Illawarra Shoalhaven Local Health District

Emergency Medicine Fellowship Program

Topic-Based Quiz: Qs and As

Paediatrics 1

Candidate Instructions

- Duration = 30min
- Props are included within the examination booklets
- Allocated marks for each question are shown
- Each mark is of equal weight
- There is no negative marking
- Write answers CLEARLY, and cross out any errors
- Answer within space provided
- Do not begin until instructed
- You may take examination book home with you

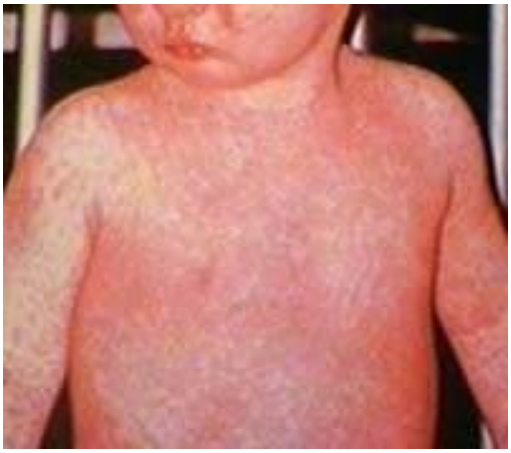
Good Luck!

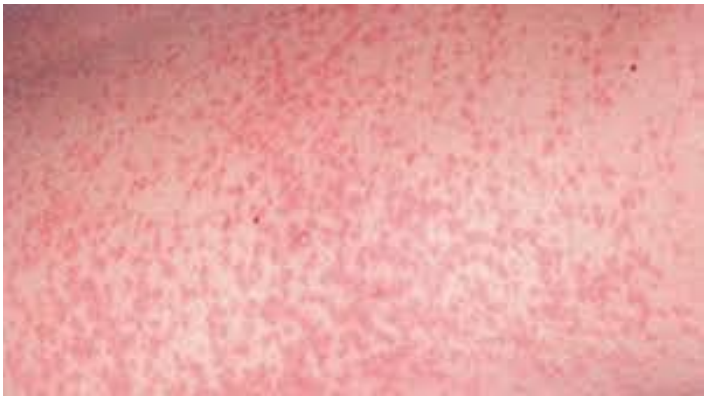
Topic-Based SAQ Quiz: Paediatrics 1

Acknowledgement: Thank you to the trainees who have written these SAQs with the hope of making their colleagues sweat, but ultimately gain more exposure to exam practice. Good job.

Question 1

This unimmunized 14 month old child, recently returned from Bali, has been unwell for 4 days with fever, conjunctivitis and coryza. He has now developed this rash over the last 12 hours.





Close up of rash

Describe this photograph (2 marks)

_____

_____

_____

What is the most likely diagnosis? Give 2 other differential diagnoses (3 marks)

_____

_____

_____

Name 2 complications of this (most likely) diagnosis/condition. (2 marks)

_____

_____

What are the infection control and public health implications of this presentation? List your management priorities regarding these 2 issues. (4 marks)

_____

_____

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_____

Question 2

You are seeing a 3 yo girl with a purpuric rash over her shins. Based on the appearance of the rash, you strongly suspect Henoch Schoenlein Purpura.

Give 2 other locations you would search for a similar rash? (1 mark)

_____

_____

List 2 renal complications of this condition (2 marks)

_____

_____

List 3 extra-renal complications or findings in this condition (3 marks)

_____

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List 4 investigations with justification (4 marks)

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Briefly outline the utility of prednisolone in HSP (2 marks)

_____

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Question 3

A 6 week old infant with known Tetralogy of Fallot presents with increased cyanosis.

List 3 features on examination that are suggestive of a hypercyanotic/tet spell: (3 marks)

_____

_____

_____

What is your initial management for this clinical situation? List 3 steps. (3 marks)

_____

_____

_____

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Question 4

A 6 month old baby girl presents with 3 days of rhinorrhea, low grade fever, cough and bilateral wheeze on auscultation. You make a clinical diagnosis of bronchiolitis.

List 4 risk factors for developing severe bronchiolitis (2 marks)

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Give 4 indications for inpatient admission (2 marks)

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You decide the infant requires admission. Currently RA Sats are 88%, RR 60, with moderate work of breathing but the child is alert. The infant has not fed over the last 6 hours but there are no clinical signs of dehydration.
List 4 methods of delivering oxygen to this child, with a pro and con for each: (8 marks)

Method of O2 delivery	Pro	Con

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Question 5

An 18 month old toddler without any significant comorbidities, presents with a 2 month history of progressive lethargy and pallor. Her significant initial blood results are:

	Normal range
Hb 75	(115 – 145)
WCC 3.8	(4.5 – 13.5)
Plts 70	(150 – 450)
CRP 27	(<10)
ESR 42	(< 15)
LDH 3762	(< 200)

Describe and interpret these blood results. (2 marks)

_____

_____

_____

List the most likely diagnosis, and 2 other differential diagnoses (3 marks)

_____

_____

_____

What key features on history and examination would you expect in support of the most likely diagnosis? (4 marks)

History	Examination

List 3 additional investigations (separate to those listed above) that you would request, with justification (6 marks)

Investigation	Justification

Topic-Based SAQ Quiz: Paediatrics 1

ANSWERS

Question 1

After reading the entire question, it should be obvious they are asking about ***measles****.*

Just to recap.

- *Highly infectious*
- *Droplet spread / direction contact with secretions*
- *Virus can be suspended in the air for up to an 1hour (think waiting room risk)*
- *Pts are infectious for 3-4 days prior to rash developing AND 4-6 days after rash onset*
- *After exposure to measles, incubation is about 10 days (range 7-18 days) to fever, and rash comes 14 days after exposure*

Assessment:

- *The child is always miserable, febrile and unwell*
- *3 Cs: cough / coryza / conjunctivitis*
- *Coarse blotchy, maculopapular, morbiliform rash*
    - *Starts in face and upper neck, then spreads*
- *Koplik spots appear 1-4 days PRIOR to the rash (white spots on buccal mucosa of inner cheek)*

Investigations:

- *Notify on call Microbiology to ensure rapid processings*
- *Measles Abs (IgM and IgG) IgM will rise 1-2 days after rash*
- *PNA for viruses and urgent PCR*
- *Urine for measles PCR*

Public Health Management:

- *Isolate immediately in negative pressure isolation room*
- *PPE equipment*
- *Must be D/W tertiary paediatric clinical microbiologist to coordinate local response*
- *Lab confirmation is ALWAYS required*
- *Must have contact history tracing:*
    - ***Susceptible contacts include:***
        - *< 2 doses of MMR*
        - *Unimmunised*
        - *Children < 18mo*
            - *Australian immunization schedule is for MMR at 12mo, 18mo and sometimes at 4yo (depending if a monovalent varicella vaccine was a part of that schedule)*

    - ***<u>On the flip side, contacts that have acceptable evidence of measles immunity are:</u>***
        - *People born before 1966*
        - *Have received at least 2 doses of MMR (4 weeks apart)*
        - *Serological documentation of measles IgG*
        - *Lab documentation of prior measles infection*
- *Isolate at home until results available*
    - *If positive, isolate until 6 days post rash onset*
    - *Avoid hospitalization IF possible due to infectivity*

Complications:

- *Pneumonia (most common cause of death)*
- *Acute otitis media*
- *Diarrhea and vomiting*
- *Subacute sclerosing pan encephalitis (SSPE) is a rare, late complication*

Describe this photograph (2 marks)

The answer describing the photograph is already discussed above.
The differentials include: Enterovirus / Scarlet fever / Rubella / Adenovirus / Variant Kawasaki.

What is the most likely diagnosis? Give 2 other differential diagnoses (3 marks)

Measles

Name 2 complications of this (most likely) diagnosis/condition. (2 marks)

The complications, again, are listed above.

What are the infection control and public health implications of this presentation? List your management priorities regarding these 2 issues. (4 marks)

The questions asks for infection control and public health implications, aka 2 marks allocated for infection control WITHIN ED and 2 marks for public health management OUTSIDE ED.
Accepted answers included:

- ***<u>Urgent/immediate</u>*** notification of both department of health and hospital infection control // use the words URGENT or IMMEDIATE
- Place mask on patient, isolate in negative pressure room
- PPE for staff, droplet precautions
- Contract tracing to identify susceptible contacts
- Must confirm with lab investigations
- If d/c, quarantine at home

Question 2

After reading this question, you know you don't have to waste time on differentials of a non blanching rash. They are telling you it's HSP and they want to see what you know about it.

To recap on HSP:

- *The most common non thrombocytopaenic purpura in kids*
- *Cause unknown, but it is an IgA mediate vasculitis of SMALL vessels, usually following an URTI*
- *More common in children but can occur in adults*
    - *Peak incident in 2-8yo*
    - *Seasonal peak in winter*
- *Onset can be acute, with simultaneous involvement of several organ groups*
    - *Onset can also be insidious, with sequential occurrence of features over weeks to months*
- *Usually self limiting*
- *Many children will only need a U/A and can be sent home with strict GP follow up*

Assessment:

- *usually well looking child*
- *often a Hx of recent URTI*
- *remember that the small vessel vasculitis can involve several organ groups, look for:*
    - *Skin:*
        - *Rash:*
            - *Initially blanching pink maculopapules*
            - *Can be discrete vs confluent*
            - *Progresses to petechiae/purpura*
                - *Often raised / palpable*
            - *Gravity dependent distribution, particularly buttocks / extensor surfaces of legs and arms*
        - *Oedema*
            - *Angioedema secondary to vasculitis of dermal vessels*
            - *Non pitting, often <u>painful</u>, again a/w dependent areas (hands, feet, eyelids, lips, scrotum)*
    - *Joints*
        - *Arthritis occurs in 2/3 of pts*
        - *Self limiting serous joint effusions*
            - *Usually resolve over several days*
        - *Again, involve gravity dependent joints*
            - *Elbows / wrists / knees / ankles*
        - *a/w pain and difficulty WB*

- *GIT*
  - *Abdominal pain is common, usually intermittent and colicky*
  - *Diarrhea (even a/w occult blood) is also common*
  - *Occasionally frank hematemesis/melaena can occur*
  - *More serious, but infrequently, complications can include spontaneous bowel perforation or intussusception*
- *Kidneys*
  - *90% of patients have microscopic hematuria*
    - *Only 5% will these become persistent/recurrent*
  - *Seriously complications include acute glomerulonephritis, nephrotic syndrome, acute renal failure (<1%) or isolated HTN*
  - *Renal involvement can be late – up to 6 months from initial presentation*
- *CNS/pulmonary involvement is very rare*

DDx:

- *Meningococcal septicaemia*
- *Thrombocytopaenia*
- *Other vasculitides*
- *Other causes of hematuria should be excluded*

Ix:

- *No diagnostic investigations, these are done to exclude other complications or causes*
- *U/A:*
  - *If MACROSCOPIC hematuria is present, urine should be checked for RBC casts (to Ix GN) and protein (nephrotic syndrome)*
- *Consider:*
  - *FBP to exclude thrombocytopaenia if Dx uncertain*
  - *B/Culture / WCC / CRP / meningococcal PCR only if this is suspected*
  - *U+E if renal impairment is clinically suspected*
  - *Complement levels and ASOT if GN is suspected*

Mx:

- *Must document BP*
- *Consider surgical consult for abdominal complications / testicular pain if required*
- *Abdo XR / US may be needed to exclude abdo complications*
- *Use of prednisolone 1mg/kg/day for 2 weeks has some evidence to suggest improvement* ***abdo and joint pain***
  - *NO EVIDENCE TO SAY THIS HELPS WITH RENAL COMPLCIATIONS*
  - *If prescribed, MUST be done in D/W admitting Paediatrician*

- *Admission critiera:*
    - *Abdo complications*
    - *Renal complications*
    - *Requiring symptomatic Mx of joint / abdo / edema related pain*

F/U:

- *GP/Paeds F/U for 6 months*
- *BP and U/A weekly for 1 month*
    - *Then monthly for 6 months*
- *If renal symptoms persist refer to Paeds Renal team*

Give 2 other locations you would search for a similar rash? (1 mark)

Answers are above – buttocks / extensor surfaces of legs.

List 2 renal complications of this condition (2 marks)

Answers above – GN / nephrotic syndrome

List 3 extra-renal complications or findings in this condition (3 marks)

Answers above – abdominal pain / diarrhea / intussusception / peripheral or subcutaneous edema / arthritis

List 4 investigations with justification (4 marks)

Answers above – U/A, coags, FBP, U+E, blood culture, meningococcal PCR
 the theme is to express that you are aware most investigations are done to exclude OTHER DDx, not to Dx HSP

Briefly outline the utility of prednisolone in HSP (2 marks)

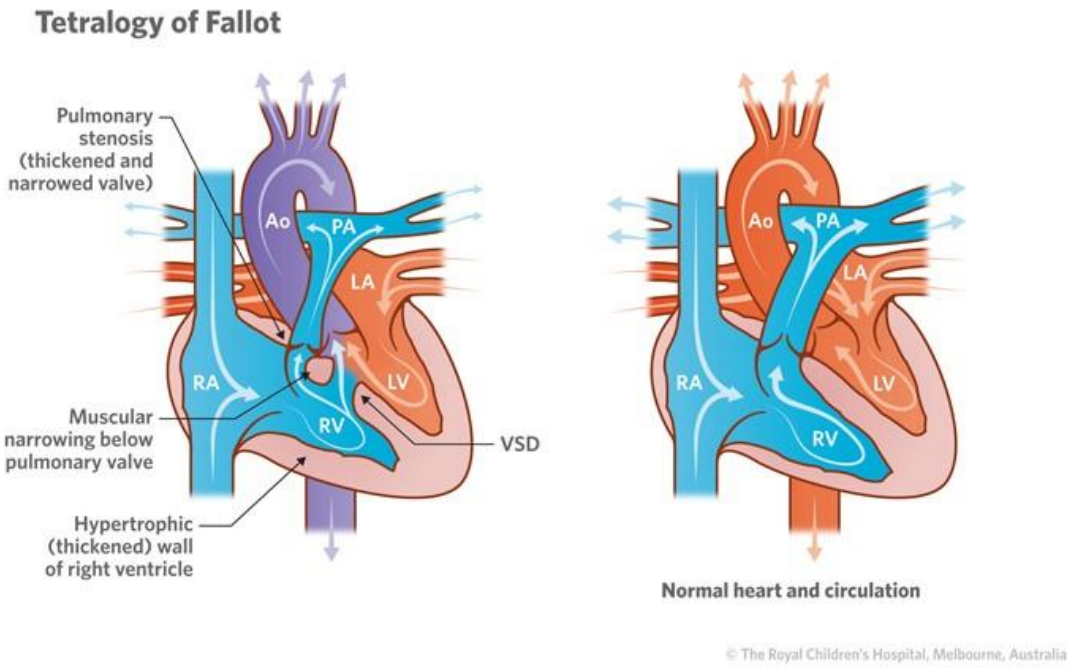
Answer above – only role of prednisolone is to assist with symptomatic Mx of joint/abdo pain, has no impact on prevention of renal complications

Question 3

This one straight up states the child has ToF – no ambiguity.

To recap using RCH guidelines, Tetralogy of Fallot includes a combination:

- VSD
- Pulmonary stenosis
- Overriding aorta (over the VSD)
- RV hypertrophy



This obstruction to blood flow to the lungs, causes blood to be diverted through the VSD into the aorta – therefore pulmonary circulation is reduced, and the child appears blue.

For extra information, a Blalock-Taussig shunt (BT shunt) is first inserted in the neonatal period, which connects the aorta/its branch arteries directly to the pulmonary artery to create a temporary bypass for flow. Eventually at 6mo the child will have a complete surgical repair (closing the VSD with a patch and enlarging the RV and pulmonary stenosis – often needing more patches).

Cyanotic spells (basically acute pulmonary HTN) can occur in children with any form of cyanotic CHD, including ToF and pulmonary atresia.
They often occur early in the morning, or in the context of stress/dehydration a/w periods of increased O2 demand/utilization. It relates to decreased pulmonary blood flow. Most are self limiting.

Assessment:

- Severe cyanosis / pallor (on exertion / feeding / crying)
- Distress / hyperpnoea
- Dehydration
- Lethargy/depressed conscious state
- Known structural heart disease
- Lessening or absences of previously heard heart murmur
- Hx of squatting (this increases systemic vascular resistance so blood preferentially goes to pulmonary flow)

Mx:

- knee to chest position
- high flow O2
- avoid exacerbating distress
- morphine 0.2mg/kg im
- continuous ECG and Sats monitoring
- Frequent BP
- Correct any underlying causes / secondary problems If the

cyanotic spell is prolonged:

- consult paediatric cardiology
- IV fluids 10ml/kg bolus
- RCH states sodium bicarbonate I have not used this in this situation

List 3 features on examination that are suggestive of a hypercyanotic/tet spell: (3 marks)

- Cyanosis on exertion/feeding/crying
- Hypoxia with minimal response to oxygen
- Decreased intensity or complete disappearance of systolic murmur
- Tachycardia
- Shock

What is your initial management for this clinical situation? List 3 steps. (3 marks)

- supplemental O2
- iv access for morphine (note PMH states 0.1mgkg) or I/N fentanyl 1.5mcg/kg
- nurse with knees to chest
- minimal handling, calm environment

Question 4

This question is all about bronchiolitis – a common presentation to any mixed ED, very reasonable questions asking what any FACEM should know.

Recap:

- clinical diagnosis
    - viral LRTI in infants < 12 mo
    - there is much less diagnostic certainty in 12-24mo age group
- Will start as an acute URTI with viral prodrome followed by respiratory distress and fever
    - Then cough / tachypnea / increased WOB / creps or wheeze
- Natural clinical history
    - Worse day 2-3
    - Then slowly improves over next 7-10 days
- CXR not usually required
- Most can be Mx at home

RFs for more serious illness in bronchiolitis:

- Ex prem (< 37 /40)
    - Chronological age at presentation < 10 weeks
    - Post natal exposure to cigarette smoke
    - BF < 2 months
    - FTT
    - CHD
    - CLD
    - Chronic neurological conditions
    - Indigenous
    - Other chronic medical conditions including immunodefiency
- Social factors including geographical location and access to transport

Assessment:

- Hx, as above
    - Ask specifically re respiratory distress
    - Young infants / ex prem are at risk of apneic episodes
    - Hydration status enquire specifically re intake vs urine output
- Ex
    - Respiratory status including RR / Sats / WOB
        - Includes nasal flaring / head bobbing / tracheal tug / acc muscle use / grunting
    - Can look pale / unwell
    - Decreased conscious state indicates exhaustion
    - Cyanosis is a very late sign and indicates severe disease

    - Dehydration signs including slow CR / sunken fontanelle / decreased tissue turgor / dry mucous membranes
    - Ascultation often reveals wheeze and/or crackles, with decreased air entry (a/w atelectasis from mucous plugging)
- I
    - CXR usually has no routine indication
    - Bloods also do not aid in Mx (not unless sig dehydrated / looking at electrolytes)
    - PNAs for viruses again do not assist Mx
    - MSU only if needing to clinically exclude UTI
- Mx:
    - Abs NOT indicated
        - Also: No role for salbutamol / atrovent / steroids / adrenaline / hypertonic saline nebs / antivirals
    - Mx is supportive O2 / fluids
        - Respiratory support if Sats , 92%
        - Fluids can be IV or NG can be replaced at 60-100% of maintenance (the ideal volume is not known)

Note important DDx:

- asthma (if> 12mo)
- bronchial FB
- cardial failure
- pneumonia
- pertussis
- pneumothorax
- fever is usually mild in bronchiolitis, any T> 39deg should have a careful evaluation to exclude other serious bacterial infections

List 4 risk factors for developing severe bronchiolitis (2 marks)

Answers above.

Give 4 indications for inpatient admission (2 marks)

- Hypoxia Sats < 92% requiring sup O2
- Dehydration / shock requiring IV or NG fluid replacement
- Risk factors for apnea including ex prem / very young neonate
- Requiring mechanical ventilator support
- Expected clinical course ie only Day 1 or 2 of illness and expected to deteriorate
- Social factors as above
- RR > 60 and signs of increasing respiratory distress

Complete the table

O2 delivery	Pro / Con
Low flow nasal prong	Pro: easily available, able to continue feeding Con: not humidified, dries nasal mucosa, low flow limited to <4L
HHFNP 2L/kg	Pro: provides flow, can titrate FiO2, can provide < 3cm H20 PEEP Con: not easily available, requires nursing staff to be trained to operate and use
Hudson mask up to 6-8L	Pro: easily available Con: cannot feed with mask on, not humidified, can distress the child
CPAP	Pro: provides increased FiO2 and PEEP, improves WOB Con: needs HDU/PICU admission

Question 5

Tough question – clearly pancytopaenic with raised LDH, can't be anything but malignancy.
Leukaemia is the most common childhood cancer (followed by CNS tumours) of this, ALL is the most common
Lymphoma only accounts for < 10% of childhood cancers.

Describe and interpret these blood results. (2 marks)

- pancytopaenia, with moderate anaemia, mild leucopaenia, and moderate thrombocytopaenia, with moderately raised inflammatory markers

List the most likely diagnosis, and 2 other differential diagnoses (3 marks)

- he setting of raised LDH, this is suspicious for malignancy, and in a child ALL is the most likely diagnosis
- DDx: aplastic anaemia, lymphoma, other forms of leukaemia

What key features on history and examination would you expect in support of the most likely diagnosis? (4 marks)

History	Examination
LOW / FTT Night sweats / fevers Limping Easy bruising Bleeding from gums	Lymphadenopathy Hepatosplenomegaly Purpuric rash / petechiae / ecchymoses Gingival enlargement

What key features on history and examination would you expect in support of the most likely diagnosis? (4 marks)

Investigation	Justification
Coags	Pre procedure / assess for other coagulopathy
Blood film	To look for blasts / appearances of cells
Abdominal US	Assess for hepatosplenomegaly
Flow cytometry / BMA	Diagnostic for blasts / leukaemia

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