QUIZ 22nd August 2018 (answers below)

1. **What is the recommended antibiotic regime for aspiration pneumonia?**

2. **What ECG changes can be present in acute pulmonary embolus?**

3. **What is the role of transthoracic ECHO in pulmonary embolus?**

4. **What are the indications for thrombolysis in pulmonary embolus?**

5. **Describe and interpret the following blood gas analysis.**

RADIOMETER ABL800 FLEX

ABL827 Emergency
PATIENT REPORT Syringe - S 250uL Sample #

Identifications	
Patient ID	
Patient Last Name	
Patient First Name	
Sex	Female
Sample type	Not specified
T	37.0 °C
$FO_2(I)$	21.0 %
PEEP	cmH2O
Pressure Support	cmH2O
SIMV	Rate
Liter Flow	L/min
Note	
Operator	
Accession No.	

Blood Gas Values			
↓ pH	**7.165**		[7.350 - 7.450]
↑ pCO_2	**56.2**	mmHg	[32.0 - 45.0]
↓ pO_2	**29.5**	mmHg	[75.0 - 105]
Oximetry Values			
*c*tHb	**120**	g/L	[115 - 165]
↓ sO_2	**37.3**	%	[95.0 - 99.0]
*F*COHb	**0.8**	%	[0.0 - 1.5]
*F*MetHb	**0.6**	%	[0.0 - 1.5]
Electrolyte Values			
↓ cNa^+	**134**	mmol/L	[137 - 146]
↑ cK^+	**5.9**	mmol/L	[3.5 - 5.0]
↓ cCa^{2+}	**1.02**	mmol/L	[1.15 - 1.30]
↓ cCl^-	**97**	mmol/L	[98 - 106]
Metabolite Values			
*c*Glu	**3.5**	mmol/L	[3.0 - 7.8]
*c*Lac	**1.2**	mmol/L	[0.0 - 2.2]
↑ *c*Crea	**432**	µmol/L	[40 - 90]
Calculated Values			
ABE_c	**-9.2**	mmol/L	[-]
$cHCO_3^-(P)_c$	**19.4**	mmol/L	[-]

Notes:

↑	Value(s) above reference range
↓	Value(s) below reference range
c	Calculated value(s)
	0293: Warning: HbF detected and compensated for

Printed [redacted]

QUIZ answers 22nd August 2018

1. **What is the recommended antibiotic regime for aspiration pneumonia?**

Hospital acquired (>48 hours inpatient) aspiration pneumonia is managed as per hospital acquired pneumonia.

Community or nursing home acquired aspiration pneumonia:

Mild disease where oral antibiotics are appropriate
Amoxycillin 1g PO tds 7 days

Moderate disease where IV antibiotics indicated
Benzylpenicillin 1.2g IV q6 hourly

**the addition of metronidazole is only indicated in moderate disease for patients with putrid sputum, severe periodontal disease, chronic hazardous alcohol consumption, lung abscesses, empyema or that don't respond to initial empirical therapy*
***if clindamycin is being used, addition of metronidazole is not required*

Severe disease where ICU/ ventilatory support required
Ceftriaxone 1g IV daily + metronidazole 500mg IV q12hourly

**If gram negative resistance is suspected (eg. Pseudomonas) use Tazocin*
***If Staphylococcal pneumonia is suspected add Vancomycin*

2. **What ECG changes can be present in acute pulmonary embolus?**

- *Sinus tachycardia*
- *RV strain pattern – T wave inversion inferiorly + right precordial leads (V1-4)*
- *RBBB – complete or incomplete*
- *Right axis deviation*
- *Dominant R wave in V1 with clockwise rotation*
- *S1Q3T3 sign*
- *Atrial arrhythmias– atrial fibrillation, atrial flutter*
- *Non-specific ST-T wave changes*

3. What is the role of transthoracic ECHO in pulmonary embolus?

Can be diagnostic

- *RV overload or dysfunction*
- *Clot may be visualised*
- *Not diagnostic in small/mod pulmonary embolus*

In the shocked patient

- *Absence of RV overload or dysfunction practically rules out PE as the cause of shock*
- *Bedside test – don't have to move to scanner*

Quantifies right ventricular dysfunction

- *Risk stratifies for management decisions*
- *Affects prognosis*

Can demonstrate alternate diagnoses

- *Cardiac tamponade*
- *RV infarct (regional wall motion abnormality)*
- *Chronic pulmonary hypertension*

Addition of bubble study can demonstrate PFO as source of systemic emboli

4. What are the indications for thrombolysis in pulmonary embolus?

Thrombolytic therapy in acute pulmonary embolus (PE) results in early haemodynamic improvement, but at the cost of increased major bleeding where the consequences can be devastating.

Haemodynamic compromise due to acute PE is the only widely accepted indication for systemic thrombolysis. The few trials that exist are part of a meta-analysis that showed a drop in mortality from 19% to 9.4%.

Thrombolysis is not recommended in most patients with PE that are not haemodynamically compromised. The most controversial of this group is patients with severe or worsening right ventricular dysfunction. They are at an increased risk of pulmonary hypertension and mortality but randomised controlled trials of thrombolysis in these patients have not shown a mortality benefit. These trials didn't stratify for the degree of RV impairment – something for the future maybe. Case by case consideration of thrombolysis in these patients may be considered.

Other situations where thrombolysis for PE may be considered in patients without haemodynamic compromise are:

a) *Extensive clot burden*
b) *Free floating RA or RV thrombus*
c) *Patent foramen ovale*

Most guidelines also recommend catheter directed therapies in patients with high bleeding risk or as rescue therapy when systemic thrombolysis has failed. Catheter directed thrombolysis is not faster than systemic administration.

In cardiac arrest, there is no evidence for routine use of thrombolysis. There are at least 3 prospective trials that failed to show any benefit. The largest of these was the European TROICA trial (NEJM 2008;359(25):2651) where over 1050 patients involved failed to show any benefit in routine thrombolysis. ILCOR concedes that there may be a role for thrombolysis in patients where pulmonary embolus is known or suspected to be the cause. ERC/AHA/ARC guidelines make this same vague statement.

Subsequently, there is no clear guidance in dosing of thrombolysis in cardiac arrest. In non-arrested patients, guidelines are tPA 100mg over 2 hours. SVH protocol is alteplase 10mg as a bolus with the remaining 90mg infused over 2 hours. A study published in American Journal Emergency Medicine 2016 looked at 23 patients in PEA due to PE that were administered tPA 50mg as a bolus and found an astounding 87% survival to 2 years and no bleeding complications. I am not convinced that their electrical activity was all that pulseless, but nonetheless, it does give us the guidance that 50mg bolus is a relatively safe dose to use in cardiac arrest.

UpToDate Thrombolytic therapy in acute pulmonary embolism and lower extremity deep vein thrombosis May 2017

5. Describe and interpret the following blood gas analysis.

pH	7.165	Acidosis
pCO_2	56.2mmHg	Hypercarbia indicating respiratory acidosis
		If this is an acute rise in pCO_2 then HCO_3^- should rise by 1mmol/L for every 10mmHg rise in pCO_2 $HCO3^-$ would be 25.6mmol/L And pH would be 7.28 BUT pH is 7.165 (and HCO3- is 19.4mml/L) So there is concurrent metabolic acidosis
Anion gap	17.6	Raised (134 – 19.4 – 97)
Delta ratio	0.9	ΔAnion gap / ΔHCO3 = 5.6/6.2 = 0.9 HAGMA + NAGMA

<0.4 = Normal anion gap metabolic acidosis 0.4 – 1.0 = High anion gap + normal anion gap metabolic acidosis 1.0 – 2.0 = Pure high anion gap metabolic acidosis >2.0 = High anion gap metabolic acidosis + metabolic alkalosis

Na	134mmol/L	Slightly low
K	5.9mmol/L	Slightly high
Creatinine	432umol/L	Greatly elevated

➔ Mixed respiratory and metabolic acidosis
Metabolic acidosis is both high and normal anion gap

- NAGMA is likely renal in cause as creatinine is elevated
- HAGMA is likely due to uraemia as creatinine is elevated
  - Still need to consider ketones and toxins (lactate is normal)