Worcestershire Acute Hospitals NHS Trust

Osteomyelitis and Septic Arthritis (PIP)

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The following guidance is taken from the Partners In Paediatrics (PIP)

OSTEOMYELITIS AND SEPTIC ARTHRITIS

See also **Limping child** guideline

RECOGNITION AND ASSESSMENT

Symptoms and signs

- Fever
- Loss of function e.g. limp
- Pain in bone/joint
  - localised
  - constant
  - increasing
- Restricted range of movement
- Soft tissue swelling
- Point tenderness of bone
- Effusion

Above symptoms and signs are indicative of osteomyelitis or septic arthritis (in absence of clear history of obvious trauma) irrespective of WBC, CRP, ESR and fever or radiological appearance; keep nil-by-mouth pending orthopaedic aspiration/surgery

Previous history

- Ask about:
  - duration of symptoms
  - injuries
  - fever
  - antibiotics
  - antipyretics/anti-inflammatories
  - haemoglobinopathies (e.g. thalassaemia, sickle cell disease)

Urgent investigations

- FBC
- ESR
- CRP
- Blood culture before antibiotics (minimum 4 mL older children, 2 mL neonates)
- If cause of fever uncertain, collect other specimens (e.g. urine) for culture before antibiotics
  - if immunocompromised, penetrating injury or failed primary treatment, also anaerobic and TB culture

Osteomyelitis

- Plain X-ray AP and lateral of affected part
- If surgically explored or needle aspiration, tissue/pus for Gram stain and culture

Septic arthritis

- Aspiration of joint for Gram stain and culture
  - interventional radiologist or orthopaedic registrar/consultant
  - for sedation and analgesia contact paediatric registrar or on-call paediatric anaesthetist

Further investigations

Perform as soon as possible (must be within 36 hr)

- If plain X-ray normal, infection clinically localised and urgent MRI is available:
  - consultant paediatrician or orthopaedic surgeon to authorise urgent MRI of bone
  - if deep sedation or general anaesthetic required, contact on-call paediatric anaesthetist

- If plain X-ray normal, infection clinically localised and MRI not available, request ultrasound scan to look for fluid and synovial thickening in knee and hip joint
- If localising signs poor or possible multifocal infection, request isotope bone scan
- If cardiac murmur or multifocal *Staph. aureus*, request echocardiogram

IMMEDIATE TREATMENT

- Admit
- Nil-by-mouth and maintenance fluids IV
- Bed rest
- Refer immediately to orthopaedic and on-call paediatric registrar for urgent assessment
- Early involvement of on-call consultant orthopaedic surgeon

Antibiotics (see BNFc for neonatal doses)

- Commence following surgery, unless it will take >4 hr from admission to get to theatre
- Severe sepsis with organ dysfunction (e.g. hypotension, oxygen requirement, GCS <12, platelet <80, creatinine x 2 normal, abnormal LFTs)
  - after blood and urine cultures taken, commence cefotaxime 50 mg/kg 6-hrly (high dose; maximum 12 g/day) IV over 3–4 min
- No organ dysfunction: as soon as possible (must be within 4 hr)
  - aged <3 months: cefotaxime 50 mg/kg (maximum 3 g/dose) 6-hrly (neonate doses – see **BNFc**) **OR** for severe infection, ceftriaxone 50–100 mg/kg (maximum 4 g) daily
  - aged 3 months–5 yr: cefuroxime 50 mg/kg 8-hrly
  - aged >5 yr: flucloxacillin 50 mg/kg IV (maximum 2 g/dose) 6-hrly
- Targeted antibiotic therapy
  - if organism identified, use narrowest spectrum possible with good bone/joint penetration
  - *Staph. aureus* sensitive to flucloxacillin 50 mg/kg 6-hrly IV (high dose maximum 2 g/dose)
- Penicillin allergy, substitute flucloxacillin for:
  - history of rash: cefuroxime
  - history of anaphylaxis or high risk MRSA: clindamycin high dose
- Bomb blast injuries: see **Public Health England** advice www.gov.uk/government/uploads/system/uploads/attachment_data/file/616113/Antimicrobial_prophylaxis_guidance_for_bomb_blast_victims.pdf

Analgesia

- If necessary initially to allow splintage, use morphine IV (see **Analgesia** guideline)
  - elevate and splint affected limb
  - plaster backslab for peripheral joints
  - rest in skin traction on a pillow for central joints

Surgery

- Ask parent(s) to stay with child until consent obtained
- Resuscitate if severe sepsis
- Emergency theatres to be alerted as soon as possible
- Contact:
- anaesthetic office to arrange paediatric anaesthetist
- orthopaedic registrar to book patient onto suitable list
- consultant paediatrician and orthopaedic surgeon

SUBSEQUENT MANAGEMENT

- Inform paediatric orthopaedic surgeon and consultant paediatrician

Uncomplicated septic arthritis (not complicated by associated osteomyelitis)

- Aspirate or drain joint in theatre
- Request long line insertion under GA and repeat any blood tests required
- If discharged for hospital at home IV treatment, change to ceftriaxone
- If treatment started within 24 hr of first symptoms and clinically improving, discuss with consultant about changing IV to oral antibiotics after 72 hr if:
  - recovery of joint movement
  - absence of pyrexia after 4-hrly monitoring for 48 hr

- WCC <11, CRP and ESR falling on 2 successive specimens ≥24 hr apart
- If agreed by orthopaedic consultant, give oral antibiotic to complete treatment
- no organism identified: co-amoxiclav [double dose (see **BNFc**)]
- organism identified: narrowest spectrum with good bone penetration
  - if *Staph. aureus* sensitive to flucloxacillin: flucloxacillin oral (high dose) if capsules tolerated; **OR** co-amoxiclav (double dose) if can only take suspension
- allergic to penicillin: clindamycin oral
- Stop treatment only if CRP is normal: agree duration of treatment with orthopaedic consultant depending on individual case

Early-presenting osteomyelitis

- If IV antibiotics started within 24 hr of onset of symptoms with a good clinical response as above, follow **Uncomplicated septic arthritis**

Established osteomyelitis or complicated septic arthritis

- Presentation >24 hr after onset of symptoms or partial treatment (e.g. oral antibiotics)
- Formal debridement in theatre with insertion of Hickman line
- Antibiotics IV as above. Discuss with orthopaedic consultant about switch to oral antibiotics after 14 days, if afebrile, pain free for 48 hr and CRP <20
- Continue oral antibiotics until all inflammatory markers are normal and clear evidence of healing established on radiographs
- Discuss duration of antibiotics with orthopaedic consultant in each case

Septic arthritis or osteomyelitis (deteriorating condition/failure to improve within 48 hr)

- Inform orthopaedic team for exploration to drain pus
- Review culture result
- Discuss with consultant microbiologist and paediatrician
- Arrange for repeat blood cultures
- if culture positive target antibiotic therapy
- Complete or repeat any investigations listed above
- Consultant paediatric medical and orthopaedic review
- Exclude important differential diagnoses
- systemic inflammatory response as seen in juvenile chronic arthritis
- transient synovitis, associated with intercurrent infection
- acute leukaemia, septicaemia, multifocal disease, endocarditis, Ewing sarcoma
- Continuing problems with local sepsis
- return to theatre for further debridement and insertion of Hickman line

MONITORING TREATMENT

- Peripheral colour, warmth, movement of affected limb: hourly for first 4 hr then 4-hrly for 24 hr
- Respiratory rate, pulse, temperature 4-hrly
- If not improving:
- repeat blood cultures
- additional imaging for metastatic infection
- assess for deep vein thrombosis
- discuss with infectious diseases/microbiology about increasing antimicrobial spectrum