ID NUMBER: ☐ ☐ ☐ ☐ ☐

University Hospital, Geelong

Emergency Medicine

Trial Fellowship Exam

Short Answer Questions (SAQ)

Week 5

DIRECTIONS TO CANDIDATE

1. Answer each question in the space provided in this question paper.
2. Do not write your name on this question paper.
3. Enter your examination number in the space below.
4. Cross out any errors completely.
5. Do not begin the exam until instructed to do so.
6. Do not take examination paper or materials from this room.
7. The booklet binder may be removed during the exam.

QUESTION & ANSWER

BOOKLET

Question 1 (20 marks)

A 35 year old woman is brought to the emergency department after skin exposure to a chemical spill at a local petrochemical plant. Hazchem information has identified the substance involved as an organophosphate.

a. List three (3) potential NON LIFE THREATENING clinical effects that would suggest acute intoxication in this patient. (3 marks)

1. _____

2. _____

3. _____

b. List three (3) potential early, LIFE THREATENING clinical effects of acute intoxication with an organophosphate. (3 marks)

1. _____

2. _____

3. _____

Question 1 (continued)

c. State the decontamination required for this patient? (2 marks)

_____

_____

d. State the personal protective equipment that is required by staff who care for this patient. (1 mark)

_____

_____

Question 1 (continued)

The patient exhibits clinical features of a life threatening exposure. The patient undergoes appropriate decontamination and intubation.

e. List two (2) KEY medications that you would use. Provide details including route, dose and endpoints of treatment. (8 marks)

	Management (2 marks)	**Route (2 marks)**	**Dose (2 marks)**	**Endpoint of treatment (2 marks)**
1				
2				

Question 2 (12 marks)

A 3 year old boy presents to the emergency department after refusing to weight bear on his right leg for the last 3 days.

a. List four (4) MOST LIKELY differential diagnoses for this presentation. (4 marks)

1. _____

2. _____

3. _____

4. _____

Question 2 (continued)

b. List four (4) KEY investigations that you may perform in the emergency department. Provide one (1) justification for each choice. (8 marks)

	Investigation (4 marks)	**Justification (4 marks)**
1.		
2.		
3.		
4.		

Question 3 (12 marks)

An 80 year old woman presents to the emergency department with palpitations and shortness of breath. She has undergone coronary artery bypass grafting 2 weeks earlier.

An ECG is taken- refer to the props booklet- page 1.

a. State four (4) SIGNIFICANT abnormalities shown on this ECG. (4 marks)

1. _____

2. _____

3. _____

4. _____

b. List four (4) likely causes for her symptoms in the setting of this ECG. (4 marks)

1. _____

2. _____

3. _____

4. _____

Question 3 (continued)

c. List four (4) KEY investigations that you would perform to assist with your diagnosis. (4 marks)

1. _____

2. _____

3. _____

4. _____

Question 4 (12 marks)

A 72 year old man presents to the emergency department with ongoing epistaxis. He is taking warfarin and atenolol for atrial fibrillation. He has 2 large bore IV access in situ and non-invasive monitoring applied.
His vital signs on presentation are:

HR	50	bpm (atrial fibrillation)
RR	16	/min
BP	70/30	mmHg
Temp	37	°C
GCS	15	

a. List four (4) KEY STEPS in your management in the Emergency Department. Provide one (1) detail for each step. (8 marks)

	Management (4 marks)	**Detail (4 marks)**
1.		
2.		
3.		
4.		

Question 4 (continued)

The bleeding persists despite your management above. You suspect a posterior site for the bleeding.

b. State two (2) options for control of bleeding in the Emergency Department. List one (1) important pro for each option. (4 marks)

	Option (2 marks)	**Pro (2 marks)**
1.		
2.		

Question 5 (12 marks)

A 5 year old boy presents to the emergency department after an episode of near drowning. He is intubated on arrival and the Xray below is taken soon after intubation.

A Chest X-ray is taken- refer to the props booklet- page 2.

a. State three (3) abnormal findings in this Chest X-ray. (3 marks)

1. _____

2. _____

3. _____

His weight is 20 kg.

b. List the initial ventilator settings that you would commence. (5 marks)

Mode (1 mark)	
Tidal volume (1 mark)	
Respiratory rate (1 mark)	
I:E (1 mark)	
PEEP (1 mark)	

Question 5 (continued)

45 minutes after instituting these settings, his Peak Inspiratory pressures are 50 cm H_20.

c. State four (4) KEY STEPS that you would perform to rectify this problem. (4 marks)

1. _____

2. _____

3. _____

4. _____

Question 6 (12 marks)

A 35 year old woman presents to the emergency department with a suspected Red Back spider bite.

a. List three (3) clinical features that you may expect with this bite. (3 marks)

1. _____

2. _____

3. _____

b. State three (3) current controversies in the management of a red back spider bite. (3 marks)

1. _____

2. _____

3. _____

Question 6 (continued)

Following your review, the features are more suggestive of Funnel Web spider bite.

c. List three (3) clinical features that you may expect with this bite. (3 marks)

1. _____

2. _____

3. _____

d. List three (3) agents that you may use for supportive care or specific treatment of a suspected severe Funnel Web spider bite. (3 marks)

1. _____

2. _____

3. _____

Question 7 (12 marks)

A 3 year old boy presents with right elbow pain following a fall from monkey bars.

An X-ray is taken soon after arrival- refer to the props booklet- page 3.

a. State four (4) abnormal findings shown on this X-ray. (4 marks)

1. _____

2. _____

3. _____

4. _____

b. Assuming that there is neurovascular compromise, list five (5) KEY STEPS to correct this problem. (5 marks)

1. _____

2. _____

3. _____

4. _____

5. _____

Question 7 (continued)

c. List three (3) KEY complications of this injury in the first 1 week post injury. (3 marks)

1. _____

2. _____

3. _____

Question 8 (7 marks)

A 25 year old man presents to the emergency department after a 2 day illness of fever and vomiting.

Initial blood tests taken soon after arrival- refer to the props booklet- page 3.

a. List two (2) calculations to help you to interpret these results. (2 marks)

Derived value 1: _____

_____

Derived value 2: _____

_____

b. Using the scenario and the derived values, define the primary abnormality/s. (2 marks)

_____

_____

_____

Question 8 (continued)

c. Using the scenario and the derived values, define the secondary abnormality/s. (1 mark)

_____

_____

_____

d. Provide a unifying explanation for these results. (2 marks)

_____

_____

_____

Question 9 (18 marks)

A 35 year old man presents to the emergency department with swelling to both his left knee and right elbow joints.

a. List four (4) MOST LIKELY differential diagnoses for this presentation. (4 marks)

1. _____

2. _____

3. _____

4. _____

b. List four (4) features on history that may assist with obtaining a diagnosis. (4 marks)

1. _____

2. _____

3. _____

4. _____

Question 9 (continued)

c. State two (2) KEY REASONS to perform a knee joint aspiration for this patient. (2 marks)

1. _____

2. _____

d. List four (4) contraindications to perform a knee aspiration in this patient. (4 marks)

1. _____

2. _____

3. _____

4. _____

Question 9 (continued)

e. List four (4) KEY LIKELY diagnoses that you would consider if the patient was a 5 year old female. (4 marks)

1. _____

2. _____

3. _____

4. _____

ID NUMBER: ☐ ☐ ☐ ☐ ☐

University Hospital, Geelong

Emergency Medicine

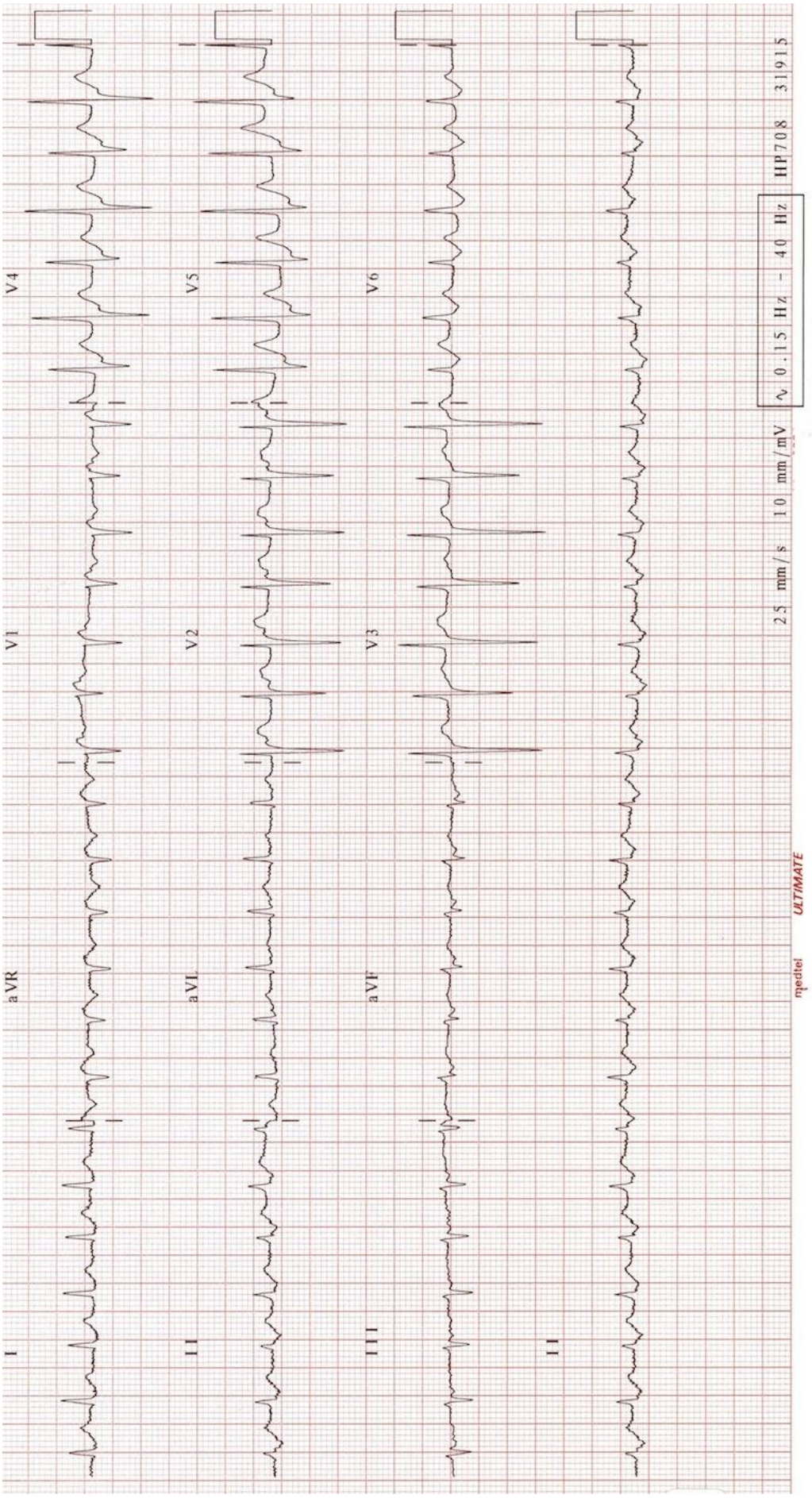
Trial Fellowship Exam

Short Answer Questions (SAQ)

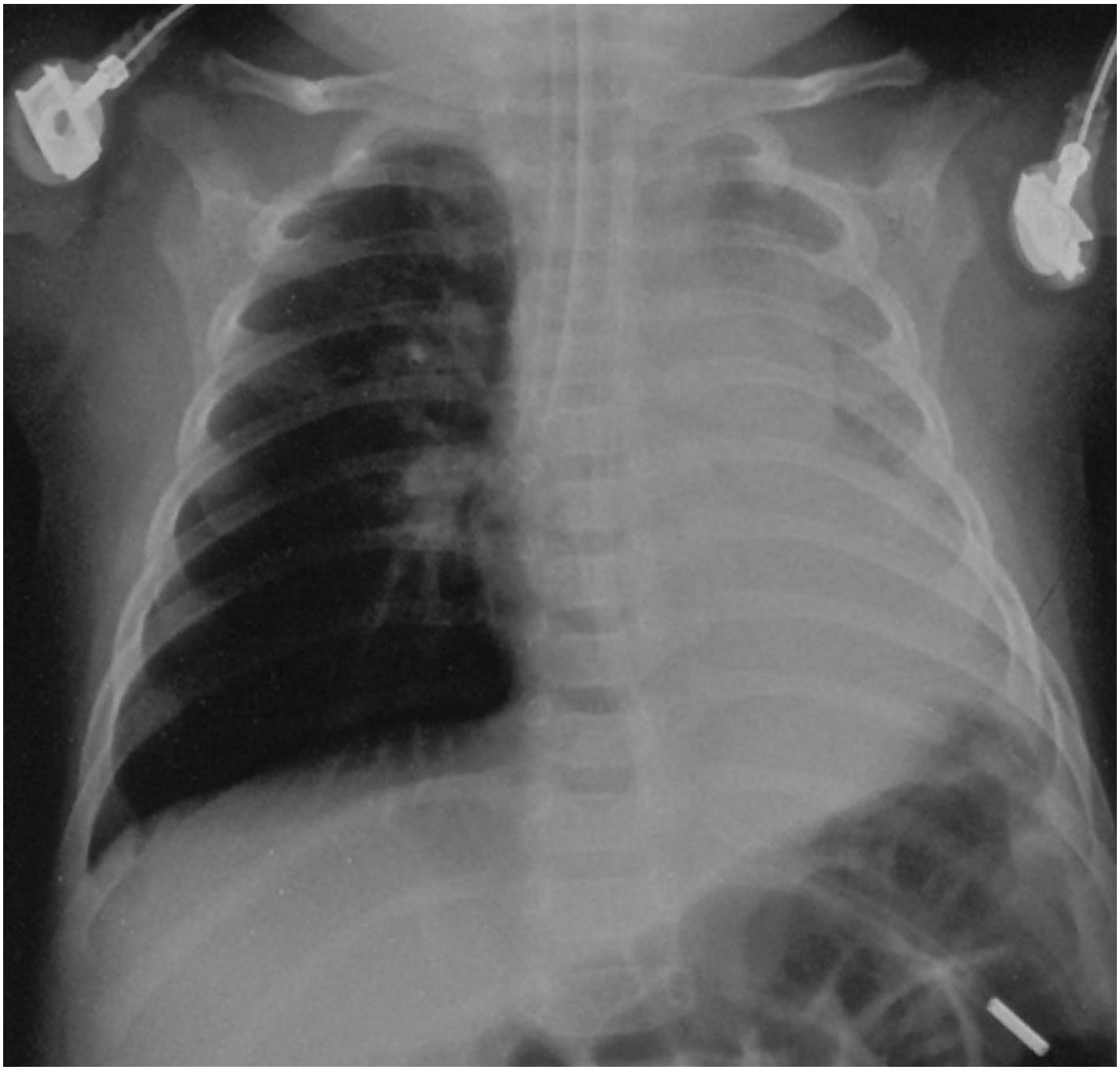
Week 5

PROP BOOKLET

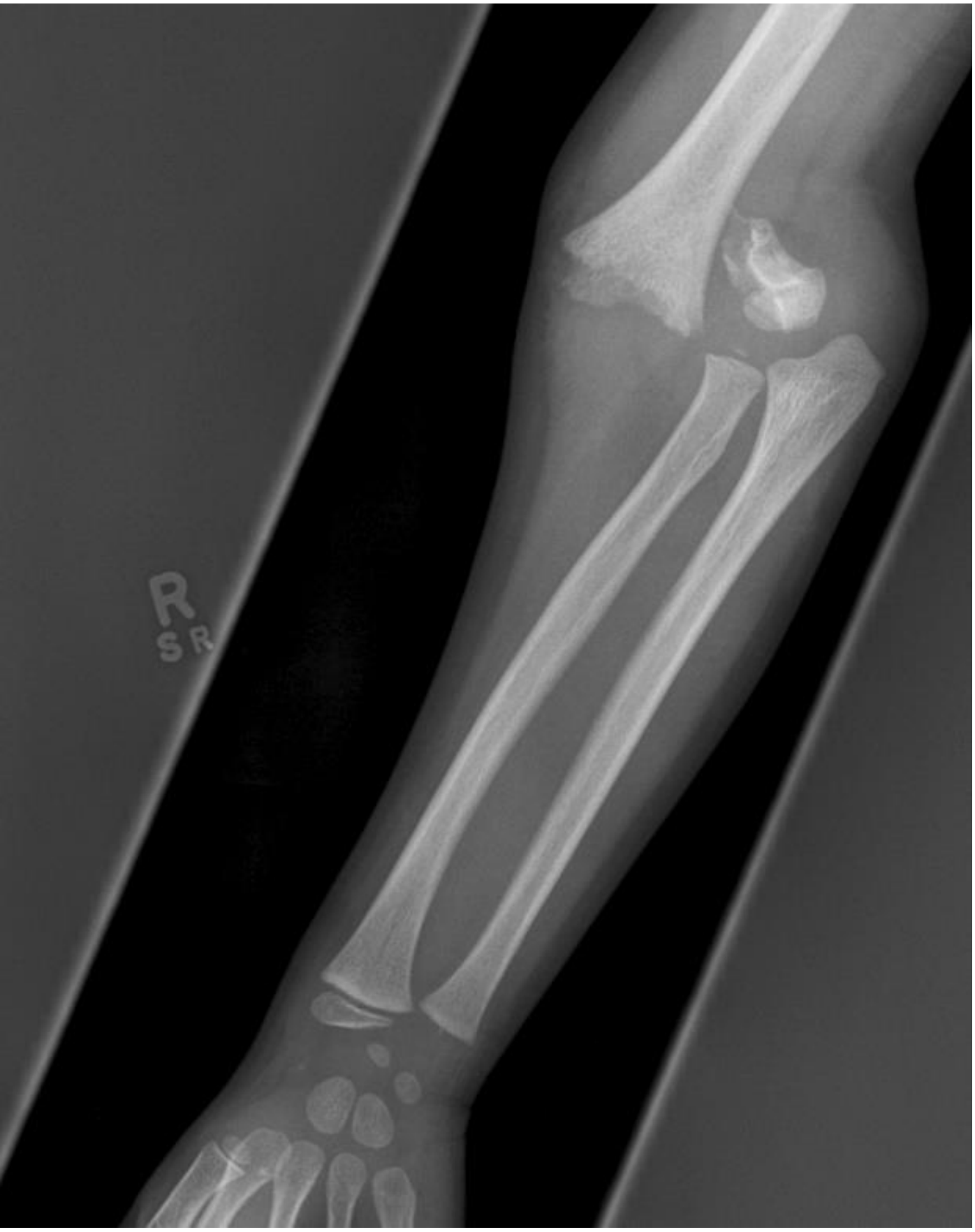
Question 3


I
aVR
V1
V4
II
aVL
V2
V5
III
aVF
V3
V6
II
25 mm/s 10 mm/mV
0.15 Hz - 40 Hz
HP708 31915
medtel
ULTIMATE

Question 5



Question 7



Question 8

Taken on room air

FIO2	0.4	
pH	7.80	(7.35-7.45)
PCO_2	15mmHg	(35-45)
PO_2	192mmHg	(75-100)
HCO_3	23mmHg	(22-33)
Base excess	10.1	(-3.0 - +3.0)
O_2 sat	99.7%	(95-98%)
Na^+	119mmol/L	(135-145)
K^+	2.5mmol/L	(3.2-4.5)
Cl^-	65mmol/L	(100-110)
Urea	10.3mmol/L	(3.0-8.0)
Creatinine	0.187mmol/L	(0.07-0.12)
Glucose	4.5mmol/L	(3.0-7.8)

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

UNIVERSITY HOSPITAL, GEELONG
FELLOWSHIP WRITTEN EXAMINATION
WEEK 5– 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 (20 marks)

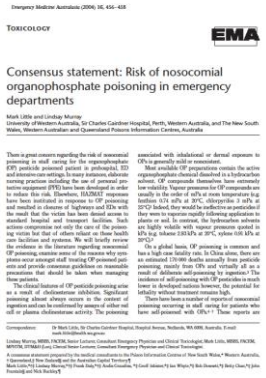
A 35 year old woman is brought to the emergency department after skin exposure to a chemical spill at a local petrochemical plant. Hazchem information has identified the substance involved as an organophosphate.

a. List three (3) potential NON LIFE THREATENING clinical effects that would suggest acute intoxication in this patient. (3 marks)

Muscarinic:
- **Ds**
- **Urination**
- **Miosis**
- **Bronchorrhoea**
- **Emesis**
- **Lacrimation**
- **Salivation**

Nicotinic:
- **Fasciculation**
- **Agitation**
- **Tremor**
- **Weakness**
- **HT**

b. List three (3) potential early, LIFE THREATENING clinical effects of acute intoxication with an organophosphate. (3 marks)
- **Bradycardia**
- **Hypotension**
- **Bronchospasm**
- **Resp. muscle paralysis**
- **Tachycardia**
- **Seizures**
- **Coma**


Emergency Medicine Australasia (2004) 16, 456–458

TOXICOLOGY

EMA

Consensus statement: Risk of nosocomial organophosphate poisoning in emergency departments

Mark Little and Lindsay Murray
University of Western Australia, Sir Charles Gairdner Hospital, Perth, Western Australia, and The New South Wales, Western Australian and Queensland Poisons Information Centres, Australia

c. State the decontamination required for this patient? (2 marks)
- **Remove clothes, soap, water**
- **Resuscitation should not be delayed for decontamintion**

d. State the personal protective equipment that is required by staff who care for this patient. (1 mark)
- **Universal precautions** *only (More sophisticated PPE not required- most of the inhalational effects that are felt are related to the Hydrocarbon that is associated with the OP)*

The patient exhibits clinical features of a life threatening exposure. The patient undergoes appropriate decontamination and intubation.

e. List two (2) KEY medications that you would use. Provide details including route, dose and endpoints of treatment. (8 marks)

	Management (2 marks)	Route (2 marks)	Dose (2 marks)	Endpoint of treatment (2 marks)
1	**Atropine**	**IV**	**Big 1.2mg every 5 min- double dose each interval**	**Cessation of salivation/ lacrimation- drying of secretions Resolution bradycardia HR > 80 Good air entry on auscultation**
2	**Pralidoxine**	**IV**	**2g followed by infusion (0.5g/hr)**	**> 24/24 if clinically well**

Additional Q:

f. State the toxic mechanism/s of this poisoning. (3 marks)
- **Irreversible inhibition of Acetylcholinesterase enzymes**
- **Increases Ach at both cholinergic nicotinic and muscarinic receptors**

∴both autonomic and skeletal muscle stimulation

- **Usually formulated with a hydrocarbon- inhalation frequently causes HA & dizziness**
- **Chemical pneumonitis If hydrocarbon solvent aspirated**

Question 2 (12 marks)

A 3 year old boy presents to the emergency department after refusing to weight bear on his right leg for the last 3 days.

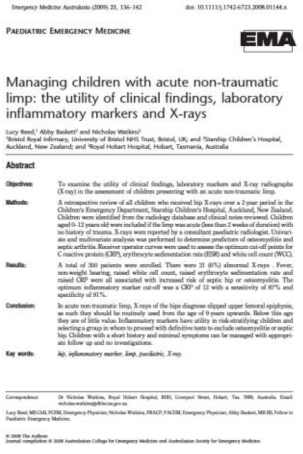
a. List four (4) MOST LIKELY differential diagnoses for this presentation. (4 marks)
   - **Toddlers #**
   - **# elsewhere**
   - **Foreign body/ lesion - foot**
   - **Joint effusion/ viral/ transient synovitis**
   - **Septic arthritis- hip or other**
   - **Osteomyelitis**
   - **Back trauma**
   - **NAI- #/ sprain/ haematoma**
   - **developmental dysplasia of hip**
   - **abdominal pathology**

b. List four (4) KEY investigations that you may perform in the emergency department. Provide one (1) justification for each choice. (8 marks)

NB: "in the emergency department"- ie not bone scan

Investigation (4 marks)	Justification (4 marks)
Tib/fib XR	**Demonstrate spiral fracture distal tibia, although not always seen on initial films, initial Ix of choice for developmental dysplasia**
Foot Xray	**Occult #**
Joint Ultrasound (esp hip)	**Looking for effusion and guide potential aspiration if systemically unwell and septic joint suspected**
FBE	**WCC > 15 and > 75% neutrophils +/-or L shift increase likelihood septic arthritis and warrants admission**
CRP	**Elevation supports diagnosis of infections/inflammation (Marker of potential bacterial sepsis) e.g. septic joint, can be used to monitor response to treatment**
Blood cultures	**Indicated early in management if febrile to identify organism and guide antibiotic treatment**

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



Emergency Medicine Australasia (2009) 21, 136–142 doi: 10.1111/j.1742-6723.2008.01144.x

PAEDIATRIC EMERGENCY MEDICINE

Managing children with acute non-traumatic limp: the utility of clinical findings, laboratory inflammatory markers and X-rays

Lucy Reed,[1] Abby Baskett[2] and Nicholas Watkins[3]
[1]Bristol Royal Infirmary, University of Bristol NHS Trust, Bristol, UK; and [2]Starship Children's Hospital, Auckland, New Zealand; and [3]Royal Hobart Hospital, Hobart, Tasmania, Australia

Abstract

Objectives: To examine the utility of clinical findings, laboratory markers and X-ray radiographs (X-ray) in the assessment of children presenting with an acute non-traumatic limp.

Methods: A retrospective review of all children who received hip X-rays over a 2 year period in the Children's Emergency Department, Starship Children's Hospital, Auckland, New Zealand. Children were identified from the radiology database and clinical notes reviewed. Children aged 0–12 years old were included if the limp was acute (less than 2 weeks of duration) with no history of trauma. X-rays were reported by a consultant paediatric radiologist. Univariate and multivariate analysis was performed to determine predictors of osteomyelitis and septic arthritis. Receiver operator curves were used to assess the optimum cut-off points for C reactive protein (CRP), erythrocyte sedimentation rate (ESR) and white cell count (WCC).

Results: A total of 350 patients were enrolled. There were 21 (6%) abnormal X-rays . Fever, non-weight bearing, raised white cell count, raised erythrocyte sedimentation rate and raised CRP were all associated with increased risk of septic hip or osteomyelitis. The optimum inflammatory marker cut-off was a CRP of 12 with a sensitivity of 87% and specificity of 91%.

Conclusion: In acute non-traumatic limp, X-rays of the hips diagnose slipped upper femoral epiphysis, as such they should be routinely used from the age of 9 years upwards. Below this age they are of little value. Inflammatory markers have utility in risk-stratifying children and selecting a group in whom to proceed with definitive tests to exclude osteomyelitis or septic hip. Children with a short history and minimal symptoms can be managed with appropriate follow up and no investigations.

Key words: *hip, inflammatory marker, limp, paediatric, X-ray.*

EMA Emergency Medicine Australasia

Emergency Medicine Australasia (2017)

DON'T FORGET THE BUBBLES

Walking in circles: The limping child

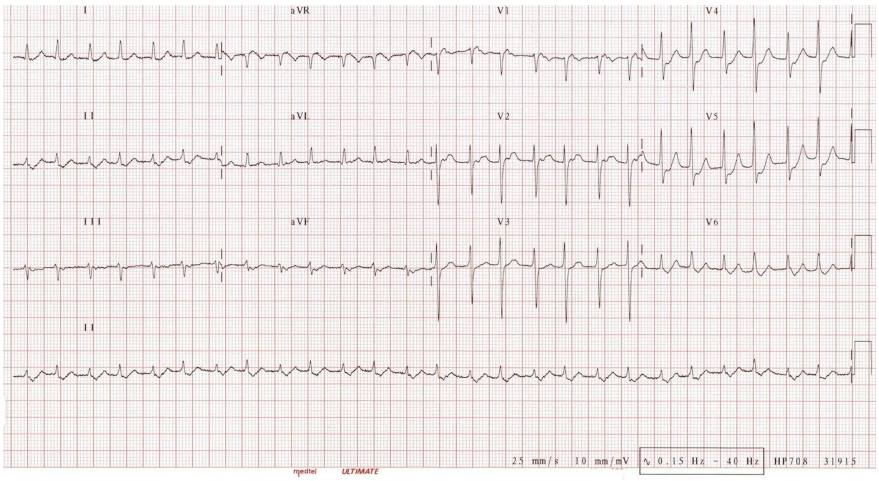
Tessa DAVIS,[1] Ben LAWTON,[2,3,4] Kristina KLEIN,[4,5] Henry GOLDSTEIN[2,3] and Andrew TAGG[6]

A child with a limp is a common presentation to paediatric EDs occurring in 1.8 per 1000 children. It accounts for 4% of paediatric presentations to the paediatric ED. However, limp is merely a symptom and not a diagnosis and is secondary to pain, weakness or physical deformity.

There are six key diagnoses not to miss: septic arthritis, osteomyelitis, malignancy, non-accidental injury, Perthes disease and a slipped upper femoral epiphysis (SUFE). They all demand early intervention and ...

Question 3 (12 marks)

An 80 year old woman presents to the emergency department with palpitations and shortness of breath. She has undergone coronary artery bypass grafting 2 weeks earlier.



a. State four (4) significant abnormalities shown on this ECG. (4 marks)
   - **Rate ~ 160**
   - **NCT- no p waves**
   - **Electrical alternans**
   - **STE 1mm aVR**
   - **STD 1mm II, 0.5 mm aVF, 2mm V2, 3mm V5, 1mm V6**

b. List four (4) MOST LIKELY causes for her symptoms in the setting of this ECG. (4 marks)
   - **Pericardal effusion- secondary to post operative haemorrhage- most likely given alternans**
   - **CCF**
   - **PE**
   - **ACS**
   - **Dissection down graft**
   - **Anaemia**
   - **Bronchospasm- βblocker induced**
   - **Post op pneumonia/ atelectasis**

c. List four (4) KEY investigations that you would perform to assist with your diagnosis. (4 marks)
   - **ECHO- urgent, bedside**
   - **CXR** *(may identify large pneumothorax or large pleural effusion)*
   - **FBE**
   - **CTPA** *(high sensitivity and specificity for PE, plus may aid in alternative diagnosis)*
   - **HS trops (***myocardial ischaemia or myocarditis)*
   - **U+E** *(severe uraemia)*

Question 4 (12 marks)

A 72 year old man presents to the emergency department with epistaxis. He is taking warfarin and atenolol for atrial fibrillation. He has 2 large bore IV access in situ and non-invasive monitoring applied. His vital signs on presentation are: BP 70/30 mmHg PR 50 bpm RR 16 Temp 37°C GCS 15

a. List four (4) KEY steps in your management in the emergency department. Provide one (1) detail for each step. (8 marks)

Treatment/ supportive care	Detail
• **Control bleeding- direct measures**	• **↓ ongoing losses** • **Sit upright/pressure/ ice to suck/ cophenylcaine/ suction clots/ cautery/pack**
• **Stat fluids**	• **1L NS** • **Aim for normovolaemic resuscitation**
• **Reverse warfarin**	• **FFP 4 Units /Prothrombinex 50 IU/kg /Vit K10mg IV**
• **Volume resuscitation**	• **1000ml normal saline intravenous** • **Early blood products** • **Activation massive transfusion protocol as hemorrhagic shock** • **Endpoints: SBP > 90, MAP 65, UO > 0.5ml/kg/hr**
• **ENT referral**	• **ENT admission with urgent consult to critical care area e.g. HDU/ICU** • **may need endoscopic surgical ligation or embolisation**

The bleeding persists despite your management above. You suspect a posterior site for the bleeding.

b. State two (2) options for control of bleeding in the emergency department. List one (1) IMPORTANT pro for each option. (4 marks)

Option (2 marks)	Pro (2 marks)
• **Double balloon catheter (Brighton balloon/ Rapid Rhino/Epistat)**	• **most effective** • **easy to insert and inflate** • **bilateral if ongoing bleeding**
• **Tranexamic acid 1g/10mins then 1g/8hrs**	• **potent competitive inhibitor of plasminogen activator therefore may prevent clot disintegration**
• **Foley Catheter**	• **pressure necrosis if left for prolonged time** • **intolerable to pt**

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


Emergency Medicine Australasia (2004) 16, 428–440

REVIEW ARTICLE

EMA

Epistaxis

Paul M Middleton
Emergency Department, Prince of Wales Hospital, University of New South Wales, Sydney, New South Wales and Joseph Epstein Centre For Emergency Medicine Research, Western Hospital, Melbourne, Victoria, Australia

Abstract

Epistaxis is a frequent complaint, and may often cause great anxiety in patients and clinicians. Epistaxis results from the interaction of factors that damage the nasal mucosal lining, affect the vessel walls, or alter the coagulability of the blood, and which may be categorized into environmental, local, systemic and medication related. The knowledge of the first aid treatment of epistaxis is very poor, amongst not only the public, but also health professionals. Immediate emergency department management of epistaxis depends on prioritised assessment and treatment, including resuscitation if necessary, together with the application of relatively simple otolaryngological techniques. There is little high quality evidence regarding routine, alternative or adjunctive treatments.

Key words: bleeding, blood loss, epistaxis, haemorrhage, nose, nosebleed.

Introduction

'Nose bleeds occur in those who are beginning to have feelings of lust or who are getting the signs of manliness.'

Hippocrates 4th century BC

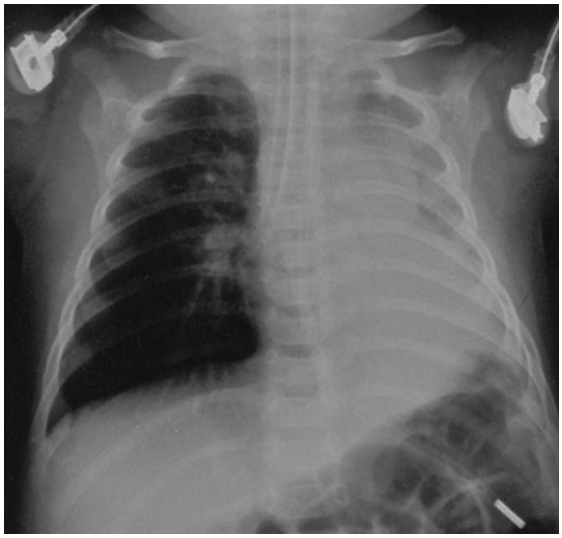
Epistaxis is common. Approximately 10% of the population have had a significant nose bleed at some time in their lives, and 30% of all children aged 0–5 years, 56% of those aged 6–10 years, and 64% of those aged 11–15 years have had at least one episode of epistaxis in their lifetime. In addition, 56% of adults with recurrent nosebleeds have been reported to have suffered problems in childhood. Hippocrates and others believed that as disease was caused by an imbalance of the humours, nosebleeds, together with vomiting and expectorating, were potentially curative for illnesses above the diaphragm. He treated prolonged bleeds with the application of cold towels to the shaven head, and is reported to have packed the nasal cavity with compressed calves rennet or wool soaked in oil of figs.

Even though epistaxis has been dealt with for centuries, both the public and many health professionals are very poor even at applying first-aid measures. A survey of 500 members of the public in 1997 revealed that only 11% of people knew the correct first aid treatment for a nosebleed. Perhaps even more worryingly, an earlier study showed that only 33% of staff of the accident and emergency department of a major United Kingdom teaching hospital were aware of the correct positioning of the fingers to compress the commonest bleeding point,

Competing interests: None declared.

Question 5 (12 marks)

A 5 year old boy presents to the emergency department after an episode of near drowning.
He is intubated on arrival and the X-ray opposite is taken soon after intubation. His weight is 20 kg.



a. State three (3) abnormal findings in this CXR. (3 marks)
   - **RMB ETT- REQUIRED**
   - **Opacification L lung- REQUIRED**
   - **NGT stomach**
   - **Absent L hemidiaphragm**
   - **Crowding of ribs on L**
   - **(?) bilateral mid clavicle callous**

His weight is 20 kg.

b. List the initial ventilator settings that you would commence. (5 marks)

Mode	**SIMV**
Tidal volume	**120-200ml**
Respiratory rate	**16**
I:E	**1:1 (1.4:1)**
PEEP	**Start 5cm increase to 10-15 as tolerated**

45 minutes after instituting these settings, his Peak Inspiratory pressures are 50 cm H_20.

c. State four (4) KEY steps that you would perform to rectify this problem. (4 marks)
   - **Remove from ventilator→ BVM**
   - **Check tube- depth**
   - **Check tube - patency- suction tube/ check filter**
   - **↓ RR**
   - **↑ I:E**
   - **Bronchodilators if evidence bronchospasm**
   - **Exclude PTX- clinical/US / CXR**
   - **Reduce PEEP**
   - **Consider further or first dose paralysis e.g. rocuronium 0.6mg/kg, or increase sedation**

   "DOPES"- Disconnect + displaced ETT, obstruction, pneumothorax + paralysis, equipment failure, suction + sedation + breath stacking

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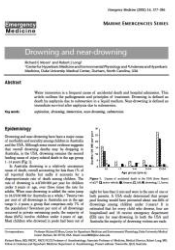
Drowning and near-drowning

Question 6 (12 marks)

A 35 year old woman presents to the emergency department with a suspected red back spider bite.

a. List three (3) clinical features that you may expect with this bite. (3 marks)
   - **Absence of bite mark**
   - **Local severe pain < 1/24**
   - **Piloerection at site < 1/24**
   - **Sweating at site/unrelated site/ generalise/ profuse < 1/24**
   - **Erythema (minimal) at site < 1/24**
   - **Distant/ random pains**
   - **LN pains**
   - **Muscle fasciculations**
   - **Shivering**
   - **N/V**
   - **Restlessness**
   - **Lymphangitis**
   - **Tachycardia, HT**

b. State three (3) current controversies in the management of a red back spider bite. (3 marks)
   - **Role of AV at all vs symptomatic Rx** (see RAVE II below)
   - **Route of AV- IM vs IV** (may be viewed as not controversial anymore)
   - **Role of AV in delayed presentation**
   - **Role of repeated AV dose**

Following your review, the features are more suggestive of Funnel Web spider bite.

c. List three (3) clinical features that you may expect with this bite. (3 marks)
   - **Witnessed big black spider with huge fangs**
   - **Fang marks at bite site**
   - **Rapid onset**
   - **Pain- immediate**
   - **Erythema- immediate**
   - **General:**
     - **HA**
     - **Vomiting**
     - **Abdo pain**
   - **Autonomic:**
     - **Sweating**
     - **Salivation**
     - **Lacrimation**
     - **Piloerection**
   - **Mydriasis**
   - **CVS:**
     - **HT/Hypotension**
     - **Tachycardia/ bradycardia**
     - **APO**
   - **Neurological:**
     - **Paraesthesia (local/distant/perioral)**
   - **NM paralysis**
     - **Muscle fasciculations**
     - **Coma**

d. List three (3) agents that you may use for supportive care or specific treatment of a suspected severe Funnel Web spider bite. (3 marks)
   - **Pressure bandage with immobilisation**
   - **Oxygen**
   - **Atropine**
   - **Antivenom- (**systemic envenoming -> 2 ampoules CSL funnel web spider antivenom, severe envenoming/cardiac arrest -> 4 ampoules IV)
   - **Antiemetic**
   - **Analgesia**
   - **Tetanus prophylaxis**

	Red back spider	Funnel web spider
Urgency of treatment	**Non urgent (Severe envenomation is unlikely in < 3/24)**	**Urgent (death may occur in < 1/24**
Application of ice	**May ↓ symptoms**	**Not recommended**
Pressure immobilisation	**Not recommended**	**Indicated, may be lifesaving**
Indications for antivenom	**Now controversial:** **Previously:** **1. Severe pain- local or regional** **2. Systemic symptoms or signs of envenomation**	**1. Systemic envenomation** **2. any other symptoms:** • **Perioral tingling** • **Muscle fasciculation** • **Excessive salivation/lacrimation** • **Piloerection** • **Tachy/ HT** • **Nausea** • **SOB** • **↓ GCS** •
Premedication prior to antivenom	**Not recommended (Only if Equine allergy)**	**+/-**
Route of antivenom administration	**IM or IV**	**IV**
Initial dose of antivenom	**2 ampoules**	**2 ampoules if moderate** **4 ampoules if severe**
Interval to repeat antivenom	**2/24**	**30-60 minutely**
Disposition if antivenom given	**D/c @ 2/24 if symptoms resolved**	**ICU**

   - **AntiHt**
   - **Fluids- in shock- careful**

RAVE & RAVE II

- **Background- Case experience suggests RBS AV appears to be effective in acute and delayed presentations. "Everyone" has seen/heard of delayed symptoms being Rx effectively within a short time following AV administration**
- **RAVE:**
  - **IM efficacy = IV efficacy**
  - **IM administration was found to be associated with zero serum concentration of AV**
  - **∴ raised the Q: is the AV better than placebo?**
- **RAVE:**
  - **AV had minimal/ if any benefit over placebo wrt ↓ pain and systemic effects**
  - **It seems that RBS symptoms wear off rapidly in ~ 20% of cases (<2/24) with no Rx**
  - **3.5% hypersensitivity reactions following AV**
- **On the strength of these studies, routine use of RBS AV is not recommended**

QJM. 2008 Jul;101(7):557-65. doi: 10.1093/qjmed/hcn048. Epub 2008 Apr 8.

A randomised controlled trial of intramuscular vs. intravenous antivenom for latrodectism--the RAVE study.

Isbister GK[1], Brown SG, Miller M, Tankel A, Macdonald E, Stokes B, Ellis R, Nagree Y, Wilkes GJ, James R, Short A, Holdgate A.

Author information

Abstract

BACKGROUND: Widow spider-bite causes latrodectism and is associated with significant morbidity worldwide. Antivenom is given by both the intravenous (IV) and intramuscular (IM) routes and it is unclear which is more effective.

AIM: To compare the effectiveness of IV vs. IM redback spider antivenom.

DESIGN: Randomized controlled trial.

METHODS: Patients with latrodectism were given either IV or IM antivenom according to a randomized double-dummy, double-blind protocol. The first antivenom treatment was followed by another identical treatment after two hours if required. The primary outcome was a clinically significant reduction in pain two hours after the last treatment. A fully Bayesian analysis was used to estimate the probability of the desired treatment effect, predetermined as an absolute difference of 20%.

RESULTS: We randomly allocated 126 patients to receive antivenom IV (64) and IM (62). After antivenom treatment pain improved in 40/64(62%) in the IV group vs. 33/62(53%) in the IM group (+9%; 95% Credible Interval [CrI]: -8% to +26%). The probability of a difference greater than zero (IV superior) was 85% but the probability of a difference >20% was only 10%. In 55 patients with systemic effects, these improved in 58% after IV antivenom vs. 65% after IM antivenom (-8%; 95% CrI: -32% to +17%). Twenty-four hours after antivenom pain had improved in 84% in the IV group vs. 71% in the IM group (+13%; 95% CrI: -2% to +27%). A meta-analysis including data from a previous trial found no difference in the primary outcome between IV and IM administration.

DISCUSSION: The difference between IV and IM routes of administration of widow spider antivenom is, at best, small and does not justify routinely choosing one route over the other. Furthermore, antivenom may provide no benefit over placebo.

Randomized Controlled Trial of Intravenous Antivenom Versus Placebo for Latrodectism: The Second Redback Antivenom Evaluation (RAVE-II) Study

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Study objective: Latrodectism is the most important spider envenomation syndrome worldwide. There remains considerable controversy over antivenom treatment. We aimed to investigate whether antivenom resulted in resolution of pain and systemic effects in patients with latrodectism who received standardized analgesia.

Methods: In a multicenter randomized placebo-controlled trial of redback spider antivenom for latrodectism, 224 patients (>7 years) with a redback spider bite and severe pain, with or without systemic effects, were randomized to receive normal saline solution (placebo) or antivenom after receiving standardized analgesia. The primary outcome was a clinically significant reduction in pain 2 hours after trial medication compared with baseline. A second primary outcome for the subgroup with systemic features of envenomation was resolution of systemic features at 2 hours. Secondary outcomes were improved pain at 4 and 24 hours, resolution of systemic features at 4 hours, administration of opioid analgesics or unblinded antivenom after 2 hours, and adverse reactions.

Results: Two hours after treatment, 26 of 112 patients (23%) from the placebo arm had a clinically significant improvement in pain versus 38 of 112 (34%) from the antivenom arm (difference in favor of antivenom 10.7%; 95% confidence interval −1.1% to 22.6%; *P*=.10). Systemic effects resolved after 2 hours in 9 of 41 patients (22%) in the placebo arm and 9 of 35 (26%) in the antivenom arm (difference 3.8%; 95% confidence interval −15% to 23%; *P*=.79). There was no significant difference in any secondary outcome between antivenom and placebo. Acute systemic hypersensitivity reactions occurred in 4 of 112 patients (3.6%) receiving antivenom.

Conclusion: The addition of antivenom to standardized analgesia in patients with latrodectism did not significantly improve pain or systemic effects. [Ann Emerg Med. 2014;64:620-628.]

Please see page 621 for the Editor's Capsule Summary of this article.

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Emergency Medicine (2003) 15, 170–175

TOXICOLOGY

Emergency Medicine

Red-back spider envenomation in children in Central Australia

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Abstract

Objective: To describe the clinical spectrum of Red-back spider (RBS) envenomation in children up to 12 years of age.

Methods: Retrospective case notes review of children with a discharge diagnosis of RBS bite from January 1992 to June 2001. The setting was Alice Springs Hospital, the main paediatric hospital for the whole region of Central Australia. The patients were 54 children, comprising 39 Aboriginal and 15 non-Aboriginal children.

Results: Forty-six (85%) children had systemic envenomation. The three most common systemic features are irritability, hypertension and sweating; 35 (65%) children had all three systemic features. Forty-five (83%) received antivenom therapy. The clinical characteristics and outcomes showed no significant difference between children ≤ 4 and > 4 years of age.

Conclusions: There is a high incidence of systemic envenomation due to RBS bite in children in Central Australia. The triad of irritability, hypertension and sweating in a previously well child is highly suggestive of latrodectism.

Key words: *Central Australia, children, Red-back spider.*

Introduction

In Australia, the Red-back spider (RBS) (*Latrodectus hasselti*) remains a common urban spider, and bites to humans number thousands per annum.[1,2] Not surprisingly, the use of RBS antivenom remains greater than the combined usage of all other antivenoms produced for the Australian market.[1,3] Yet, despite numerous attempts to summarise the clinical features of RBS envenomation, much of our understanding continues to evolve.[2,4–7] Limited stratification of results from these studies has meant that current concepts of envenomation are generalised across all age groups.

Exploration of possible differences in clinical outcomes of RBS envenomation between adults and children remains largely undocumented. A view popularly held is that children are at particular risk of systemic envenomation because they receive a larger weight of

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Emergency Medicine Australasia (2005) 17, 152–156

TOXICOLOGY

EMA

A double-blind, randomized trial of intravenous versus intramuscular antivenom for Red-back spider envenoming

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Abstract

Objective: To compare the efficacy of intravenous versus intramuscular antivenom (AV) in the treatment of Red-back spider (RBS) envenoming.

Methods: Randomized, double-dummy, double-blind, multicentre trial of patients with red-back spider envenoming requiring AV treatment recruited from five hospital EDs in Western Australia.

Results: Thirty-five patients were recruited; two were excluded; 33 were available for initial analysis, but two who were unblinded after one ampoule of trial AV and given i.v. AV had limited data; 31 remained in the study and had more complete data. After AV, pain scores for both i.m. and i.v. groups improved rapidly. At 24 h, the i.v. group was better with a 55% absolute difference (76% vs. 21%; 95% CI 25–85% difference) in the proportion pain-free. There were no safety issues.

Conclusions: Red-back spider antivenom was initially effective by both i.m. and i.v. routes. The study generates the hypothesis that at 24 h, significantly more patients are pain-free with i.v. administration. Definitive recommendations on the optimal route of administration of RBS AV await the results of further studies.

Key words: *antivenom, arachnidism, latrodectism, Red-back spider, spider bites, spider venoms.*

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Emergency Medicine Australasia (2004) 16, 161–166

Developing a decision tree algorithm for the diagnosis of suspected spider bites

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Abstract

Objective: To develop a diagnostic algorithm (decision tree) to improve the ability to identify or predict medically important spider bites (funnel-web and redback spiders) from information about the circumstances and initial clinical effects of spider bites.

Methods: A dataset of definite spider bites with expert identification of all spiders was used from a previous Australia-wide prospective study. Spider bites were categorized as: big black spider (BBS), redback spider (RED) and other spider (OTH). Big black spider included funnel-web spiders (most medically significant), but also other spiders of similar appearance. Fifteen predictor variables were based on univariate analysis from previous studies and clinical experience. They included information about the circumstances and early clinical effects of bites. The data were analyzed using CART® (Classification and Regression Trees), a 'decision tree' algorithm used to create a tree-like structure to describe a data set.

Results: Of 789 spider bites there were 49 (6.2%) bites by BBS, 68 (8.6%) bites by RED and 672 (85.2%) bites by OTH. A decision tree was developed that included six predictor variables (fang marks/bleeding; state/territory; local diaphoresis; month; time of day; and proximal or distal bite region). The decision tree accurately classified 47 out of the 49 (96%) BBS, and no funnel-web spiders were incorrectly classified (100% sensitivity). Two hundred and forty-four of 789 were classified as OTH and included no BBS.

Conclusions: A decision tree based on a small amount of information about the circumstances and early clinical effects of spider bites safely predicted all funnel-web spider bites. Application of this algorithm would allow the early institution of appropriate treatment for funnel-web spider bites and the immediate discharge of 31% as other spider bites (reassurance only).

Key words: *algorithm, diagnosis, envenoming, decision tree, spider bite.*

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Conflicts of interests: None

Question 7 (12 marks)

A 3 year old boy presents with right elbow pain following a fall from monkey bars.

i) State four (4) abnormal findings shown on this X-ray. (4 marks)

- **Supracondylar # R humerus- Gartland III**
- **Off ended/ 100% displaced**
- **Posterior displacement**
- **Marked soft tissue swelling**

ii) Assuming that there is neurovascular compromise, list five (5) KEY steps to correct this problem. (5 marks)

- **Explain to pt (consent if possible/ not required)**
- **Analgesia**
- **Procedural sedation**
- **Traction and extension until radial pulse palpable**
- **Immobilise in full extension**

NB: Repeat Xray doesn't really "correct this problem" but it is a step you would probably preform

iii) Other than pain, list three (3) KEY complications of this injury in the first 1 week post injury. (3 marks)

- **Median n neuropraxia (must mention n- specifics of anterior interoseous branch not req)**
- **Wound infection**
- **Ischaemic digits**
- **Compartment syndrome**

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Question 8 (12 marks)

A 25 year old man presents to the emergency department after a 2 day illness of fever and vomiting. Some of his blood tests taken soon after arrival are shown.

FIO2	0.4	
pH	7.80	(7.35-7.45)
PCO_2	15mmHg(35-45)	
PO_2	192mmHg	(75-100)
HCO_3	23mmHg(22-33)	
Base excess	10.1	(-3.0 - +3.0)
O_2 sat	99.7%	(95-98%)
Na^+	119mmol/L	(135-145)
K^+	2.5mmol/L	(3.2-4.5)
Cl^-	65mmol/L	(100-110)
Urea	10.3mmol/L	(3.0-8.0)
Creatinine	0.187mmol/L	(0.07-0.12)
Glucose	4.5mmol/L	(3.0-7.8)

e. List two (2) calculations to help you to interpret these results. (2 marks)

Derived values:

- **Expected HCO3 = 20 in acute process and 14 in chronic process**

  Acute ↓HCO3- 2 in 10 min every 10 mmHg ↓ PCO2.

  Minimum of 18 ∴ < 18 highly suggestive of metabolic acidosis

  (pCO2 values cannot be negative)

  Chronic ↓HCO3- 5 if sustained for 2-3 days
- **A-a gradient = 90= Increased A-a gradient**
- **AG = 119 -65 -23 = 119 - 88 = 31 therefore HAGMA**

PAO2= PiO2 – (PACO2/R)

PiO2= (atmospheric pressure - partial pressure of water) x FiO2
760 - 47 at sea level x ~
(0.21= RA)

PAO2= (FIO2) (P_{atm} – 47 mm Hg) - (P_aCO2)/ 0.8

Normal Aa Gradient = 2.5 + (0.21) (age in years) OR = age+4/4

Normal range: age/4 (in erect position) or 10 + (age/10)
R ~ with composition of diet

f. Using the scenario and the derived values, define the primary abnormality/s. (2 marks)
   - **Profound metabolic alkalosis**

g. Using the scenario and the derived values, define the secondary abnormality/s. (1 mark)
   - **Respiratory alkalosis**
   - **High anion gap metabolic acidosis**
   - **Severe hyponatraemia and hypochloraemia, life threatening hypokalaemia**

h. Provide a unifying explanation for these results. (2 marks)

- **Early Salicylate poisoning causing triple acid base disturbance**
- **Significant electrolyte abnormalities due to prolonged vomiting**
- **DDx: sepsis secondary to pulmonary infection with vomiting**

Question 9 (18 marks)

A 35 year old man presents to the emergency department with swelling to both his left knee and right elbow joints.

a. List four (4) MOST LIKELY differential diagnoses for this presentation. (4 marks)
   - **Haemarthrosis- Traumatic**
   - **Haemarthrosis- anticoagulation**
   - **Haemarthrosis- haemophilia**
   - **Septic arthritis: poly-articular septic arthritis**
   - **Viral arthritis e.g. Ross River Virus, parvovirus, rubella, HCV**
   - **Reiters- STI- Gonococcal**
   - **Serum sickness- recent abs/ infection**
   - **IVDU- septic arthritis from IE**
   - **Gout/ crystal arthropathy**
   - **RhA**
   - **Vasculitis**
   - **Malignancy e.g. leukaemia, neuroblastoma**

b. List four (4) KEY features on history that may assist with obtaining a diagnosis. (4 marks)
   - **Trauma**
   - **Recent illness e.g. diarrhoea, tonsillitis, conjunctivitis, urethritis**
   - **PHx similar- known joint disease**
   - **PHx- Comorbidities e.g. inflammatory bowel disease** (usually mono arthritis large joint, peripheral arthritis usually reflects activity of bowel disease)
   - **Sexual Hx**
   - **IVDU**
   - **FHx- esp haemophilia**
   - **Meds**

c. State two (2) KEY reasons to perform a knee joint aspiration for this patient. (2 marks)

- **Diagnostic- unexplained joint effusion to differentiate septic joint form an inflammatory or bloody effusion by sending fluid for cytology, microbiology and biochemical testing e.g. > 50,000 WCC or presence of organism on gram stain warrants urgent washout and antibiotics to treat septic arthritis**
- **Therapeutic- administration of intra-articular steroid, removal fluid or blood to provide symptomatic relief and increase mobility**

d. List four (4) contraindications to performing a knee aspiration in this patient. (4 marks)
   - **Overlying cellulitis**
   - **Coagulopathy (INR > 1.4)**
   - **Joint prosthesis**
   - **Acute #**
   - **Pt refusal**
   - **Uncooperative pt**

e. List four (4) MOST LIKELY DIFFERENT diagnoses that you would consider if the patient was a 5 year old female. (4 marks)

NB: MUST be "different" !
   - **NAI**
   - **Juvenile chronic arthritis** (peak age 1-5yrs, pain surprisingly little cf other cause acute joint, can affect any joint, or multiple joints)
   - **Reactive - post infective (recent Gastro)**
   - **Vasculitis- HSP**

- **Serum Sickness- eg ceclor**
- **Leukaemia**