Suspected bone or joint infection (osteoarticular infection – OAI)

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See also: ***the limping child***

Background

- The classical picture of acute severe pain, fever and systemic upset may be absent in very young children and babies, and those with immunodeficiency.
- Fever may be absent in up to 40% of patients
- CRP is an early sensitive inflammatory marker; ESR is specific but less sensitive.
- In sub-acute OAI, inflammatory markers are often NORMAL.
- Infections with Kingella Kingae and Group B streptococcus can be indolent with near normal inflammatory markers, leading to delayed diagnosis. Must have high index of suspicion and investigate appropriately.
- If recent travel, consider MRSA and discuss with Microbiology

Septic arthritis	• Usually acute onset with joint pain and swelling, limited movement and spasm with passive movements. • Gold standard investigation is aspiration of the joint.
Osteomyelitis	• Usually haematogenous spread to metaphyses of growing bones. • Often local swelling, erythema and tenderness. May have **no signs** just pain or not using limb • Bony changes on plain films are not evident until 14 – 21 days (periosteal elevation then lucencies).
Discitis	• Infection of intervertebral disc space. • Usually back pain and tenderness and inability to flex spine. • Persistent back pain in children always warrants investigation

Investigations:

- Bloods: At least one *large volume* **blood culture** (4 ml minimum, 2 ml neonates)

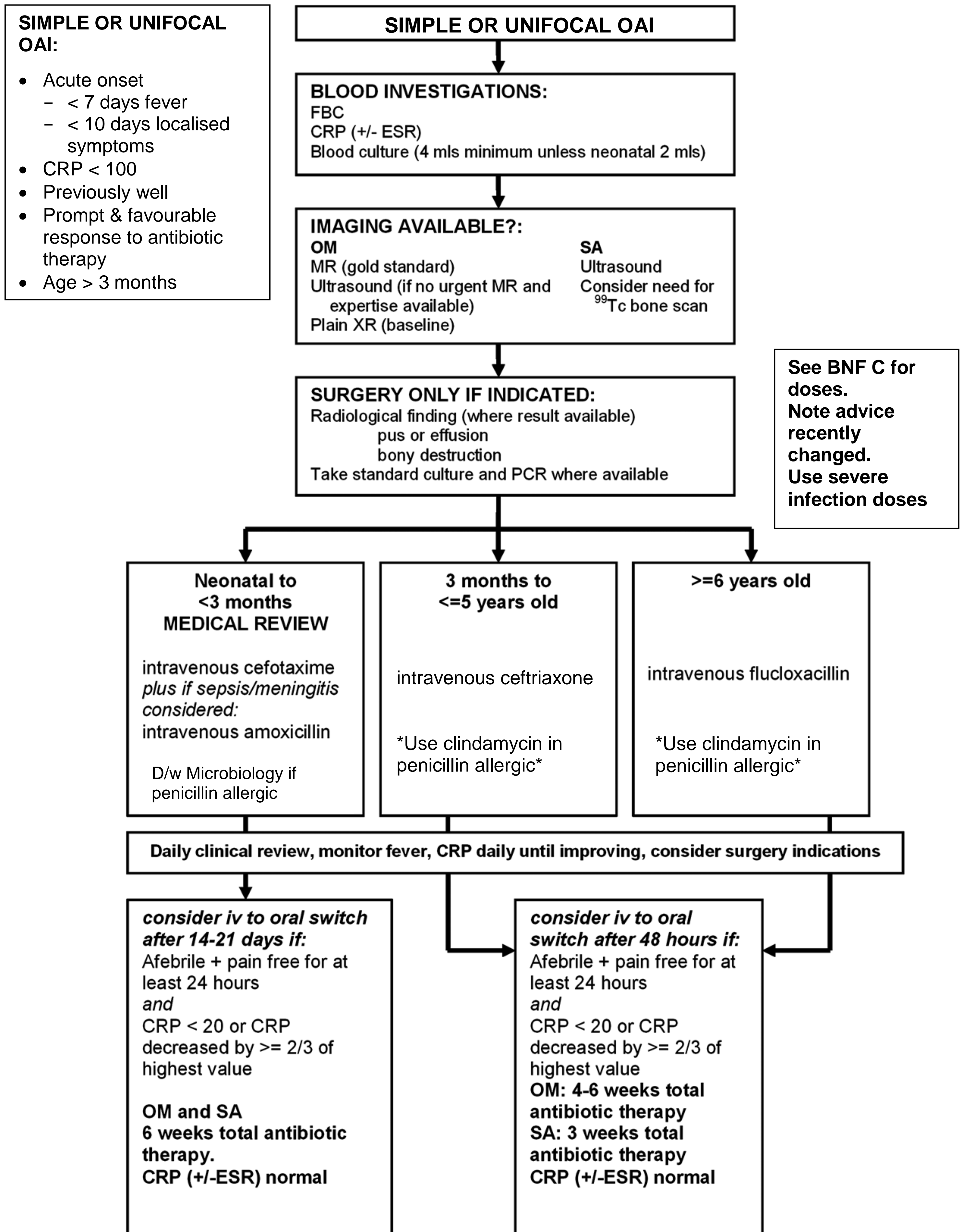
  FBC, CRP, ESR (needs to go in a separate purple top vacutainer bottle)

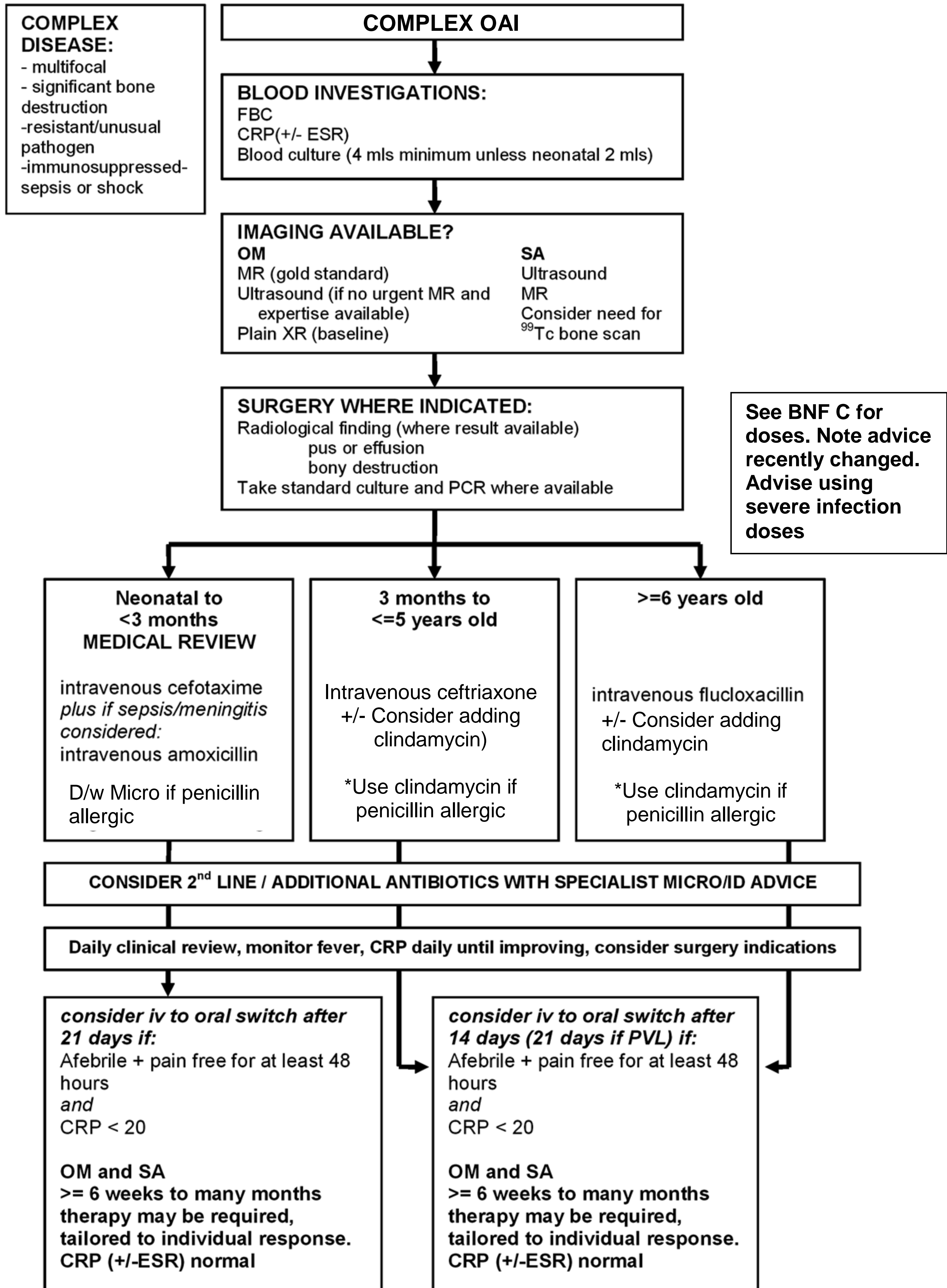
- Imaging: X-ray of bone or joint (periosteal reaction / r/o injury or malignancy)

  Ultrasound scan of joints – will visualise large joint effusions

  MRI – best imaging modality for bone and joint infections. Consider CT if MRI not available.

Management pathways




COMPLEX DISEASE:
- multifocal
- significant bone destruction
-resistant/unusual pathogen
-immunosuppressed-sepsis or shock
COMPLEX OAI
BLOOD INVESTIGATIONS:
FBC
CRP(+/- ESR)
Blood culture (4 mls minimum unless neonatal 2 mls)
IMAGING AVAILABLE?
OM
MR (gold standard)
Ultrasound (if no urgent MR and expertise available)
Plain XR (baseline)
SA
Ultrasound
MR
Consider need for ^{99}Tc bone scan
SURGERY WHERE INDICATED:
Radiological finding (where result available)
pus or effusion
bony destruction
Take standard culture and PCR where available
See BNF C for doses. Note advice recently changed. Advise using severe infection doses
Neonatal to <3 months
MEDICAL REVIEW
intravenous cefotaxime
plus if sepsis/meningitis considered:
intravenous amoxicillin
D/w Micro if penicillin allergic
3 months to <=5 years old
Intravenous ceftriaxone
+/- Consider adding clindamycin)
*Use clindamycin if penicillin allergic
>=6 years old
intravenous flucloxacillin
+/- Consider adding clindamycin
*Use clindamycin if penicillin allergic
CONSIDER 2nd LINE / ADDITIONAL ANTIBIOTICS WITH SPECIALIST MICRO/ID ADVICE
Daily clinical review, monitor fever, CRP daily until improving, consider surgery indications
consider iv to oral switch after 21 days if:
Afebrile + pain free for at least 48 hours
and
CRP < 20
OM and SA
>= 6 weeks to many months therapy may be required, tailored to individual response.
CRP (+/-ESR) normal
consider iv to oral switch after 14 days (21 days if PVL) if:
Afebrile + pain free for at least 48 hours
and
CRP < 20
OM and SA
>= 6 weeks to many months therapy may be required, tailored to individual response.
CRP (+/-ESR) normal

Management

- Remember septic arthritis is a **surgical emergency**.
- Any child with a suspected bone or joint infection needs urgent referral to the Orthopaedic Registrar (bleep 8629).
- The majority of children will require admission for further investigations / joint aspiration and wash out under GA / intravenous antibiotics via PICC line

Children with suspected bone or joint infections **should not be discharged until discussed with a senior paediatric doctor.**

- Children must be admitted under **joint care** – primarily paediatrics with orthopaedic input if less than one year, until the case has been discussed with both Consultants.
- Any suspected bone or joint infection that is being admitted **must** be discussed with the COW on admission.
- Admitted patients need daily review by both Orthopaedic and Medical teams.

This is particularly important in children under 1 year old where sepsis is easily missed.

Antibiotic therapy

Intravenous antibiotics

- It is ideal to obtain microbiology samples before commencing intravenous antibiotics but it is known that delaying therapy increases the risk of complications.
- **If child is overtly septic, start empirical antibiotics ASAP**
- Start as soon as a clear diagnosis of bone or joint infection is made – but **must be a senior decision after discussion with Paediatric and Orthopaedic Consultant**.
- Use the **management pathway** to decide which antibiotics. The duration of IV antibiotics has to balance the benefits against the risks associated with prolonged IV antibiotic therapy
- **NB. in simple / unifocal OAI, I.V antibiotics may only be required for a few days before oral switch** (see **management pathway**)

Oral antibiotics

Age range	Antibiotic choice	Dose	Notes
Neonate – 8 years old	Co-amoxiclav	See BNFc. NB. advice recently changed. Advise using severe infection doses	If penicillin allergic discuss with microbiology registrar / consultant with regards to sensitivities and choice of antibiotics. Clindamycin is a likely choice
9 – 18 years old	Flucloxacillin		

Surgery

If the child requires surgery for septic arthritis or complex osteomyelitis:

- **Aim for surgery < 4 hours**
- If the child is systemically well AND theatre will be < 4 hours then take blood cultures and withhold antibiotics until washout. **Start I.V antibiotics in theatres immediately post washout.**
- If child is unwell / septic or theatre will be delayed > 4 hours, take blood cultures and commence I.V antibiotics as per **management pathway**.
- Consider arranging insertion of PICC line when under GA for complex OAI – senior team members to decide on case by case basis (Anaesthetics / Paediatrics / Orthopaedics).
- At surgery samples should be sent for microbiology and histology
    - Joint fluid, pus or tissue samples should also be sent for Kingella Kingae PCR.

Follow-up:

1. If going home on I.V antibiotics

Arrange **Community Nurse** follow up: Tel 01273 523125 (internal ext. 3125) for Brighton and Hove area, outside this area ask ward staff for contact details.

They will need:

- **Referral form** – see clinical guidelines page on the intranet
- **TTO / drug chart** with diluent, flushes and all drugs prescribed, including adrenaline PRN, along with the **oral antibiotic course**

ENSURE duration of intravenous antibiotic is clearly indicated.
Contact Pharmacy if any questions bleep 8259 / 8694 / 8026.

Arrange:

- **Weekly review** by Dr Fidler or the Paediatric Registrar **and blood tests** (CRP, FBC, ESR and LFT) **on level 7 Day Care on Thursday morning**. Call ext. 2383 to book patient in.

If inflammatory markers are found to be rising OR patient symptoms are worsening the patient will need **urgent Orthopaedic team review.**

2. If going home on oral antibiotics

Arrange follow up in the joint paediatric orthopaedic clinic on Wednesday morning.

- Patients should be followed up more closely and for longer if on 'short course' to identify relapse.
- Follow up at **2 weeks and 4-6 weeks** with safety-net advice to return if worsening symptoms.

All patients will be seen again at 1 year post presentation to ensure no late sequelae.

Reference: Faust SN, Clark J, Pallett A, *et al.* Managing bone and joint infection in children. *Arch Dis Child* (2012).