEP</td> <td>5</td> <td>8</td> <td>8</td> <td>10</td> <td>10</td> <td>10</td> <td>12</td> <td>14</td> <td>14</td> <td>14</td> </tr> </table>	FiO ₂	40	40	50	50	60	70	70	70	80	90	PEEP	5	8	8	10	10	10	12	14	14	14	0
FiO ₂	40	40	50	50	60	70	70	70	80	90														
PEEP	5	8	8	10	10	10	12	14	14	14														
I:E	1:1.5 (default)	≥1:4																						
AutoFlow: ON	Slope: (default)	Slope: (ie: fast inspiratory flow rate)																						
Other	<ul style="list-style-type: none"> if high PEEP results in ↓BP, give fluids & inotropes keeping MAP>65 (for paediatric values, check chart) if P_{max} alarms, check for patient agitation/ tube obstruction. if not the cause, perform INSPIRATORY HOLD MANOEUVRE - if Pplat >30 ↓TV by 1ml/kg steps (min 4ml/kg) 	<ul style="list-style-type: none"> sedate +++, avoid ongoing paralysis if ↓BP + difficult to ventilate, disconnect tube & allow to expire stacked breaths if P_{max} alarms, check for patient agitation/ tube obstruction. if not the cause, perform INSPIRATORY HOLD MANOEUVRE - if Pplat >30 ↓TV by 1ml/kg steps (min 4ml/kg) 																						

GUIDE FOR INITIAL SETTINGS FOR PRESSURE CONTROLLED VENTILATION FOR DRAEGER OXYLOG 3000 PLUS

Assumes patient is apnoeic from sedation & nursed at 30° to minimise aspiration.

Recommended for all **UNCUFFED** tubes

	LUNG PROTECTIVE STRATEGY (all other patients)	OBSTRUCTIVE STRATEGY (bronchiolitis/asthma)																						
Mode	PC SIMV+	PC SIMV+																						
VT	can't be set in PC mode- see P _{insp}	can't be set in PC mode- see P _{insp}																						
RR	see chart- then titrate to normal pCO ₂ /pH	{1/3 normal RR}- see chart then examine EXPIRATORY FLOW CURVES - if breath stacking, ↓ RR by further 20% -permissive hypercapnoea (pH> 7.1)																						
Pmax(alarm)	≥40 (if alarms, follow instructions below)	≥40 (if alarms, follow instructions below)																						
FiO ₂	titrate using FiO ₂ /PEEP scale → SpO ₂ of 88-95%	minimal FiO ₂ for SpO ₂ 88-95%																						
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FiO ₂	40	40	50	50	60	70	70	70	80	90														
PEEP	5	8	8	10	10	10	12	14	14	14														
P _{insp}	start at 20 then titrate to VT (6ml/kg IBW)- see chart	start at 20 then titrate to VT (6ml/kg IBW)- see chart																						
I:E	1:1.5 (default)	≥1:4																						
Slope	(default)	(ie: fast inspiratory flow rate)																						
Other	<ul style="list-style-type: none"> if high PEEP results in ↓BP, give fluids & inotropes keeping SBP as per chart if P_{max} alarms, check for patient agitation/ tube obstruction. if not the cause, perform INSPIRATORY HOLD MANOEUVRE - if Pplat >30 ↓TV by 1ml/kg steps (min 4ml/kg) 	<ul style="list-style-type: none"> sedate +++, avoid ongoing paralysis if ↓BP + difficult to ventilate, disconnect tube & allow to expire stacked breaths if P_{max} alarms, check for patient agitation/ tube obstruction. if not the cause, perform INSPIRATORY HOLD MANOEUVRE - if Pplat >30 ↓TV by 1ml/kg steps (min 4ml/kg) 																						

- b. Despite the above settings the patient remains hypoxic. List three (3) measures would you advise to improve oxygenation and one rationale for each? **(6 marks)**
 Need 4/6 to pass

Measure (3 marks)	Reasoning (3 marks)
Increase FiO ₂ to 100	Maximum O ₂ required
Increase PEEP	Increase SA for gas exchange Decrease atelectasis
Prone or sit up	Better VQ match Less lung compression from abdo Trial evidence
Ensure optimal sedation/paralysis	Decrease O ₂ consumption/CO ₂ production, reduce dyssynchronous
Physio/suction/hand vent Treat Sepsis Optimise fluid balance Optimise Hb Recruitment manoeuvres Increase I:E ratio towards 1:1	Improve gas exchange Reduce metabolic demand Maximise CO/oxygen delivery Improve oxygen carriage Open collapsed alveoli Increase FRC, recruitment

- Inhaled Nitric oxide and ECMO not realistic in rural ED setting
- Accept any 3 of the above extensive list for Measure and 3 for Reasoning.
- Accept 1 of generic answer: hand ventilate/suction tube/check PTx. Did not accept bronchodilators, steroids (acutely). Don't give a generic answer.

Rules

- Write 1 thing in each box.
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- If you insist on writing more than 1 thing in each box, make sure the second thing you write is not wrong!

Pass mark 8/12

54/65 passed = 83%