Orthopedics in field conditions

André Desrochers dmv, MS, Dipl. ACVS, Dip ECBHM

What can be done?
- Cast for MTC, MTT fractures
- Joint lavage and arthrotomy for septic arthritis
- Joint resection/digit amputation and other foot surgeries
- Tenotomy for flexural deformities

Can be done but more difficult
- Pin cast for long bone fractures
- Thomas splinting for radial and tibial fractures
- Distal limb amputation
- Mandibular fracture in calves
- Sequestrum resection
- Dorsal coxofemoral luxation reduction

Fracture in field situation?
- ‘Easy’ to reduce and immobilize
  - Distal phalanx, MTC or MTT in young animals
  - Non displaced humeral fracture (stall rest)
- Possible but challenging
  - MTC & MTT in mature animals
  - Radius and tibial fracture with Thomas splint
- Hospitalization
  - Femoral fracture, ALD, open fracture

Myopathy and fracture

Difficult reduction needs appropriate sedation
**Basic sedation and analgesia/anesthesia**
- Sedation: xylazine + ketamine
- Lidocaine
  - « ring block »
  - IV under tourniquet
- Brachial block
- Epidural anesthesia

**Ket stun**
- X xylazine + \( \frac{1}{2} \) X butorphanol + 2X ketamine
- Mix in the same syringe
- IM, SC, IV
- 30-40 minutes
- Sedation and analgesia according to your need
- Based on the dose of xylazine you would give
  - E.g. standing surgery:
    - 20mg xylazine + 10mg butorphanol + 40 mg ketamine

**IV anesthesia**
- Triple drip
  - Guiafanesin 5% 2ml/kg
    (Glyceryl guaiacolate= GG or G-colate)
  - Ketamine 2.2 mg/kg
  - Xylazine 0.05 mg/kg
- To effect
  - Bolus follow by slow drip
- DO NOT administer more than 2ml/kg of GG

**Epidural anesthesia**
- Paralyse and analgesia
  - New bottle of 2% lidocaine
  - 0,15 ml/kg of lidocaine for Hind limb anesthesia
  - Coccygeal injection (surgical prep)
- Analgesia alone (15 min before procedure)
  - 0,05 mg/kg xylazine in 5-15 ml of sterile saline
  - 0,1 mg/kg of morphine

**Brachial block**
- Ultrasound guided brachial block

[Image of ultrasound guided brachial block]
Fiberglass cast

• General principles
  – Protection at the pressure point
  – Digits must be included in the cast
  – Adjacent joints should be immobilized
  – Balance between lightness and stiffness

Fiberglass cast

• General principles
  – 50% overlapping between bands
  – Fiberglass is resistant in tension therefore it will fail at compression point
  • Splint can be applied at strategic point to avoid cast failure
    – Splint: aluminum bar, folded layers of cast material
    – Caudal aspect of the carpus
    – Cranial aspect of the tarsus
### Full limb cast

<table>
<thead>
<tr>
<th>Weight (kg)</th>
<th>Number or rolls</th>
<th>width</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt; 70</td>
<td>3-4</td>
<td>3-4 in</td>
</tr>
<tr>
<td>70-225</td>
<td>6-7</td>
<td>4-5</td>
</tr>
<tr>
<td>225-460</td>
<td>8-9</td>
<td>4-5</td>
</tr>
<tr>
<td>460-675</td>
<td>10-11</td>
<td>5</td>
</tr>
<tr>
<td>&gt;675</td>
<td>12-16</td>
<td>5</td>
</tr>
</tbody>
</table>
MTC and MTT fractures

MTC physeal fracture
Fracture in Canada at -20C

Dystocia injuries

- Metacarpal bones
- Inadequate positioning of the chains or ropes
- Swelling of the distal limb
- Non weight bearing
- Complete physical exam for other trauma (ribs, mtc, femur, humerus, vertebrae)

2 weeks post casting
Obstetrical fracture
Conclusion

- MTC & MTT are easily treated with a full limb cast
- Distal physeal fracture is the most common fracture configuration
- Prognosis for obstetrical MTC fractures is 60-70%
- Distal limb amputation should be considered in beef calves.

Classification of septic arthritis in Cattle

- Primary
  - Direct trauma to the joint (laceration, foreign bodies)
- Secondary
  - Infection adjacent to a joint
- Tertiary
  - Systemic infection (pneumonia, diarrhea, omphalitis, endocarditis)

Diagnostic of septic arthritis

- Complete physical examination
- Calf = look for a primary site of infection until proven otherwise
  - Navel
  - Lungs
  - Diarrhea
- From the digits to proximal
Synovial fluid analysis

<table>
<thead>
<tr>
<th></th>
<th>Nucleated cells (c/μl)</th>
<th>Proteins g/l</th>
<th>Neutro %</th>
<th>Mono %</th>
</tr>
</thead>
<tbody>
<tr>
<td>Non infectious arthritis</td>
<td>900 (34-97000)</td>
<td>30</td>
<td>6</td>
<td>77</td>
</tr>
<tr>
<td>Infectious arthritis</td>
<td>63000 (1250-385000)</td>
<td>56</td>
<td>94</td>
<td>5</td>
</tr>
</tbody>
</table>

Rohde et al Vet Surg 2000

Conclusion:
Septic arthritis = NCC>25000, PMN>80%, TP>45

Treatment plan

- Duration of clinical signs
- Severity of the lesions
  - Number of joints involved
  - >2 = poor prognosis
  - Clinical exam
  - Radiographs (not a good prognosis indicator)
- Cost of treatment
- Prognosis
  - Return to previous production

Example

- Young calf with history of pneumonia
  - tetracycline, spectinomycin, Micotil, Draxin.
- Young calf with history of navel infection or septicemia
  - Ceftiofur (2mg/kg bid), ampicillin
- Adult with type 1 septic arthritis (laceration)
  - Pen G, ceftiofur, TMS, ampicillin Na
- Chronic fibrinous arthritis
  - Pen G, Euthanasia

Alternative Administration route

- IV under tourniquet
  - High local concentration of ATB
  - ↓ treatment cost
  - 1/3 of systemic dose
  - Difficult to keep a catheter
  - Limited to distal limb

Alternative Administration route

- Intraarticular antibiotics
  - Easy to use
  - High concentration of antibiotics for 24 hrs
  - Synovitis with certain antibiotics
  - Injection at the end of articular lavage
  - 1/3 of the systemic dose
Techniques for joint lavage

- Sedation and restrain (xylazine or Ket stunt)
- Preop NSAIDs
- Surgical preparation of the site (hair removal and scrubbing)
- Joint tap. Sample submitted for analysis (cytology and bacteriology).
  - needle size (16 to 14 G) or 4-5 mm trocar-cannula unit
- Joint distension with fluids
- Insertion of a second needle
- Lavage until the fluid is clear without fibrine (500 to 2000 ml)

Joints communication

- Carpus
  - Middle and carpometacarpal joints always communicate
  - Radiocarpal joint communicates with middle carpal in 13%
- Stifle
  - MFT and FP always communicate
  - LFT communicate with FP in 40%
- Tarsus:
  - Tibiotarsal and prox intertarsal always communicate
- Fetlock
  - Medial and lateral pouches always communicate
Joint lavage

• Repeated once a day for 2 days
  – If fibrin present after the second lavage
    • Third lavage
    • Arthrotomy

• Joint lavage is cancelled if:
  – Clinical improvement
  – ↓ WBC in synovial fluids

Arthrotomy

• Indications
  – Failure of the medical treatment (ATB and lavage)
  – Large amount of fibrin plugging up the needles
  – Thick pus in the joint
Technique for Arthrotomy

- Sedation and restrain
  - Hind limb affected: epidural possible
  - Forelimb: Plexus brachial block
- Standard surgical preparation
- 3 cm skin incision at the usual joint tap locations.
  - At least 2 incisions are required
- Joint distension with fluids
- Debridement of the joint
  - Fibrin removal without damaging the cartilage

- 3 cm skin incision at the usual joint tap locations.
  - At least 2 incisions are required
- Joint distension with fluids
- Debridement of the joint
  - Fibrin removal without damaging the cartilage
Postop care of arthrotonies

- Rapid improvement of clinical signs because of joint decompression
- Keep a bandage for a few days until the skin incisions are well closed (3 to 5 days)
- Lavage is repeated as needed

Arthrodesis

- Surgical fusion of a joint by cartilage resection and immobilization of the joint with a cast or implants
- Last resort
- Biomechanical consequences on the gait especially if arthrodesis is performed on a joint proximal to the fetlock
  - Carpus
  - Tarsus
Septic arthritis of the DIJ

X-rays
In field situation
Postoperative treatments

- Incisions left opened
- Antibiotics
  - I.M Pen G, I.V. Ampicillin
  - 7-14 days
  - Intravenous antibiotics under tourniquet
- NSAIDs
  - 2 to 3 days,
- Bandage
  - Changed 24 hours post-op
  - Kept and changed as needed
- Joint flushed as needed
  - Diluted iodine solution
Septic arthritis P1-P2

Conclusion
- Complete physical examination
- Joint lavage important part of the treatment
- Antibiotics locally and 2-3 weeks syst. If possible
- Arthrotomy if thick pus or fibrin plugging the needle
- Arthrodesis: foot and carpus.

Pedal osteitis
- Causes
  - Penetrating wound
  - Severe abrasion of the sole (apical)
  - Excessive trimming (buffer)
  - Laminitis
  - Adjacent infection

Pedal osteitis
- Kofler 1999
  - 53 animals (78 digits)
  - Cause
    - Inadequate trimming (buffer) (49%)
    - Laminitis (30.2%)
    - Trauma (11.3%)

Pedal osteitis
- Treatment
  - Débridement, curetage
  - Wooden block on sound digit
  - Antibiotics
  - Antibiotics IV under tourniquet
- Prognosis
  - Good
    - 20/23 success (Kofler 1990)
Pedal osteitis

Conclusion

• Pedal osteitis is treated with partial distal phalanges amputation
• Evaluate the DIJ for septic arthritis before selecting a surgical approach
• Up to 2/3 of the phalanx can be removed and still have a functional claw

Thank you
Questions?