

# Clinical Quiz in Emergency Medicine

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## Contents

Preface	ix
Acknowledgements	x
About the authors	xi
Abbreviations and symbols	xii
1. A 60-year-old man with severe interscapular back pain	2
2. A 13-year-old boy with chin injury	4
3. A 40-year-old woman with cat-bite wound	7
4. A 12-year-old girl with left ankle sprain	10
5. A 28-year-old man with left eye pain	12
6. A 45-year-old man with painful swollen right thigh	14
7. A 60-year-old woman with shortness of breath and fever	16
8. An 18-year-old young man with shortness of breath and dizziness	18
9. A 50-year-old man with persistent headache and dizziness	20
10. A 25-year-old man with syncope	22
11. A 12-year-old boy with left hip pain	24
12. A 50-year-old man with neck injury	27
13. A 17-year-old young man with snakebite	30
14. A 16-year-old girl with severe vaginal bleeding	32

15.	A 16-year-old boy with left eye injury	35
16.	A 65-year-old man with severe chest pain	38
17.	A 23-year-old man with neck injury	40
18.	A 43-year-old man with painful facial rash	42
19.	An 18-year-old young man with chest pain	44
20.	A 48-year-old man with severe chest pain	47
21.	A teenage girl with rash over the lower limbs	50
22.	An 80-year-old man with right lower quadrant pain	52
23.	A 20-year-old man with palpitations	54
24.	A 6-year-old girl with diarrhoea	57
25.	An 18-year-old young woman with neck injury	60
26.	A 15-year-old girl with right elbow injury	62
27.	A 44-year-old man with head injury	65
28.	A 39-year-old woman with increasing swelling of face	68
29.	A 5-year-old boy with left facial pain	70
30.	A 42-year-old pregnant woman with repeated vomiting and dehydration	72
31.	A 50-year-old man with severe chest pain	74
32.	A 60-year-old woman with abdominal pain and vomiting	76
33.	A 5-year-old boy with high fever	78
34.	A 45-year-old motorcyclist with anterior chest wall contusion	81
35.	A 68-year-old woman with drooling of saliva and left ear pain	84
36.	A 50-year-old man with confusion	87

37.	A 37-year-old woman with per vaginal bleeding and lower abdominal pain	90
38.	A 29-year-old man with palpitations	92
39.	A 39-year-old woman who attempted suicide by hanging	94
40.	A 50-year-old woman with insomnia and headache	96
41.	A 45-year-old motorcyclist with left foot injury	98
42.	A 9-day-old neonate with left eye discharge	100
43.	A 16-year-old boy with retrosternal chest pain and dizziness	102
44.	A 38-year-old man with head injury	104
45.	A 13-year-old boy with right knee injury	106
46.	A 52-year-old man with numbness and spasm of four extremities	108
47.	An elderly woman with inability to close the mouth	110
48.	A 41-year-old woman with right hip injury	112
49.	A 55-year-old man with fever and cough	115
50.	A 62-year-old woman with dizziness and severe headache	118
51.	A 25-year-old man with chest pain	120
52.	A 48-year-old man with facial injury	122
53.	A 60-year-old man with dizziness and weakness	125
54.	An 11-year-old girl with left knee injury	128
55.	A 75-year-old man with fever, hoarseness and difficulty in swallowing	130
56.	A 60-year-old diabetic man with left hand pain and swelling	133

57.	A 19-month-old boy with drowsiness and multiple bruises	134
58.	A 21-year-old woman with severe epigastric pain	136
59.	A 58-year-old man with dyspnoea and chest tightness	138
60.	A 42-year-old woman with lower chin pain and swelling	140
61.	A 55-year-old man with left foot pain and swelling	142
62.	A 19-year-old young man with right arm injury	144
63.	A 55-year-old man with right eye injury	147
64.	A 39-year-old woman with dyspnoea	150
65.	A 23-year-old man with an electric shock	152
66.	A 40-year-old woman with persistent wound pain	154
67.	A 30-year-old woman with right-sided abdominal pain	156
68.	A 26-year-old woman with pain and swelling of left index finger	158
69.	A 40-year-old man with snake bite	160
70.	A 65-year-old man with palpitations	162
	Index	164



## About the authors

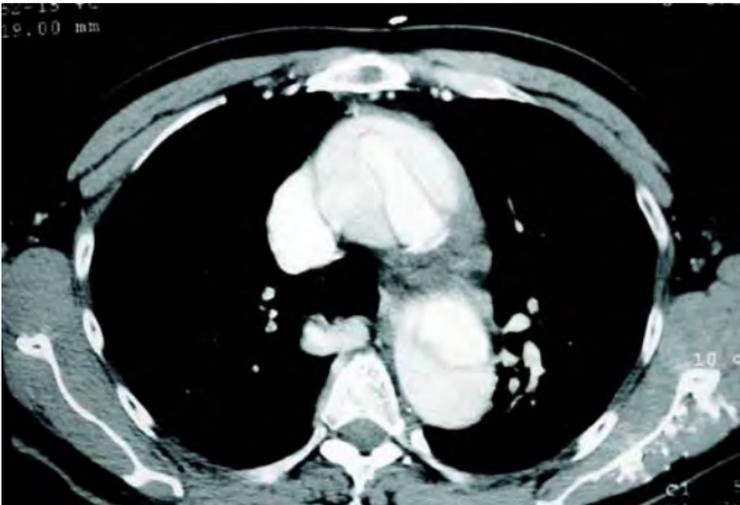
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# 1

## A 60-year-old man with severe interscapular back pain

A 60-year-old man presented to ED because of sudden onset of severe interscapular back pain that he had experienced for one hour. A CXR revealed a widened mediastinum. An urgent CT thorax was performed.



### QUESTIONS

1. What are the CT findings?
2. What is the diagnosis?
3. What might the CXR show (in addition to widened mediastinum)?
4. What are two classifications of the above diagnosis?

### ANSWERS

1. There is an intimal flap separating the true lumen and false lumen. Both ascending and descending aorta are involved. The true lumen is markedly narrow and is close to the inner

curvature of the aortic arch. The false lumen is usually larger. The presence of beak sign (acute angle between the dissected flap and the outer wall) and cobweb sign (thin strands crossing the lumen) are suggestive of false lumen.

2. The diagnosis is aortic dissection. Thoracic aortic dissection is the most frequent cause of aortic emergency. It occurs more frequently in those with hypertension, bicuspid aortic valve, Marfan's syndrome or Ehler-Danlos syndrome. Sensitivity and specificity of MDCT is nearly 100%. CT scan also depicts other pathological entities with similar clinical manifestation such as intramural haematoma (best shown in the noncontrast CT) and penetrating atherosclerotic ulcer.
3. CXR may show a double knuckle aorta, left pleural effusion, deviation of the trachea/nasogastric tube to the right and the "calcium" sign. The calcium sign is the separation of the two parts of the wall of a calcified aorta by  $> 5$  mm.
4. Aorta dissection can be classified by the DeBakey or Stanford classifications. DeBakey type I dissections are those that involve the ascending aorta, the arch and the descending aorta. Type II involves only the ascending aorta, and type III involves only the descending aorta.

Stanford type A aortic dissection involves the ascending aorta. Type B involves only the descending aorta. In general, type A dissection requires surgical repair, and type B dissection is treated medically unless complications occur.

## REFERENCES

1. LePage MA, Quint LE, Sonnad SS, et al. Aortic dissection: CT features that distinguish true lumen from false lumen. *AJR Am J Roentgenol* 2001;177:207-11.
2. Hagan PG, Nienaber CA, Isselbacher EM, et al. The International Registry of Acute Aortic Dissection (IRAD): new insights into an old disease. *JAMA* 2000;283:897-903.

# 15

## A 16-year-old boy with left eye injury

A 16-year-old boy presented to ED because his left eye had been hit by another player's elbow during a basketball game. An X-ray of the face was taken.



### QUESTIONS

1. What is the name of this X-ray view?
2. What is the X-ray finding?
3. What is the diagnosis?
4. What are two theories on the mechanism of the above diagnosis?
5. What physical examinations should be done?

## ANSWERS

1. This is the occipitomeatal (Waters) view, which is useful to evaluate most midface fractures.
2. There is left orbital emphysema (intraorbital air) or black eyebrow sign, which is diagnostic of a fracture through one of the adjacent sinuses. Surgical emphysema may present in examination. There was no maxillary sinus air-fluid level or opacification. There was no tear drop sign (soft tissue mass in the roof of the maxillary sinus).
3. The diagnosis is orbital blowout fracture. In our patient, coronal CT orbit was performed and fracture of the medial orbital wall was confirmed (white arrow).



4. The first mechanism is the increased intraorbital hydraulic pressure causing fracture of the orbital floor (more common) or medial wall of the orbit. The second mechanism is the buckling force from the orbital rim.
5. Orbital blowout fracture frequently is associated with eye injury. The emergency physician should check the eye for diplopia (entrapment of the inferior rectus muscle in fracture of the orbital floor), hyphaema, visual acuity,

enophthalmos and retinal detachment. Infraorbital nerve anaesthesia should be documented. The patient should be referred to the maxillofacial surgeon and ophthalmologist for further assessment. The patient should be informed not to blow his nose.

## REFERENCE

1. Burm JS, Chung CH, Oh SJ. Pure orbital blowout fracture: new concepts and importance of medial orbital blowout fracture. *Plast Reconstr Surg* 1999;103:1839–49.

# 35

## A 68-year-old woman with drooling of saliva and left ear pain

A 68-year-old woman presented to ED with drooling of saliva and left ear pain that she had experienced for two days.



### QUESTIONS

1. What are the findings in the clinical photograph?
2. What other possible symptoms may the patient present?
3. What are the possible causes of the above findings?
4. What is the ED treatment?

### ANSWERS

1. The patient has left lower motor neurone facial nerve palsy

involving the entire left face. There is no forehead sparing. Emergency physicians need to differentiate between an upper and lower motor neurone lesion of the facial nerve. A lower motor neurone lesion occurs with Bell's palsy, whereas an upper motor neurone lesion is associated with a cerebrovascular accident.

2. Possible symptoms include hyperacusis (involvement of nerve to stapedius) and loss of sensation of anterior two-thirds of the left side of the tongue (involvement of chorda tympani nerve).
3. The possible causes of lower motor neurone facial nerve palsy include the following:
  - temporal bone fracture
  - parotid tumour
  - middle ear infection or pathology (e.g. cholesteatoma)
  - acoustics neuroma, usually with evidence of other nerve involvement (V, VI, VIII nerves) at the cerebello-pontine angle
  - Ramsay Hunt syndrome
  - idiopathic Bell's palsy (commonest cause)



Our patient had a vesicle over the left ear as shown, and she was diagnosed as having Ramsay Hunt syndrome. This is due to herpes zoster infection of the geniculate ganglion. Cranial nerves V, VIII, IX and X may also be affected. Patients also may complain of hearing loss and vertigo. In addition to vesicle eruptions being over the ear, they may be found on the tongue, palate, mastoid process and neck. Recovery of facial nerve function is much less likely than in Bell's palsy.

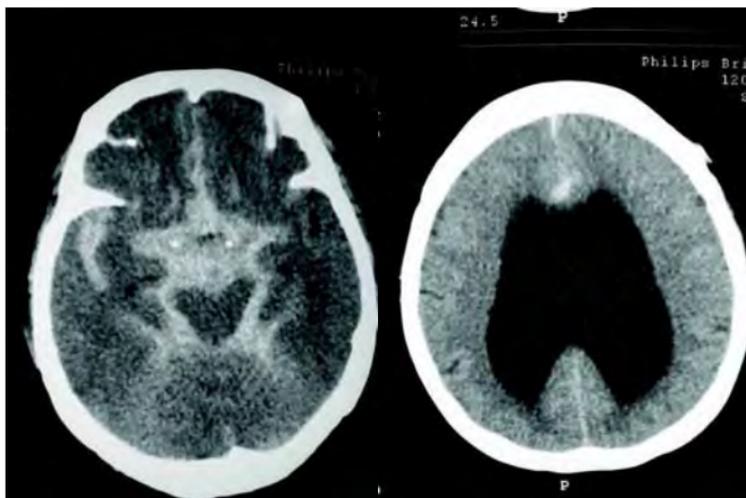
4. Treatment consists of analgesics, acyclovir, prednisolone and appropriate eye care. Consider taping the eye closed during sleep. Patients should be referred to an ENT specialist for follow up.

## REFERENCE

1. Birinyi F. Facial weakness and rash. Ramsay Hunt syndrome (herpes zoster cephalicus, herpes zoster oticus, herpes zoster auricularis). *Acad Emerg Med* 1996;3:1144–5, 1153–5.

## A 62-year-old woman with dizziness and severe headache

A 62-year-old woman complaining of dizziness and severe headache presented to ED. She was unconscious on arrival. Her BP was 244/127 mmHg and pulse was 62/min. A GCS was E1V2M4. An urgent CT scan of brain was performed.



### QUESTIONS

1. What are the CT scan findings?
2. What is the clinical diagnosis?
3. What is the most likely cause of the above condition? Where are common sites?
4. What is name of the grading system for the above condition? What is the grading of this patient?
5. What are common complications?

## ANSWERS

1. There is blood in the sulci on the sylvian fissures bilaterally and the basal cistern. There is marked obstructive hydrocephalus in the second CT image.
2. The clinical diagnosis is acute subarachnoid haemorrhage with marked hydrocephalus.
3. The most likely cause of subarachnoid haemorrhage is rupture berry aneurysm (90%). Common sites are at the points of bifurcation of the anterior communicating artery, posterior communicating artery, middle cerebral artery and terminal internal carotid artery. Another cause is arterio-venous malformation.
4. The grading system is the Hunt and Hess scale. The patient had grade IV or V. The prognosis is best in grade I (mortality 5%) and worst in grade V (mortality 50–70%).
5. Common complications include the following:
  - obstructive hydrocephalus from haematoma in the aqueduct
  - vasospasm at one week producing brain infarction
  - rebleeding at two weeks

## REFERENCES

1. Edlow JA. Diagnosis of subarachnoid hemorrhage in the emergency department. *Emerg Med Clin North Am* 2003;21: 73–87.
2. Suarez JI, Tarr RW, Selman WR. Aneurysmal subarachnoid hemorrhage. *New Engl J Med* 2006;354:387–96.

# 54

## An 11-year-old girl with left knee injury

An 11-year-old girl fell down and injured her left knee during a hurdles race. She was unable to move her left leg immediately after the injury. She presented to ED and an X-ray of the left knee was taken.



### QUESTIONS

1. What are the X-ray and clinical findings?
2. What important mechanism needs to be checked during the physical examination?
3. What are the components of the above mechanism?
4. What should be the treatment?
5. What is Osgood-Schlatter's disease?

## ANSWERS

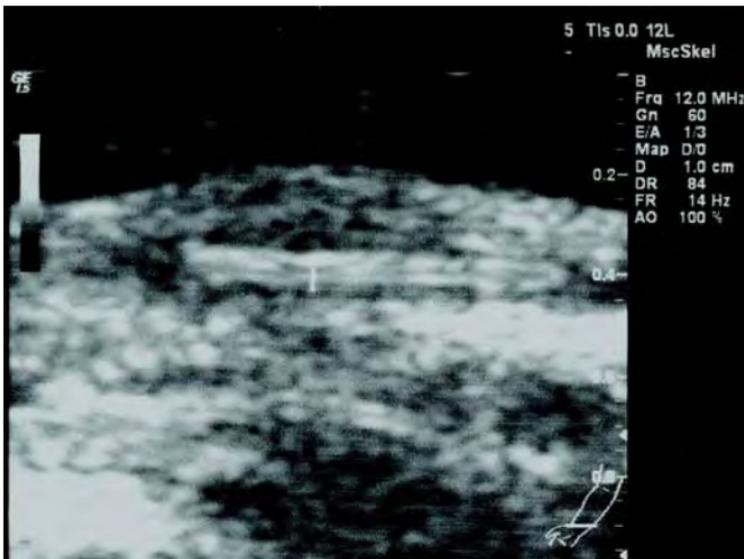
1. There are abrasions over the left knee region, a grossly swollen left knee joint and swelling over the left upper leg region. The X-ray reveals a displaced fracture of the tibial tuberosity. The mechanism of injury is indirect. A sudden flexion force is applied to a flexed knee joint with the quadriceps tightly contracted. The tightly contracted quadriceps resists this force and avulses the tibial tubercle.
2. The extensors mechanism of the knee should be checked.
3. Extensor mechanisms of the knee include the following:
  - quadriceps muscle
  - quadriceps tendon
  - patella
  - patella tendon
  - tibial tubercle
4. The patient should be admitted to the orthopaedic ward for open reduction and internal fixation.
5. Osgood-Schlatter's disease is traction apophysis of tibial attachment of the patella tendon that occurs in active adolescents (10–15 years, M > F). Anterior knee pain after exercise is characteristic. The tibial tuberosity is prominent and tender. An X-ray may show an enlarged and sometimes fragmented tibial tuberosity. Treatment is rest and analgesia.

## REFERENCE

1. Hand WL, Hand CR, Dunn AW. Avulsion fractures of the tibial tubercle. *J Bone Joint Surg* 1971;53:1579–83.

## A 40-year-old woman with persistent wound pain

A 40-year-old woman presented to ED because of persistent pain and redness around her left forearm that she had experienced for one week. She had a history of a pricking injury by a wooden object on her wrist one week earlier. An X-ray of that last ED attendance was normal. A bedside USG was performed at this second visit.



### QUESTIONS

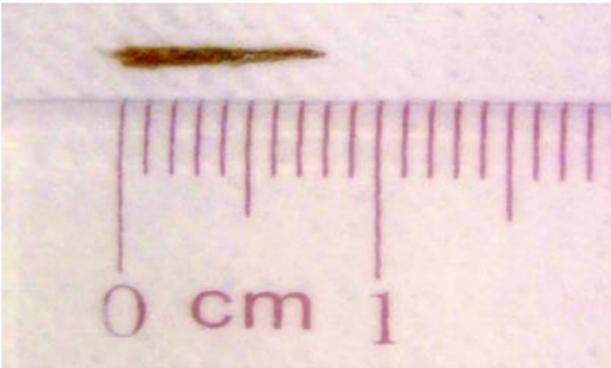
1. What is the clinical diagnosis?
2. What technique should be used in the bedside USG examination in this case?
3. What are the USG findings?

## ANSWERS

1. With a history of pricking injury, retained foreign body leading to persistent infection should be suspected.
2. A linear high frequency 7.5–15 MHz probe should be used to localize a subcutaneous foreign body. A higher frequency transducer offers the ability to delineate the small foreign body. A load of ultrasound jelly or a commercial jelly pad (acoustic standoff pad) could be used to space out the distance between the probe and the contact surface, allowing an improved object focus. It allows the skin and superficial subcutaneous tissues to be moved well away from the transducers near field “dead zone”.
3. There is a hyperechoic linear foreign body that is surrounded by a hypoechoic margin. An acoustic shadow is behind the hyperechoic foreign body.

## OUTCOME

The patient had an exploration and removal of the foreign body under the guidance of USG. A wooden object (0.8 cm in length) was finally removed. She made an uneventful recovery.



## REFERENCE

1. Graham DD Jr. Ultrasound in the emergency department: detection of wooden foreign bodies in the soft tissues. *J Emerg Med* 2002;22:75–9.

## A 30-year-old woman with right-sided abdominal pain

A 30-year-old woman presented to ED because of having right-sided abdominal pain for one day. An AXR was taken and an abdominal USG was performed.



## QUESTIONS

1. What are the AXR findings?
2. What are the USG findings, including the echogenic shadow? What is one likely finding in this case that does not show on this single static image?
3. What are the traditional physical signs possibly detected in her?
4. What are the components of the arrow pointed USG shadow?
5. If the patient recurs with the same diagnosis, what rare inadequate surgical treatment could account for this?

## ANSWERS

1. There is an opacity and localized ileus in the right lower quadrant.
2. The USG findings are distended appendix (diameter > 6 mm) and appendicolith (brightly echogenic and produce acoustic shadowing). The appendix is likely noncompressible.
3. Traditional physical signs are Rovsing's sign, Blumberg's sign, Cope's sign (Obturator test), psoas sign and straight leg raising sign.
4. Components of appendicolith include fecal matter, calcium phosphate, bacteria and epithelial debris.
5. There could have been a remaining appendix stump.

## REFERENCE

1. Tan LTH, Ong KL. Clinical and ultrasonographic diagnosis of acute appendicitis. *Hong Kong J Emerg Med* 2004;11:109–16.



## Index

The numbers in this index refer to the case numbers in the book.

- abdominal aorta aneurysm 22
- Acanthamoeba* 5
- aconitine poisoning 46
- anaphylaxis 8
- aorta dissection 1
- appendicitis 67
- atlantoaxial dissociation 25
- atrial fibrillation 70
  
- bacterial keratitis 5
- bamboo snakebite 13
- Bankart lesion 62
- Bartonella henselae* 3
- bee sting 8
- Bell's palsy 35
- Boerhaave's syndrome 19, 20
- Brugada syndrome 10
  
- Capnocytophaga canimorsus* 3
- cardioversion 70
- cat bite 3
- cat-scratch disease 3
- Chilaiditi's syndrome 58
- child abuse 57
- Chinese cobra bite 69
- Chlamydia trachomatis* 42
- cholera 24
  
- defibrillation 16
  
- epidural haematoma 44
- ectopic pregnancy 37
- electrical injury 65
  
- fractured tibial tuberosity 54
- fractured medial epicondyle 26
- fractured odontoid 17
- fascicular VT 23
- foreign body in nose 29
- foreign body in soft tissue 66
- foreign body in throat 55
- Fusarium* keratitis 5
  
- gestational trophoblastic disease 14
  
- Haemophilus influenzae* 36, 49
- Hamman's signs 19, 20
- hanging 39
- Henoch-Schönlein purpura 21
- hernia 32
- herpes simplex 42
- herpes zoster ophthalmicus 18
- Hiatus hernia 7
- Hill-Sachs lesion 62
- hip dislocation 48
- Hutchinson's sign 18

- hyperkalaemia 53
- intestinal obstruction 32
- intraocular foreign body 63
- jaw dislocation 47
- Kawasaki disease 33
- Le Fort fracture 52
- Lisfranc fracture-dislocation 41
- Ludwig's angina 60
- mandible fracture 2
- Meningococcal meningitis 36
- Moraxella catarrhalis* 49
- Mycobacterium marinum* 56
- myocarditis 43, 51
- myocardial infarction 16, 31, 51
- necrotizing fasciitis 6, 61
- necrotizing cellulitis 61
- Neisseria gonorrhoea* 42
- Neisseria meningitidis* 36
- neonatal conjunctivitis 42
- nonaccidental injury 57
- ophthalmia neonatorum 42
- osteomyelitis 68
- orbital blowout fracture 15
- Osgood-Schlatter's disease 53
- Open globe injury 63
- odontoid fracture 17
- Pasteurella multocida* 3
- Pasteurella canis* 3
- patellar dislocation 45
- pericarditis 51
- perforated peptic ulcer 58
- pituitary apoplexy 40
- pneumocephalus 27
- pneumomediastinum 19, 20, 39
- Pseudomonas aeruginosa* 5
- pulmonary embolism 59, 64
- Ramsay Hunt syndrome 35
- retropharyngeal abscess 55
- Rigler's sign 58
- RVOT ventricular tachycardia 23, 38
- shoulder dislocation 62
- slipped capital femoral epiphysis 11
- snake bite 13, 69
- spinal cord injury 12, 17, 25
- Staphylococcus aureus* 5, 42, 68
- streptokinase, in pulmonary embolism 64
- Streptococcus pneumoniae* 36, 49
- Streptococcus pyogenes* 6
- subarachnoid haemorrhage 50
- subdural haematoma 9
- superior vena cava syndrome 28
- Tillaux fracture 4
- traumatic aortic disruption 34
- triplane fracture 4
- twin pregnancy 30
- unstable angina 31
- ventricular tachycardia 23, 38, 70
- ventricular fibrillation 16, 70
- Vibrio vulnificus* 6
- Vibrio cholerae* 24
- Wellen's syndrome 31
- Wolff-Parkinson-White syndrome 70