SELF ASSESSMENT EXERCISES

Self Assessment Exercises

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Fig 2. 12 lead ECG

Questions

You are a doctor in a medical centre. The nearest hospital facility is 5 miles away. The following scenarios may constitute a typical day.

1. A 22 year-old serviceman presents to you at your morning sick parade. He states he had "a few beers" the night before. His memory of the previous night is a little hazy. He remembers getting into an argument and has woken with pain in his right hand.

Examination reveals a fully alert and orientated patient with a tender swelling over the fifth metacarpal neck of his right hand. There is a 1cm laceration over the knuckle (metacarpophalangeal joint) of the little finger, which appears to be superficial. General examination reveals no other injuries.

Question a.

What else would you look for in the examination of the hand?

Fig 1. X-ray of # 5th metacarpal neck

Question b.

What investigation would you arrange? Give 2 reasons.

Question c.

The result of your investigation is at fig 1. What would be your management plan?

2. Later the same morning, a 42 year-old senior NCO comes into the medical centre complaining of some discomfort in his chest, which started after breakfast. It has stopped him from continuing his normal day-to-day activities. He has no past medical history or family history of note, smokes 20 cigarettes per day, and admits to 'social' drinking. He has never had his cholesterol checked.

Examination reveals a stoical, well built man who is slightly sweaty. His pulse rate is 100 beats per minute, his blood pressure is 110/60, and the rest of the clinical examination reveals no abnormality.

You perform a 12 lead ECG that is shown at figure 2.

Question a.

List 3 abnormalities demonstrated on the ECG.

Question b.

What is the diagnosis?

Question c.

If you were in doubt of your diagnosis, what simple further investigation could you perform to confirm your suspicions?

Question d.

What are the priorities in the management of this patient?

3. During lunch you are interrupted with an

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urgent request to attend the medical centre. A young soldier has collapsed while doing a combat fitness test. The staff who were supervising the test noticed him to be staggering, but before they could get to him he collapsed.

On your arrival at the medical centre you are faced with a semi-responsive patient on a trolley. The combat medical technicians have removed his clothes and a rectal thermometer reveals a core temperature of 41.5 degrees Celsius.

Question a.

What are your priorities in management?

Question b.

What would be your choice of intravenous fluids and why?

Question c.

Should this patient be managed in the medical centre or transferred to hospital? Give reasons.

4. Later that afternoon you are doing some routine medical examinations for your unit. You see a 30 year-old sergeant who, on general questioning, admits to a minor knee injury 3 weeks previously for which he has been self-medicating with ibuprofen. He says he is otherwise entirely well. You notice that he has bilateral lower limb swelling, and examination confirms pitting oedema to the knees.

Otherwise, examination is unremarkable. Blood pressure is 130/85 mmHg. Urinalysis reveals protein +++ with no blood.

Question a.

What is the likely diagnosis?

Question b.

What is the most likely pathology to have caused this, and what is likely to have been the precipitating factor in its development?

Question c.

What would be your approach to investigation and management of this patient?

5. You have finished your afternoon surgery and take the patients' notes through to the secretaries. One of them has just been stung on the hand by a bee. She is in a bit of a panic as she has had a severe reaction to bee stings in the past.

You calm her down and manage to get her into the treatment bay so that you can assess her. She is talking in full sentences but is developing some wheeze, her pulse is 110, and her blood pressure is 95/50.

Question a.

What would be your approach to her management?

Answers to self-assessment questions

1a. Neurovascular deficit, rotational deformity, extensor tendon lag.

b. An X-ray - to assess for bony injury and to exclude foreign body e.g. a tooth.

c. Thorough wound debridement and washout is necessary in this case, as this is potentially an open fracture, possibly as the result of a human bite wound. Where practical the patient should be referred to the local orthopaedic on-call facility for this procedure to be carried out in theatre. Wound after-care will involve antibiotic prophylaxis, elevation, and depending on the procedure carried out in theatre, may include immobilisation in a volar slab.

Discussion

In closed fractures of the fifth metacarpal neck it has been established that there is no difference in functional outcome between those patients who receive internal fixation and those who are treated with early mobilisation and neighbour strapping (Mackway-Jones 1998, Theeuwes GA *et al* 1991, Ford DJ *et al* 1989). Therefore the simplest optimal management for an uncomplicated fracture of the fifth metacarpal neck is neighbour strapping and early mobilisation.

Fig 3. Posterior leads

However, this case is complicated by the fact that there is a high possibility of a human bite wound over the fracture site, as the result of a punch, creating a potentially open fracture site. This requires meticulous wound management and tailoring of the exact nature of treatment to the needs of the patient (Tsai *et al* 1999). The optimal treatment in this case is thorough debridement of the wound in theatre. The wound should be dressed, and the hand elevated in a high arm sling. A broad spectrum antibiotic is appropriate (e.g. co-amoxiclav). These wounds should be reviewed after a couple of days to exclude insidious infection.

- 2a.
  - i. Sinus tachycardia rate 100 beats per minute
  - ii. Tall R wave in V1 and V2
  - iii. Deep ST depression V1 - V3
  - iv. ST elevation I, AVL, V6
- b. acute postero-lateral myocardial infarction
- c. posterior ECG leads
- d. call for emergency ambulance for rapid transport to hospital
  - oxygen
  - IV access
  - Aspirin 300mg PO (chewed)
  - Intravenous opiate analgesia with anti-emetic
  - Thrombolysis within 30 minutes of arrival at hospital

Discussion

The ECG findings are typical of acute posterior myocardial infarction, although it may be argued that the R wave in lead V1 is not dominant. This is more a reflection of the time scale of the infarct (compare the time it takes for Q wave development in other infarct patterns) than a representation of a different diagnosis. Lateral extension of the infarct with ST segment elevation in leads I, AVL and V6 is evident. If there is doubt as to whether these findings represent a posterior infarct or anterior ischaemia, the diagnosis can be confirmed by performing posterior ECG leads (shown at figure 3). Pre-hospital thrombolysis is of proven benefit when pre-hospital times are prolonged, but its practical application is not widespread (the GREAT Group, 1992.) Urgent transfer to a facility capable of thrombolysis is a priority. Interventions such as gaining IV access should preferably be attempted either while awaiting the arrival of an ambulance or en route to the hospital so as not to delay time from onset of symptoms to start of thrombolysis.

- 3a. Open, clear and secure the airway; give high concentration oxygen; monitor ECG rhythm and rate; obtain wide bore venous access (2x 14g or 16g cannulae)
  - Undress the casualty and initiate

external cooling (STRIP-SPRAY FAN)

- IV fluids - 2 litres cold normal saline to start
  - Intravenous benzodiazepine to manage combativeness (cerebral irritation) and convulsions
  - Exclude hypoglycaemia
  - Urgent ambulance transfer to hospital
- b. Normal saline and dextrose saline (see below)
  - c. Should be transferred as soon as possible to hospital. He will need intensive monitoring facilities and fluid management dependant on urine output. Complications of severe heat illness may also develop (rhabdomyolysis; compartment syndrome; DIC).

Discussion

Heat illness occurs as a result of thermoregulatory failure. In severe cases, the core temperature rises above 40.5 degrees Celsius ("heat stroke"), with breakdown of cellular enzyme functions. Anhidrosis is typical, but sweating does not exclude the presence of heat stroke. There is a progressive deterioration in conscious level, with confusion, fits or coma. Pre-disposing factors include obesity, dehydration and intercurrent illness. The duration of hyperthermia is the most important determinant of neurological outcome (Larner 1992).

Treatment priorities are outlined in 3(a) above. Reducing the core temperature to below 38.9 degrees within 30 minutes of presentation improves survival (Dematte JE *et al* 1998). The choice of IV fluids should be normal saline until the electrolyte status and blood glucose have been checked. Hyperkalaemia is often associated with rhabdomyolysis, and can be worsened by giving fluids that contain potassium. Giving 5% dextrose solution could in theory worsen cerebral oedema. If there is hypoglycaemia, glucose replacement should be in the form of 10% dextrose to minimise the amount of free water given to the patient. However, normal saline is not a "normal" solution, it is slightly hypertonic. Resuscitation with normal saline alone may result in a hyperchloraemic acidosis. Some dextrose-saline should be included in the fluid regimen, but in the resuscitative phase this will be empirical.

How much fluid is given should be determined by the clinical state of the patient, and by monitoring both the urine output and central venous pressure. A urine output of at least 100 mls per hour should be maintained if possible.

- 4a. Nephrotic syndrome
- b. Minimal change glomerulonephritis, associated with NSAID use
- ci. Start a diuretic such as frusemide 40mg od
- ii. Initiate investigation with 24 hour urine collection, urine microscopy, renal

- function tests, FBC, ESR, LFT's
iii. Refer to renal physician for assessment

Discussion

Nephrotic syndrome is characterised by proteinuria, hypoalbuminaemia and oedema. It is often associated with hypercholesterolaemia.

Minimal change glomerulonephritis is a common cause of nephrotic syndrome (90% of childhood cases, 20% of adult cases {Mason 1997}), and is most commonly idiopathic, although it is associated with non-steroidal anti-inflammatory drug usage.

Prednisolone is the treatment of choice in this condition, but the initial general management includes rest, a high protein diet, and treatment with a loop diuretic such as frusemide to relieve the oedema (Mason 1997). It would be appropriate to refer to a renal physician for further evaluation.

- 5a. This lady is suffering from an acute anaphylactic reaction. She should receive high concentration oxygen by mask, adrenaline 0.5mg by intramuscular injection (repeated after 5 minutes if no improvement), and IV access should be established. A colloid infusion should be started to correct her hypotension, and an anti-histamine such as chlorpheniramine 10mg given IV. To treat her wheeze she should receive nebulised salbutamol, and hydrocortisone 100 - 200 mg IV (Chamberlain 1999, Gavalas *et al* 1998, Fisher 1995.)

She should be closely observed and there should be a low threshold for referral to the nearest A&E department if there is any deterioration, or failure to improve rapidly.

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