INSTRUCTIONAL COURSE

British Orthopaedic Association

Saturday 11th January 2020
Your first night on call.....

Hip septic arthritis

Slipped epiphysis

Open fractures
What you will hear

Evidence

Personal take

Top tips

Traps for the unlucky
<table>
<thead>
<tr>
<th>Description</th>
<th>Value</th>
</tr>
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<tbody>
<tr>
<td>9/12 girl</td>
<td></td>
</tr>
<tr>
<td>Left hip pain</td>
<td></td>
</tr>
<tr>
<td>CRP</td>
<td>13</td>
</tr>
<tr>
<td>Grumpy</td>
<td></td>
</tr>
<tr>
<td>WCC</td>
<td>14</td>
</tr>
<tr>
<td>T</td>
<td>38°C</td>
</tr>
<tr>
<td>Plain film</td>
<td>normal</td>
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</tbody>
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Bacterial seeding

Large lower limb joints

Metaphyseal osteomyelitis  Proximal femur
Bacterial seeding

Large lower limb joints

Metaphyseal osteomyelitis
- Proximal femur
- Distal fibula
- Proximal humerus
- Proximal radius

Multiple joints 5 - 10%
Rapid joint destruction

Synovitis

Fibrinous exudate

Intra-articular pus

↑↑↑ Intra-articular pressure

Avascular necrosis
2 week old
All ages

Fever

Systemic illness

Intense joint pain

Absent range of movement
Differential diagnosis

Reactive Arthritis vs. Septic Arthritis

Joint movement less restricted

Haematological parameters overlap
Kocher et al JBJS Am 1999, 2004

Fever >38.5°C
Inability to weight bear even with support
WCC > 12 x 10⁹ cells/L
ESR >40 mm/Hg

1 3%
2 40%
3 93 %
4 99% positive predictive value

Caird et al JBJS Am 2006

CRP ≥ 20mg/L
98% positive predictive value
### Easy wins

<p>| | |</p>
<table>
<thead>
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<tbody>
<tr>
<td>0</td>
<td>Home and review</td>
</tr>
<tr>
<td>1</td>
<td>Admit and observe</td>
</tr>
<tr>
<td>4</td>
<td>Drain</td>
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</tbody>
</table>

### Hard yards

<p>| | |</p>
<table>
<thead>
<tr>
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<tbody>
<tr>
<td>2-3</td>
<td>Clinical suspicion</td>
</tr>
</tbody>
</table>
Hip Drainage

Bikini incision

Identify TFL-sartorius interval

Retract rectus femoris (Straight head)

Incise capsule
Anterior superior iliac spine
Sartorius muscle

Tensor fascia lata muscle
Hip Drainage

Visualise and assess articular cartilage
? Drill metaphysis
Copious irrigation
Close wound without drainage

+/- Plaster spica
+/- Long line
High dose intravenous antibiotics
Cef du jour
Armageddocillin

Rapid clinical response
Resolution of fever
Resolution of pain
Improvement of serum markers

Oral antibiotics
(Adjusted for sensitivities)
Take home message

Septic arthritis is a surgical emergency
14-year-old boy
6/52 limp
| At-risk Population\(^{(a)}\) (Mid-year estimate 2016\(^{(b)}\)) | First presentation of SCFE |
|---|---|---|---|
| **n** | **n** | **Incidence** | **95% CI** |
| **All\(^{(a)}\)** | 9,499,724 | 429 | 3.61 | (3.27, 3.95) |
| **By Country & Region:** | | | | |
| England | 8,301,394 | 379 | 3.65 | (3.28, 4.02) |
| London & Surrounding Boroughs | 1,851,204 | 89 | 3.85 | (3.09, 4.73) |
| South | 1,696,467 | 75 | 3.54 | (2.78, 4.43) |
| Northern | 2,280,272 | 102 | 3.58 | (2.88, 4.27) |
| Central | 2,473,451 | 113 | 3.65 | (2.98, 4.33) |
| Wales | 454,551 | 12 | 2.11 | (1.09, 3.69) |
| Scotland | 743,779 | 38 | 4.09 | (2.89, 5.61) |
| **By age-group:** | | | | |
| 6-10 years | 3,850,071 | 82 | 1.70 | (1.36, 2.11) |
| 11-18 years | 5,649,653 | 347 | 4.91 | (4.45, 5.43) |
| **By sex:** | | | | |
| Male | 4,867,679 | 243 | 3.99 | (3.49, 4.50) |
| Female | 4,632,045 | 186 | 3.21 | (2.75, 3.67) |

\(^{(a)}\)6-18 year-olds, England, Scotland & Wales; \(^{(b)}\) Source: ONS

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<table>
<thead>
<tr>
<th>BMI</th>
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<tbody>
<tr>
<td><strong>n</strong></td>
</tr>
<tr>
<td>---</td>
</tr>
<tr>
<td>140</td>
</tr>
<tr>
<td>Radiographic severity (n=514 hips)</td>
</tr>
<tr>
<td>-----------------------------------</td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td>Mild</td>
</tr>
<tr>
<td>Moderate</td>
</tr>
<tr>
<td>Severe</td>
</tr>
<tr>
<td>Missing</td>
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</table>
12 year old boy
Acute Left hip pain

13.4%
Serendipitous reduction?
Parsch mini-open

Parsch mini-open


Within 24 hours
AVN 4.7%
The other side

20% within 18 months

60 – 100% with endocrinopathy
Top tip

Prophylactic pinning

Acute severe

Known cause

Young patient

Extreme obesity
Take home message

Adolescents with a limp have a slip until proven otherwise
10.10 female
Fall 3 m

0.5 cm laceration
No consensus

What

Amount or type of irrigation
Use of antibiotics in the irrigation
Bone end delivery

Where

Treated in the Emergency Room
   Soft-tissue infections 13%
   Delayed union 8%

Treated in the Operating Room
   Soft-tissue infections 16%
   Delayed union 30%
“There are three kinds of lies: lies, damned lies and statistics”

Benjamin Disraeli
1804-1881
Just a fracture with an incidental soft tissue injury?
6-8 µ

0.2 - 10 µ
If blood has got out, germs have got in
Unevidenced Algorithm

Panoramic view of bone ends

Remove all the dead stuff

Irrigate with *fluid du jour*

Until your feet are wet

Armageddodocillin for a bit
10^10 female
Fall 3 m

0.5 cm laceration

0.2 - 10 µ
6 weeks
Top tip

Do not underestimate Gustillo I Ever
Top tip

Children with open forearm fractures are just small adults with open forearm fractures
9 y boy
Pedestrian vs Car
Villains

Dead bone

Dead soft tissue

Germs
BOAST 4: THE MANAGEMENT OF SEVERE OPEN LOWER LIMB FRACTURES

Background and Justification:
The British Orthopaedic Association and the British Association of Plastic, Reconstructive and Aesthetic Surgeons have reviewed their 1997 guidance and now publish a review of all aspects of the acute management of these injuries using an evidence-based approach, leading to the "Standards for the Management of Open Lower Limb Fractures," which are free to download from www.boa.ac.uk and www.bapras.org.uk. This BOAST is derived from these standards. Contrary to traditional teaching, best outcomes are achieved by timely, specialist surgery rather than emergency surgery by less experienced teams.

Included Patients:
All patients with high energy open fractures as manifest by the following injury patterns:
Fracture Pattern:
- Multifragmentary (comminuted) tibial fracture with fibular fracture at same level
- Segmental fractures
- Fractures with bone loss, either from extrusion or after debridement
Soft tissue injury:
- Swelling or skin loss, such that direct, tension-free wound closure is not possible
- Degloving
- Muscle injury that requires excision of devitalized muscle via wound extensions
- Injury to one or more major arteries of the leg
- Wound contamination with marine, agricultural or sewage material

Standards for Practice Audit:
1. Intravenous antibiotics are administered as soon as possible, ideally within 3 hours of injury: Co-amoxiclav (1.2g) or Cefuroxime (1.5g) 8 hourly and are continued until wound debridement. Clindamycin 600mg, 6 hourly if penicillin allergy
2. The vascular and neurological status of the limb is assessed systematically and repeatedly at intervals, particularly after reduction of fractures or the application of splints
3. Vascular impairment requires immediate surgery and restoration of the circulation using shunts, ideally within 3-4 hours, with a maximum acceptable delay of 6 hours of warm ischaemia
4. Compartment syndrome also requires immediate surgery, with 4 compartment decompression via 2 inions (see overtight)
5. Urgent surgery is also needed in some multiply injured patients with open fractures or if the wound is heavily contaminated by marine, agricultural or sewage matter
6. A combined plan for the management of both the soft tissues and bone is formulated by the plastic and orthopaedic surgical teams and clearly documented
7. The wound is handled only to remove gross contamination and to allow photography, then covered in saline-soaked gauze and an impermeable film to prevent desiccation
8. The limb, including the knee and ankle, is splinted
9. Centres that cannot provide combined plastic and orthopaedic surgical care for severe open tibial fractures have protocols in place for the early transfer of the patient to an appropriate specialist centre
10. The primary surgical treatment (wound excision and fracture stabilisation) of severe open tibial fractures only takes place in a non-specialist centre if the patient cannot be transferred safely
11. The wound, soft tissue and bone excision (debridement) is performed by senior plastic and orthopaedic surgeons working together on scheduled trauma operating lists within normal working hours and within 24 hours of the injury unless there is marine, agricultural or sewage contamination. The 6 hour rule does not apply for solitary open fractures. Co-amoxiclav (1.2g) and Gentamycin (1.5mg/kg) are administered at wound excision and continued for 72 hours or definitive wound closure, whichever is sooner
12. If definitive skeletal and soft tissue reconstruction is not to be undertaken in a single stage, then vacuum foam dressing or an antibiotic bead pouch is applied until definitive surgery
13. Definitive skeletal stabilisation and wound cover are achieved within 72 hours and should not exceed 7 days
14. Vacuum foam dressings are not used for definitive wound management in open fractures
15. The wound in open tibial fractures in children is treated in the same way as adults
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Top tip

Get into bed with your plastic surgeons
7 M
20mph car vs pedestrian
4-6 hours ago
isolated injury
Normally fit and well
Martin Gargan on for ortho
Plans to take for initial debridement tomorrow am (after shunt revision but can go first at 0830)
Who is on for plastics
Pics to follow
Top tip

Get rid of all the bad stuff
Wound Assessment In Theatre

Systematic

Bone Assessment & Resection

Wound “Excision” (not debridement)

Wound Extension
+ 3 hours

Courtesy of Mr S Mitchell
+ 48 hours
Take home message

Children with open fractures are just small adults with open fractures
What you have heard

Hip septic arthritis

Slipped epiphysis

Open fractures