Managing Fractured Limbs of Cows in Nepal

Recommendations for field conditions following 2015 Nepal Earthquake

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Many distal limb fractures of cattle have been seen due to the 2015 Nepal Earthquake. This protocol was made to assist local and foreign veterinarians working in animal disaster relief to best treat this condition, given the cultural aspects of cattle in Nepal.

Cattle are considered good orthopaedic patients. They spend large amounts of time sitting down, they tolerate casts and other external orthopedic devices, and they have good bone healing capacity. With the use of any casting material, recheck and follow-up of the patient is ESSENTIAL.

Equipment Required

- Stethoscope
- Thermometer
- Hair Clippers (electric) or scissors
- Gloves
- Xylazine
- Ketoprofen or Meloxicam
- Oxytetracycline LA or Trimethoprim-Sulfa
- Povidone-Iodine or Chlorhexadine
- Sterile Saline (NaCL)
- Gauze squares
- Non-stick bandage
- Woven Gauze rolls (8 rolls)
- Absorbent Cotton rolls (4 rolls)
- Plaster of Paris (8 to 10 large rolls)
- Duct Tape (1 roll)
- PVC (plastic) Pipe: precut in half lengthwise

Assessing and Treating fractured cow limbs in field conditions

1. Complete a full clinical examination before examining the affected limb
   a. Concurrent diseases: mastitis, respiratory disease, hypocalcaemia, uterine infections
   b. Temperature, Heart Rate, Respiratory rate, Lung sounds, Mucous membrane colour, Udder and milk, Reproductive exam
2. Examine the affected limb
   a. Other possible conditions: foot rot (interdigital infection), foot abscess, hip dislocation
   b. Range of motion of leg, crepitus
   c. SEDATION: Xylazine 0.05 mg/kg IV; usually about 10 to 20 mg IV to adult cow
   d. Open vs. Closed fracture
      i. Open Fracture: bone visible or felt through wound; guarded prognosis
      ii. Closed Fracture: skin intact, better prognosis
   e. Examine tissue, blood vessel or nerve damage, contamination of wound, smell
3. Wound Care
   a. ESSENTIAL for open fractures; WEAR GLOVES; have assistant hold leg
   b. Remove any old bandages, padding with scissors
   c. Remove all hair within and around wound (Hair clippers or scissors)
   d. Wash leg and wound w/ warm water and Povidone-Iodine or Chlorhexadine
   e. Flush wound with 2 Liters of sterile Saline using syringe and needle
   f. Gently pat wound dry with clean gauze squares; use towel to dry off leg
   g. Depending on the wound, surgical closure of the skin and muscle may be indicated

These procedures should only be performed by a trained veterinary practitioner
4. Cover fracture site with sterile non-stick dressing (e.g. melolin)
5. Apply single gauze roll bandage to keep dressing in place, not too tightly
6. Apply a thick layer of cotton wool (about 10cm) around leg
   a. **Cotton must extend to joint above and below fracture site to immobilize**
7. Tightly wrap Woven Gauze Roll around cotton wool
   a. Start distal (towards foot) and wrap proximal (towards animal's body)
   b. Each wrap around the leg should cover one half of the previous wrap
8. Attempt to put bones in alignment and leg straight by rotation and pulling
   a. Be careful to avoid further damage to muscles/nerves/blood vessels
9. Apply Plaster of Paris (cast)
   a. Plaster of Paris (POP) will be wrapped over the previous cotton/gauze bandage
   b. Get a bucket of warm water (25 degrees celcius)
   c. Immerse POP in water for 3 seconds
   d. Wrap POP around leg; similar coverage of one half of each previous wrap
   e. You need at least 4 layers of cast (depending on size of animal and fracture)
   f. **You will have 5 minutes before cast sets;** it will get rock hard and dry
   g. Wrap cast in Duct Tape to help keep it dry and clean
10. Apply Splint
    a. Use suitable width PVC (plastic) pipe, cut in half lengthwise
    b. Place pipe below proximal joint and measure length needed
    c. Cut pipe with hacksaw to desired length
    d. Place splint to support the posterior portion of the leg (towards the tail)
       i. Wrap duct tape around a few times at top and bottom of splint

**Medications**

*Drugs listed are readily available in Nepal; other options exist*

1. Pain and Inflammatory given for **7 days** minimum
   a. Meloxicam 0.4 mg/kg once a day; Intramuscular (IM) or Oral (PO)
   b. OR
   c. Ketoprofen 2.2 mg/kg once a day; Intramuscular (IM) or Intravenous (IV)
2. Antibiotics given for **14 days** minimum
   a. Oxytetracycline 10 mg/kg once a day IM/IV; Oxytetracycine LA 10 mg/kg once every three days IM/IV
   b. OR
   c. Trimethoprim 3 mg/kg Sulphonamide 15 mg/kg IM/IV once a day
3. Other medications
   a. **Treat other concurrent diseases**
   b. B Vitamin to stimulate appetite; Calcium supplementation for lactating cows

**Aftercare and Follow-up of Patient**

1. Instructions to Owner/Farmer
   a. **The cast MUST stay DRY**
   b. Walking is ok, but not until cast is set and patient fully aware (sedation worn off)
2. Recheck and removal of cast
   a. **NOT OPTIONAL; INJURY AND DEATH WILL OCCUR WITHOUT PROPER FOLLOW-UP**
   b. Ideally remove cast, reevaluate and clean wound, **every 2 weeks for at least 6 weeks**
      i. Sedate animal with Xylazine
      ii. Remove splint; carefully cut two sides of cast with hacksaw
      iii. Replace Cast
   c. Benefits/Risks of replacement must be weighed; disturbance of the fracture site (due to improper handling or poor sedation) can detrimental to long term healing
3. **Cast must keep leg immobilized for a minimum of 6 weeks**; depends on patient size, age, and nature of fracture

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