

October 2014 • Answers

Authors: Mr Emmet Griffiths and Mr Vikas Khanduja
SpR, East of England

MCQs and EMQs

1. The correct site for injection for a L5 nerve root block is?

Answer: a. For nerve root blocks the needle is placed inferior to the pedicle and medial to the lateral border of the vertebral body. This allows injection to the L5 exiting nerve root. Lateral to the transverse processes would not isolate the nerve root. The nerves exit below the pedicles and therefore above the pedicle of L5 would not provide access to the L5 nerve root. A cadaveric study undertaken demonstrated that only 77% of needles placed in the safe triangle under image intensifier resulted in contrast adjacent to the nerve root.¹

2. A Geyser sign on a MRI arthrogram is indicative of which shoulder pathology?

Answer: b. The geyser sign classically described on a radiographic shoulder arthrogram is also seen on MRI arthrograms. It is characterised by leakage of dye from the glenohumeral joint into the sub-deltoid bursa, pathognomic of a full thickness rotator cuff tear.

3. Which one of the following is true of using Forest plots in systematic reviews?

Answer: e. Forest plots are a graphical display of the results from a number of scientific studies addressing the same question. They also provide the overall result. Funnel plots can detect publication bias. A good summary of statistics in orthopaedics is the review article by Petrie 2006 listed below.²

4. Perthes' disease is associated with which one of the following?

Answer: c. Children with Perthes' are generally male, slim, between four and seven years of age and active individuals. There is no association with neoplasms, thrombocytopenia or obesity.

5. In the Pemberton Acetabuloplasty for developmental dysplasia of the hip the osteotomy hinges on which of the following structure to redirect the acetabular inclination?

Answer: c. The Pemberton acetabuloplasty osteotomy is a volume reducing pelvic osteotomy. A curved osteotomy is performed around the inner and outer tables and then levered down hinging on the triradiate cartilage.³

6. With regard to the Coventry technique of distal femoral osteotomy, which one of the following statements is true?

Answer: d. The Coventry technique is a medial closing wedge osteotomy of the proximal tibia performed above the tibial tuberosity. As a consequence patella baja is a common post-operative finding. A review of outcomes at median ten years from the originating center suggested 90% survivorship at five years, however in overweight patients and those with less than 8° valgus overcorrection this reduced to 38% at five years.⁴

Vivas

Adult Pathology

A ten-year-old right-hand dominant boy presents with right elbow pain following a fall from monkey bars whilst playing.



Fig. 1a



Fig. 1b

1. Describe the radiograph below (Fig.1a). What is the diagnosis?

Answer: Lateral radiograph of a skeletally immature individual demonstrating open physis and a 100% displaced proximal radial epiphyseal injury, sitting posteriorly dislocated and at 90° to the physes. There is a prominent haemolipo-arthritis, commonly referred to as a "sail sign".

Diagnosis: Acute, traumatic right radial head physal disruption with 100% epiphyseal displacement.

2. How would you manage this patient?

Answer: Careful counselling of the patient and parents regarding the long-term outcomes of this missed injury. Consideration for the medico-legal aspects of the case. Consent for open reduction +/- epiphyseal excision.

3. This is their radiograph at three month follow-up (Fig. 1b). Describe the findings now.

Answer: Lateral radiograph demonstrating sclerotic change within the proximal radial epiphysis.

4. What is the diagnosis?

Answer: Post-traumatic avascular necrosis of the right radial head epiphysis.

5. What is their prognosis?

Answer: Prognosis is commonly associated with progressive joint remodelling and a progressive deformity. Angular deformity (valgus) is common, especially in a ten-year-old with six years of expected growth remaining. Joint remodelling is not always associated with arthritis or pain. Painless progressive deformity until skeletal maturity is the common sequelae.

Complications from this injury include: stiffness, avascular necrosis, premature closing of the growing plate, peri-articular ossification, pseudoarthrosis, malunion, radio-ulnar synostosis and cubito valgus.⁵

Trauma

A 28-year-old female has presented with a swollen and painful foot after falling down some steps. The radiographs obtained in A&E are shown below (Fig. 2a and 2b).



Fig. 2a



Fig. 2b

1. Describe the radiographs.

Answer: Fracture second to fourth metatarsal necks with dislocation of fifth metatarsal (MT) base.

2. How would you classify this injury?

Answer: Homolateral: all five MTS are displaced in the same direction. Lateral displacement may also suggest a cuboidal fracture.

Isolated: one or two MTS are displaced from the others.

Divergent: MTS are displaced in a sagittal or coronal plane and may also involve the intercuneiform area and include a navicular fracture.

3. What is the mechanism of this injury and what are the radiological signs of this injury?

Answer: Usually caused by indirect rotational forces and axial load through plantar flexed foot.

Radiological signs: disruption of the continuity of a line drawn from the medial base of the second MT to the medial side of the middle cuneiform; widening of the interval between the first and second ray; medial side of the base of the fourth MT does not line up with medial side of cuboid on oblique view; MT base dorsal subluxation on lateral view disruption of the medial column line (line tangential to the medial aspect of the navicular and the medial cuneiform).

4. What are the columns in the midfoot?

Answer: Medial column - includes first tarsometatarsal (TMT) joint.

Middle column - includes second and third (TMT) joints.

Lateral column - includes fourth and fifth (TMT) joints (most mobile).

5. How would you manage this patient?

Answer: CT scan revealed dislocation of fifth TMT joint with no disruption of the base of other TMT joint. Reduction of dislocation and stabilisation of fifth TMT was performed.

The alignment of second to fourth MT neck fractures was acceptable after reduction.⁶

Hands

A 60-year-old farmer presented with painless nodules over the dorsum of his right hand (Fig. 3a and 3b). He had surgery on his left hand a couple of years ago for a progressively increasing contracture of his ring and little finger.

1. What is the diagnosis?

Answer: Garrod pads – the clinical picture demonstrates



Fig. 3a



Fig. 3b

thickening over the dorsum of the proximal interphalangeal joints.

2. What disease are these associated with?

Answer: Dupuytren's Disease. Thickening of the skin over the knuckles can be also found in repetitive trauma. e.g. violinists, but is most commonly found in Dupuytren's Disease.

3. What does the presence of these nodules signify?

Answer: The presence of Garrod pads with associated Dupuytren's Disease and with contractures requiring surgery on the contralateral side suggest bilateral disease.

4. What other sites can be involved in this disease?

Answer: Myofibroblastic tissue can also be found in the foot called Ledderhose disease (plantar fascia) and the penis named Peyronie's disease (dartos fascia).⁷

5. What would the histology of these nodules reveal?

Answer: Dupuytren's nodules have three phases with differing histology depending on the stage. In the initial stage the tissue is hypocellular and predominantly myofibroblasts. After the proliferative phase in involutonal phase there is a high collagen content in the tissue. Finally the third "residual" phase has a fibroblast, myofibroblasts and chronic inflammatory tissue.⁸

Children's Orthopaedics



Fig. 4a



Fig. 4b

A five-year-old girl presents with a painful swollen left elbow having fallen off a trampoline (Fig. 4a and 4b).

1. What do these radiographs show?

Answer: Anteroposterior (AP) and lateral of an immature skeleton demonstrating a lateral condyle fracture of the humerus.

2. How would you classify this fracture?

Answer: The most commonly used classification system is that described by Milch.⁹ Type 1 fractures traverse through the capitellar ossification centre, whilst type 2 fractures pass medial to it. The fracture shown is a type 2, which are more common.

3. What are the difficulties in deciding how to treat these fractures?

Answer: The fracture line in a type 2 fracture courses through epiphyseal cartilage so cannot be seen on a radiograph. This makes quantifying the degree of displacement and the integrity of the articular surface difficult. It also makes judging the stability of the fracture difficult.

4. What investigations can be performed to provide further information about the degree of fracture displacement and stability?

Answer: MRI, arthrogram, internal oblique radiograph and high-resolution ultrasonography have all been reported.

5. How would you classify displacement and stability of these fractures?

Answer: Jakob et al¹⁰ categorised displacement into three stages, whilst Finnbogason¹¹ has classified these fractures in to three groups based on their stability (stable, indefinable risk and high risk).

6. How would you treat this fracture?

Answer: Fractures with less than 2 mm displacement and no involvement of the articular surface could be managed in a plaster. Fractures with over 2 mm displacement, and an arthrographically confirmed congruent joint could be managed with closed reduction and fixation. Fractures with displacement of the articular surface should be treated by open reduction and fixation. Fixation could be with K-wires or screw.^{11,12,13,14}

7. What are the complications of this fracture?

Answer: Lateral condylar overgrowth; cubitus varus; fishtail deformity and tardy ulnar nerve palsy. Avascular necrosis can also occur; so extensive soft tissue stripping should be avoided.

Basic Science



Fig. 5a

Fig. 5b

1. Describe the radiographs (Fig. 5a and 5b)?

Answer: AP and oblique radiographs centred on the first ray of the right foot. There is destruction of the (MTPJ) with loss of joint space, cyst formation causing expansion of the metaphysis of both the metatarsal and the proximal phalanx, and erosion of the cortices.

2. What are the possible diagnoses?

Answer: This radiograph is suggestive of an erosive arthropathy such as gout or pseudogout. Other differentials include inflammatory arthropathies (psoriatic or rheumatoid arthritis) and chronic infection.

3. What is gout?

Answer: Gout¹⁵ is a crystal induced arthropathy associated with monosodium urate crystals. This is caused by a build up of uric acid within the blood and tissues, which precipitate out into crystals. Uric acid is produced as part of purine metabolism and is excreted by the kidneys.

Risk Factors:

Hypertension, diabetes mellitus, renal insufficiency, hypertriglyceridemia, hypercholesterolemia, obesity, male sex, family history, advancing age.

Presentation:

Peripheral joint monoarthropathy, particularly first MTPJ (pseudogout tends to affect large joints).

Red, hot swollen joint, painful to range of movement.

Acute attacks.

Tophi in soft tissues.

Differential diagnosis include:

Acute sarcoidosis

Amyloidosis

Bursitis

Calcific peri-arthritis

Chondrocalcinosis

Congenital fructose intolerance

Conjunctival calcinosis

Hyperparathyroidism

Malignant soft tissue tumours

Milk-alkali syndrome

Multicentric reticulohistiocytosis

Pigmented villonodular synovitis

Phosphoribosylpyrophosphate synthetase superactivity

Psoriatic arthropathy

Reactive arthritis

Renal osteodystrophy

Septic Arthritis

Spondyloarthropathy

Rheumatoid arthritis

Tenosynovitis

Trauma

Type IIA hyperlipoproteinemia

(medicine Medscape; Gout and Pseudogout Differential Diagnoses. Bruce M Rothschild)

Complications:

Degenerative arthritis

Secondary infections

Urate or uric acid nephropathy

Renal stones

Tophi lesions

4. How is it diagnosed?

Answer: Diagnosis is based on exclusion of infection and the finding of monosodium urate crystals on aspirate. Joint aspirate demonstrates light retarding needle shaped urate crystals recognised by polarising microscopy. They are negatively birefringent.

Aspiration of tophi demonstrates urate crystals.

Serum urate levels may be raised (not diagnostic of gout if raised).

Ultrasound of joints can visualise an irregular double contour sign of the crystals on the articular surface.

Radiographs classically have maintenance of the joint space and absence of periarticular osteopenia. Lesions have a sclerotic, punched-out border.

5. How is gout treated?

Answer: Treatment is divided into acute and chronic.

Treating the acute gout attack involves reducing pain and inflammation. The mainstay of treatment is NSAIDs, colchicine and steroids. Starting treatment for hyperuricaemia at the acute phase may prolong the symptoms of the acute gout. Colchicine toxicity has been well documented (glycemic index) symptoms predominantly) and is therefore less commonly used. If NSAIDs are contraindicated intraarticular

steroid injections are favoured.

Chronic gout treatment focuses on reducing purine intact, stopping medications that are associated with causing gout (thiazide diuretics, aspirin) and lowering uric acid levels. Allopurinol (blocks xanthine oxidase lowering production of uric acid), Febuxostat (non purine selective inhibitor of xanthine oxidase) and Lesinurad (selective uric acid reabsorption inhibitor).¹⁶

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