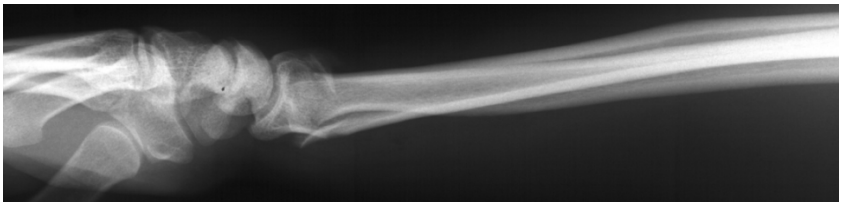
"List" = 1-3 words
"State"= short statement/ phrase/ clause

UNIVERSITY HOSPITAL, GEELONG
FELLOWSHIP WRITTEN EXAMINATION
WEEK 23– TRIAL SHORT ANSWER QUESTIONS Suggested answers
PLEASE LET TOM KNOW OF ANY ERRORS/ OTHER OPTIONS FOR ANSWERS
Please do not simply change this document - it is not the master copy !

Question 1 (18 marks)

A 35 year old man experiences a fall and sustains an isolated left wrist injury.



a. State two (2) abnormal findings in these xrays. (2 marks)
   - **# distal radius- transverse, impacted , dorsal angulation, extra articular**
   - **# scaphoid- waist**

You decide to correct the abnormality with a local anaesthetic, manipulation and plaster.

b. List five (5) patient -related contraindications to the performance of this procedure. (5 marks)
   - **Refusal to consent**
   - **Non compliant with procedure/ uncooperative pt**
   - **Compound injury- skin breach**
   - **Uncontrolled HT**
   - **Allergy to prilocaine**
   - **Failure to obtain IV access in dorsum hand**
   - **Raynaud's syndrome**
   - **Buerger's disease**

c. List your preferred drug and dose for this procedure. (2 marks)
   Drug: prilocaine
   Dose: 0.5% 1 ml/kg = max 3 mg/kg (some up to 5mg/kg)

During the procedure the patient experiences a seizure. The patient is transferred to a resuscitation cubicle and is placed in the left lateral position.

d. List five (5) steps in the management of this toxicity, for this patient. (5 marks)
   - **Check/ reinflate cuff**
   - **Stop drug**
   - **Bz**
   - **Intralipid**
   - **Haemodialysis**

e. List four (4) potential errors that may have led to the seizure. (4 marks)
   - **Cuff failure/leak**
   - **Failure to inflate cuff to sufficient BP**
   - **Incorrect prilocaine dose administration**
   - **Incorrect medication choice- eg lignocaine**
   - **Inadvertent incorrect medication**

Question 2 (12 marks)

a. Regarding Rheumatic fever, list the five (5) **major** manifestations that are included in the modified Jones criteria. (5 marks)

- **Migratory arthritis (predominantly involving the large joints)**
- **Carditis and valvulitis (eg, pancarditis)**
- **Central nervous system involvement (eg, Sydenham chorea)**
- **Erythema marginatum**
- **Subcutaneous nodules**

b. Regarding Rheumatic fever, list the four (4) **minor** manifestations that are included in the modified Jones criteria. (4 marks)

- **Arthralgia**
- **Fever**
- **Elevated acute phase reactants (erythrocyte sedimentation rate [ESR], C-reactive protein [CRP])**
- **Prolonged PR interval**

c. Regarding Rheumatic fever, list two (2) investigations that assist with definitive diagnosis.(2 marks)

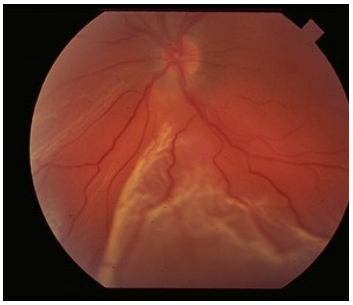
- **ASOT titre- rise**
- **Throat cultures for Group A strep**

d. Regarding Rheumatic fever, list one (1) patient group in Australasia that is most likely to experience the disease. (1 mark)

- **Indigenous**

Question 3 (12 marks)

A 35 year old woman presents with decreased vision in her right eye.



a. What is the diagnosis for her condition? (1 mark)
    - **Retinal detachment**

b. List two (2) different aetiologies that are associated with this condition. (2 marks)
    - **Myopia**
    - **Cataract removal**
    - **Ocular trauma**
    - **Vitreous diseases**
    - **Fluoroquinolone use**
    - **Marfan's syndrome**

c. List two (2) features that you would expect the patient to report in the pattern of her visual loss. (2 marks)
    - **Slow onset over hours**
        - **"like a shade over the eye"/ dark curtain/ shadow**
    - **Flashes or floaters**

d. Other than retinal appearance, list the two (2) main features that you would expect on examination. (2 marks)
    - **Visual field defect**
    - **↓ VA**

The patient is referred to the Ophthalmology team .

e. List three (3) management steps for this patient while in the emergency department. (3 marks)
    - **Antiemetic** *(not maxolon- ↑ IOP)*
    - **Pad eye**
    - **Bed rest**

f. Which two (2) factors have the major influence on prognosis in this condition? (2 marks)
    - **% of retina involved**
    - **Time to definitive Rx (surgery)**

Question 4 (12 marks)

a. List five (5) factors that improve adaptation to shift work. (5 marks)

- **Circadian principles in rostering- clockwise shift rotation**
- **Light exposure in the workplace**
- **Avoid caffeine/ nicotine/ alcohol near bedtime (each can be 1 mark)**
- **Regular meals promotes sleep**
- **Regular exercise promotes sleep**

b. Regarding rostering, list seven (7) barriers to best practice rostering. (7 marks)

- **Inadequate staff numbers/ skill mix**
- **Equal night shift allocation to all staff**
- **Education sessions**
- **Exam preparation**
- **Requirement for management meetings**
- **Historical precedent**
- **Rosters unacceptable to staff**
- **Award restrictions**
- **Financial pressures inc. minimisation of overtime**

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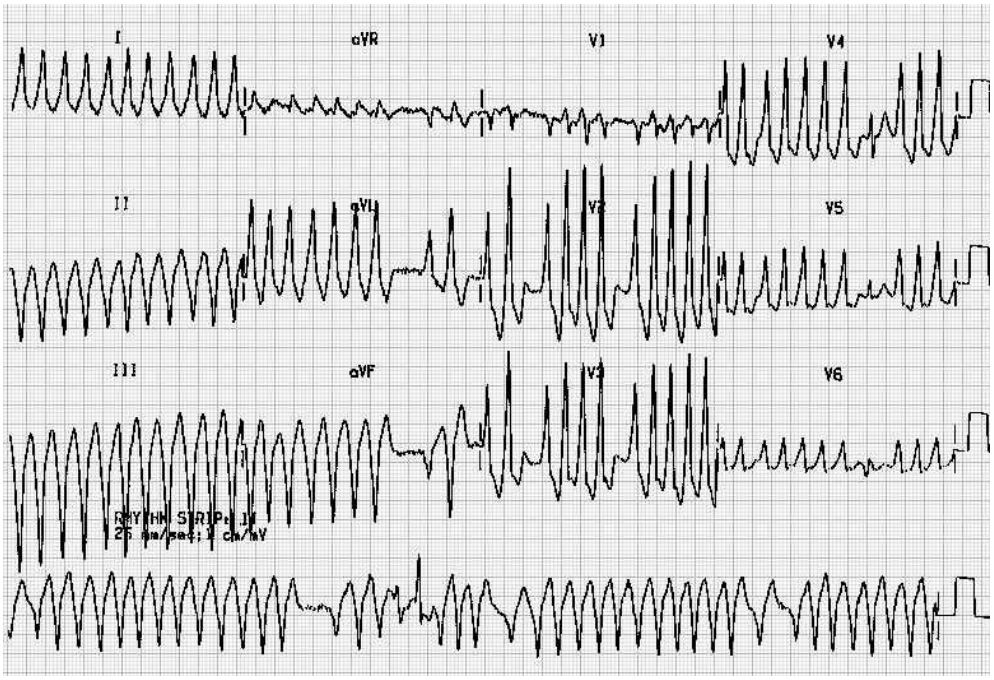
Question 5 (10 marks)

A 45 year old man presents with palpitations. He has no chest pain.

On examination: BP 140/ 60mm Hg RR 20 / min Oxygen saturation 98% on 6L via Hudson mask GCS 15



a. List five (5) abnormalities shown in this ECG. (5 marks)
   - **Irregular**
   - **BC ~ 140 msec**
   - **Beat to beat variation in QRS duration** *(classically, amplitude should not vary)*
   - **Tachycardia ~ 300**
   - **LAD**
   - **Abnormal R wave progression in chest leads**

b. State a unifying diagnosis for these ECG findings. (1 mark)
   - **WPW AF**

   .

c. List two (2) alternative, definitive treatment options for this patient. State one (1) justification for each choice. (4 marks)
   - **DCR**
     Justification: **Urgent cardioversion is required, due to risk of deterioration to VF** *(despite lack of haemodynamic compromise)*

   - **Flecainide**
     Justification: **Flecainide is the only suitable drug choice- slows conduction in accessory pathways**

Question 6 (13 marks)

An unknown 32 year old woman is involved in a single occupant high speed, rollover motor car collision. On arrival she is confused. Her observations are: BP 100/ 60 mmHg supine HR 135 /min RR 28 / min Oxygen saturation 92% on 6L via Hudson mask GCS 13 E4 V4 M5

a. List one (1) positive finding in this xray. (1 mark)

- **Advanced pregnancy**

Primary survey reveals no abnormality including FAST scan negative. Secondary survey reveals no limb injury.

b. List three (3) radiological investigations that you would perform. State one (1) justification for each choice. (6 marks)

Radiological investigation	Justification
CTB	• **GCS with CHI**
CXR	• **RR 28 mechanism**
CT C spine	• **Decreased GCS** • **Mechanism**

c. List three (3) key pathology investigations that you would perform in this case. State one (1) justification for each choice. (6 marks)

Pathological investigation	Justification
FBE	• **Estimation of blood loss.** • **May be anaemic assoc with pregnancy** • **Plt count- ? pre-existing ↓ Plt**
G+H	• **Risk of auto immunisation**
Kleihauer	• **If Rh -ve**
Blood alcohol	• **Possible cause of ↓GCS**
BSL	• **Possible cause for collision**
Police bloods	• **Forensic documentation**
Drug levels - inc paracetamol	• **+/- other drugs if access** • **if PHx Major Psychiatric illness parasuicides**
Urine drug screen	• **if PHx Major Psychiatric illness parasuicides**

Question 7 (12 marks)

A 49 year old woman presents via ambulance to the Emergency Department. She has moderately severe thoracic back pain.

a. List five (5) indications for the performance of xrays of her thoracic spine. (5 marks)
   - **Trauma**
   - **Presence of neurology**
   - **Known/ suspected malignancy**
   - **Other medical condition that may predispose to pathological fractures- eg Osteogenesis imperfecta**
   - **Associated fever (especially if immunocompromised/ IVDU)**

		Reference range
Na	140	(135-145)
K	5.0	(3.5- 5.0)
Urea	28.2	(2.5- 6.4)
Creatinine	0.13	(0.05- 0.1)
Calcium	5.5	(2.1- 2.8)

Albumin	30	g/L	(35-50)
AP	150	IU/L	(0-120)
GGT	115	IU/L	(<50)
ALT	152	IU/L	(<55)
AST	125	IU/L	(0-50)
Bili Total	15	µmol/L	(0-19)
T. Protein	61	g/L	(60-82)

b. Provide one (1) calculation to help you to interpret these results. (1 mark)
   - Calculation**: Corrected Ca = 5.5 + (40- 30)x 2/100= 5.5 + 0.2= 5.7**
     (IONIZED Ca++ (corrected) = measured Ca++ + (40 – serum albumin g/l) x 0.02)

c. State a likely unifying explanation for these results in this clinical context. Include three (3) points in your answer. (3 marks)
   - **Significant hypercalcaemia**
   - **Renal impairment ↑ Ur:Cr suggestive of dehydration**
   - **Mild LFT abnormalities c/w mets**
   - **Possible dehydration a/w metastatic bony disease**

d. List three (3) key steps in the specific treatment of her biochemical state. (3 marks)
   - **Rehydration- NS (not Hartmanns as contains Ca)**
   - **Loop diuretics (avoid thiazide diuretics)- maintain high urine output**
   - **Bisphosphonates**
   - **Steroids**
   - **Not Oestrogen (only in post menopausal primary hyperparathyroidism)**

Question 8 (11 marks)

A 32 year old man has been hit in the "groin" with a cricket ball the previous evening. He is complaining of a painful swollen scrotum.

a. List three (3) positive findings that you may anticipate on a formal ultrasound. List one (1) injury that each finding is associated with. For each of these findings, identify whether the finding is an indication for surgical exploration- yes/no. (9 marks)

Ultrasound finding	Injury associated	Indication for exploration
Parenchymal heterogeneity	**Intratesticular haematoma**	**Yes**
Loss of continuity of tunica albuginea	**Tunica rupture**	**Yes**
Haematocele	**Testicular rupture**	**Yes**
No flow to testicle	**Testicular torsion**	**Yes**

The ultrasound is reported normal.

b. List your disposition. State one (1) justification for your choice. (2 marks)

Disposition: **Admission under urology**

Justification: **A normal ultrasound should not prevent exploration of a grossly abnormal testicle on physical examination**

Question 9 (18 marks)

A 65 year old man presents with a painful left lower leg.

a. You are concerned about the possibility of deep venous thrombosis.
   i. What is the role of age-adjusted cut-off DDimer level for this patient? State four (4) points in your answer. (4 marks)
      - **Recent, large, retrospective study identified safety of age adjusted cut-offs** *(ADJUST-PE study- see below)*
      - **Age adjusted cut off can be used if non- high risk**
      - **Age in yrs x10- so adjusted cutoff is 650 ng/ml**
      - **A level below this cut-off** *(in low-intermediate risk)* **can safely exclude VTE**

b. You suspect a diagnosis of superficial thrombophlebitis
   i. List four (4) indications for the performance of lower limb ultrasound for this patient (4 marks)
      - **Involvement of upper 1/3 of thigh**
      - **Clinical evidence of extension (> 5 cm)**
      - **Lower extremity swelling > than expected from superficial phlebitis alone**
      - **Diagnosis uncertain**

c. An ultrasound confirms superficial thrombophlebitis only.
   i. State three (3) indications for anticoagulation therapy for this patient. (3 marks)
      - **Affected segment > 5 cm**
      - **Thrombosis close (< 5cm) to saphenofemoral/ saphenopopliteal junction**
      - **Presence of major risk factor for ongoing thrombosis**

   NB: difference between "Minor" and "major" superficial thrombophlebitis

d. An isolated below knee DVT is confirmed on ultrasound.
   i. State (2) indications for anticoagulation therapy for this patient. (2 marks)

   NB: propagation risks are much higher in patients with a continued risk for thrombosis
      - **Leg in cylindrical immobilisation (plaster/fibreglass)**
      - **Prothrombotic haematological disorder**

   ii. Other than warfarin, list two (2) anticoagulation options for this patient. (2 marks)
      - **Clexane (enoxaparin)**
      - **Clexane for 3-5/7, followed by Dabigatran**
      - **Rivaroxaban**
      - **Apixaban**

   iii. Assuming that there is no indication for anticoagulation therapy, list three (3) steps in your ongoing management of this patient. (3 marks)
      - **Aspirin**
      - **Anti-embolic stocking**
      - **Repeat US at 3-7 days**
      - **Guidelines for urgent representation**

Click on the image below to view the entire PDF (& print/save if necessary)

Research

Original Investigation

Age-Adjusted D-Dimer Cutoff Levels to Rule Out Pulmonary Embolism
The ADJUST-PE Study

Marc Righini, MD; Josien Van Es, MD, PhD; Paul L. Den Exter, MD; Pierre-Marie Roy, MD, PhD; Franck Verschuren, MD; Alessandra Ghuysen, MD; Olivier T. Rutschmann, MD; Olivier Sanchez, MD; Morgan Jaffrelot, MD; Albert Trinh-Duc, MD; Catherine Le Gall, MD; Farès Moustafa, MD; Alessandra Principe, MD; Anja A. Van Houten, MD; Marijn Ten Wolde, MD, PhD; Renée A. Douma, MD, PhD; Germa Hazelaar, MD; Petra M. G. Erkens, PhD; Klaas W. Van Kralingen, MD; Marco J. J. H. Grootenboers, MD, PhD; Marc F. Durian, MD; Y. Whitney Cheung, MD; Guy Meyer, MD; Henri Bounameaux, MD; Menno V. Huisman, MD, PhD; Pieter W. Kamphuisen, MD, PhD; Grégoire Le Gal, MD, PhD

IMPORTANCE D-dimer measurement is an important step in the diagnostic strategy of clinically suspected acute pulmonary embolism (PE), but its clinical usefulness is limited in elderly patients.

OBJECTIVE To prospectively validate whether an age-adjusted D-dimer cutoff, defined as age × 10 in patients 50 years or older, is associated with an increased diagnostic yield of D-dimer in elderly patients with suspected PE.

DESIGN, SETTINGS, AND PATIENTS A multicenter, multinational, prospective management outcome study in 19 centers in Belgium, France, the Netherlands, and Switzerland between January 1, 2010, and February 28, 2013.

INTERVENTIONS All consecutive outpatients who presented to the emergency department with clinically suspected PE were assessed by a sequential diagnostic strategy based on the clinical probability assessed using either the simplified, revised Geneva score or the 2-level Wells score for PE; highly sensitive D-dimer measurement; and computed tomography pulmonary angiography (CTPA). Patients with a D-dimer value between the conventional cutoff of 500 µg/L and their age-adjusted cutoff did not undergo CTPA and were left untreated and formally followed-up for a 3-month period.

MAIN OUTCOMES AND MEASURES The primary outcome was the failure rate of the diagnostic strategy, defined as adjudicated thromboembolic events during the 3-month follow-up period among patients not treated with anticoagulants on the basis of a negative age-adjusted D-dimer cutoff result.

RESULTS Of the 3346 patients with suspected PE included, the prevalence of PE was 19%. Among the 2898 patients with a nonhigh or an unlikely clinical probability, 817 patients (28.2%) had a D-dimer level lower than 500 µg/L (95% CI, 26.6%-29.9%) and 337 patients (11.6%) had a D-dimer between 500 µg/L and their age-adjusted cutoff (95% CI, 10.5%-12.9%). The 3-month failure rate in patients with a D-dimer level higher than 500 µg/L but below the age-adjusted cutoff was 1 of 331 patients (0.3% [95% CI, 0.1%-1.7%]). Among the 766 patients 75 years or older, of whom 673 had a nonhigh clinical probability, using the age-adjusted cutoff instead of the 500 µg/L cutoff increased the proportion of patients in whom PE could be excluded on the basis of D-dimer from 43 of 673 patients (6.4% [95% CI, 4.8%-8.5%]) to 200 of 673 patients (29.7% [95% CI, 26.4%-33.3%]), without any additional false-negative findings.

CONCLUSIONS AND RELEVANCE Compared with a fixed D-dimer cutoff of 500 µg/L, the combination of pretest clinical probability assessment with age-adjusted D-dimer cutoff was associated with a larger number of patients in whom PE could be considered ruled out with a low likelihood of subsequent clinical venous thromboembolism.

TRIAL REGISTRATION clinicaltrials.gov Identifier: NCT01340068

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Which age-adjusted D-dimer cut-off performs best?

Dear Editor,

D-dimer testing is used to determine the need for advanced imaging (e.g. computed tomography pulmonary angiography [CTPA]) in low probability patients with suspected pulmonary embolism (PE). While D-dimer testing is highly sensitive for PE, its specificity reduces with advancing age (especially over 50 years), resulting in increased rates of advanced imaging carrying both risk (radiation, contrast nephropathy) and inconvenience for patients. Recently, three age-adjusted cut-offs for D-dimer assay in patients aged over 50 years have been proposed – age in years times 10,[1] age in years times 16,[2] and decade-specific levels with cut-offs of 500 µg/L for age less than 60 years, 600 µg/L for age 61–70 years and 700 µg/L for age 71–80 years.[3] To test the diagnostic performance of these, we conducted a retrospective cohort study by medical records review of patients having both D-dimer and CTPA for investigation of suspected PE. This planned sub-study had the additional eligibility criteria of age ≥50 years and assessment as low risk by the simplified Wells' score.[4] Our rationale for this was that this is the group in whom advanced imaging may be able to be avoided if the adjusted cut-offs were adopted. D-dimer level was measured in fibrinogen equivalent units using the Siemens INNOVANCE D-Dimer assay measured on the Siemens/Sysmex CA-1500 (Siemens/Sysmex, Kobe, Japan). The study was approved by the institutional ethics panel.

A total of 404 patients were eligible for inclusion. The prevalence of PE was 7% (28 PE, 95% confidence interval 5–10). Diagnostic performance of each of the proposed cut-offs is shown in Table 1. There was no statistically significant difference in sensitivity or negative predictive value between cut-offs, largely due to the lower-than-expected PE rate. The single PE missed by the decade-specific and age × 10 cut-offs was in an 81-year-old woman who was shown to have a sub-segmental PE and an undiagnosed lung neoplasm. Half of the PE missed by the age × 16 cut-off were also sub-segmental. All age-specific cut-offs would have avoided a clinically significant proportion of the CTPA scans; however, they also would have missed additional PEs when compared to the conventional cut-off, concerningly more so for the age × 16 cut-off. A significant proportion of the missed PE were sub-segmental. There are varying opinions regarding the clinical significance and treatment of these. Unanswered questions remain. Is the reduction in risk from avoided scans in balance with the small number of additional missed PEs? What missed PE rate is acceptable to patients and clinicians? Our data support previous evidence that the use of age-specific D-dimer cut-offs could reduce imaging for suspected PE in patients aged over 50 years. The decade-specific and age × 10 methods seem to have the best balance of avoided imaging and missed PE. In terms of feasibility, the age × 10 is probably the easiest method to remember and apply in practice.

This data adds to the mounting evidence, reflected in recent clinical practice guidelines,[5] that age-adjusted D-dimer cut-offs should be used in low-risk patients to guide investigation strategy.

TABLE 1. *Diagnostic performance of proposed age-adjusted D-dimer cut-offs*

Cut-off	Sensitivity (%)	Specificity (%)	Negative predictive value (%)	Advanced imaging avoided	Pulmonary embolism missed
Conventional (500 µg/L)	100	10	100	–	0
Decade-specific	96	24	99	44 (15%)	1
Age × 10	96	30	99	78 (21%)	1
Age × 16	86	61	98	199 (54%)	4

Competing interests

A-MK is a member of the editorial board for *Emergency Medicine Australasia*.

References

1. Flores J, García de Tena J, Galipienzo J *et al.* Clinical usefulness and safety of an age-adjusted D-dimer cutoff levels to exclude pulmonary embolism: a retrospective analysis. *Intern. Emerg. Med.* 2016; 11: 69–75.
2. Verma N, Willeke P, Bicsan P, Lebiedz P, Pavenstaedt H, Kuempers P. Age-adjusted D-dimer cut-offs to diagnose thromboembolic events: validation in an emergency department. *Med. Klin. Intensivmed. Notfmed.* 2014; 109: 121–8.
3. Gupta A, Raja AS, Ip IK, Khorasani R. Assessing 2 D-dimer age-adjustment strategies to optimize computed tomographic use in ED evaluation of pulmonary embolism. *Am. J. Emerg. Med.* 2014; 32: 1499–502.
4. Goekoop RJ, Steghs N, Niessen RW *et al.* Simple and safe exclusion of pulmonary embolism in outpatients using quantitative D-dimer and Wells' simplified decision rule. *Thromb. Haemost.* 2007; 97: 146-50.
5. Raja AS, Greenberg JO, Qaseem A *et al.* Evaluation of patients with suspected acute pulmonary embolism: best practice advice from the Clinical Guidelines Committee of the