Downer Cow Syndrome
Downer Cow Syndrome

• Definition: Any cow that remains in sternal recumbency for more than 24 hours after initial recumbency, and after treatment for primary medical problems.
Occurrence of Downer Cow Syndrome

58% of cases occur in first 24 hours of lactation
97% of cases occur in first 100 days of lactation

May become recumbent for any number of primary medical reasons: e.g. A common complication of milk fever: 20-28% of milk fever cows become “downers”

Non-medical risk factors:
- Season (winter)
- Management: housing, footing, trauma
- Sanitation: infectious disease
- Nutritional management: metabolic disease
Primary Recumbency due to Primary Disease

- **Metabolic disease:**
  - Hypocalcemia
  - Hypophosphatemia
  - Hypokalemia
  - Hypomagnesemia
  - Fatty liver disease
  - Starvation

- **Trauma**
  - During calving or when struggling to get up
  - Fractured pelvis, long bones, dislocated hip
  - Rupture of Gastrocnemius tendon
  - Nerve damage: Sciatic &/or Obturator nerve paralysis

- **Septic/Toxic shock:** eg. Mastitis, metritis, RDA/RTA, etc
- **Other:** eg. Lymphosarcoma in vertebral canal

*Leads to******
Progresses to Secondary Recumbency

• Prolonged recumbency causes pressure damage:
  – Ischemic necrosis of muscles of ‘down’ hind limb
    • edema & swelling, congestion, cellulitis, venous thrombosis
    • Primarily Gastrocnemius & Semitendinosus muscles
  – Nerve damage:
    • common Peronial branch of Sciatic nerve.
    • Loss of function of digital extensors => knuckle over at fetlock

Leads to………
May Progresses to Tertiary Recumbency

- Cow struggling to get up may cause musculoskeletal damage that result in long-term recumbency:
  - Fractures
  - Rupture of muscle, ligaments
Progression of Events

Primary Recumbency (Primary disease)

Secondary Recumbency (ischemic muscle necrosis &/or nerve damage)

Tertiary Recumbency (musculoskeletal injury)
Clinical Signs

• Usually in sternal recumbency but unable to rise

• Often bright and alert ("alert downers")

• Eating, drinking, urinating, defecating
  Hindlimbs: under body or stretched out behind (‘frog-legged’)

• Forelimbs functional: “creepers”

• Sensation often present in hindlimbs (withdrawal reflex)

• +/- attempts to rise (part way up “sitting” or role to other hip)
Downer cow
‘dog-sitting’
Downer cow being lifted

What abnormalities do you see?
Pressure Damage and Elevated CK

- **Study:**
  - Used Halothane anesthesia to maintain cows in sternal recumbency for 6 - 12 hrs. (lower hind limb under body)

- 8 of 16 animals later unable to stand => became permanent downers:
  - Initially weak leg
  - within 24 hrs => stiff, swollen leg

- other 8 of 16 showed transient effects of pressure damage:
  - caudal ataxia and peroneal nerve paralysis

Cox et al., 1982
Pressure Damage and elevated CK

<table>
<thead>
<tr>
<th>Time interval after induced recumbency (hrs)</th>
<th>CK values (mean +/- SD)</th>
<th>Ambulatory group (8)</th>
<th>Downer group (8)</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>70</td>
<td>60</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>110</td>
<td>90</td>
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<td>12</td>
<td>15,140</td>
<td>12,430</td>
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<tr>
<td>24</td>
<td>36,610</td>
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<tr>
<td>48</td>
<td>12,800</td>
<td>41,640</td>
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<tr>
<td>4 days</td>
<td>2,160</td>
<td>16,160</td>
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<tr>
<td>6 days</td>
<td>730</td>
<td>5,750</td>
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</tbody>
</table>
Utility of CK testing

• Maximum CK activity occurs approx. 48 hrs. recumbency

• > 48 hrs., CK activity declined rapidly, even in downer animals

• a low CK value after being down for 5 days is meaningless

   CK => limited usefulness as prognostic indicator

• Clinical observation a better predictor of status than CK levels.
Diagnosis

- A diagnostic challenge
- Must differentiate primary from secondary disease
Diagnosis

- History;
  - Recumbent > 24 hrs.
  - Often high producer, early lactation
  - +/- history of primary disease
  - e.g. If Hx of milk fever, ask treatment given, route of administration, serum biochemistry results, response to therapy?
  - Trauma?
  - Dystocia?
  - Infectious disease?
Diagnosis

• Physical exam:
  – Alert, but unable to rise
  – If can partly stand may observe muscle swelling, stiffness or nerve deficits
  – Thorough exam to look for other primary disease

• TPR, rectal/vaginal exam: udder, pelvis, uterus, vagina, legs, etc., etc.
Differential Diagnoses

- Must differentiate primary from secondary causes of recumbency

- Primary diseases:
  - Blood chemistry: Milk fever, hypo-P, hypo-Mg, fat cow syndrome
  - Musculoskeletal injury (pelvis, hip, long bones, stifle, hock, ruptured tendons)
  - Nerve injury (spinal cord lesions, calving paralysis)
  - Toxic conditions: mastitis, metritis, uterine torsion, peritonitis, etc.
Clinical Pathology

- Elevated CK, AST:
  - depends on duration of recumbency
  - CK values peak after 36-48 hrs. then fall again
  - Grave prognosis is >10 times above normal and recumbent > 2-3 days.

- +/- hypocalcemia, hypo-Phos, hypo-Mg, hypo-K

- +/- elevated serum urea & creatinine (shock, poor renal perfusion, renal failure)
• Urinalysis:
  – Proteinuria:
    • within 48 hrs of onset of recumbency
    • due to skeletal muscle damage
  – Myoglobinuria:
    • skeletal muscle damage
    – +/- ketonuria

• Hematology:
  – Evidence of sepsis?
Treatment

• Specific treatment for any primary disease found (e.g. milk fever, hypophosphatemia)

• Analgesics/anti-inflammatories:
  – Non-steroidals?
  – Steroidals?
Treatment

• Analgesics/anti-inflammatory: 
  – Non-steroidals:
    • ASA
    • Banamine (flunixin meglumine)
    • Phenylbutazone
    • Ketoprofen
  – Steroidals:
    • Dexamethasone
    • Predef
Treatment

- Analgesics/anti-inflammatories:

  - Non-steroidals:
    - ASA: 24 hr 1 d
    - Banamine (flunixin meglumine): 72 hr 10 d
    - Phenylbutazone: 96 hr 12 d
    - Ketoprofen: 24 hr 7 d

  - Steroidals:
    - Dexamethasone: 0 0
    - Predef: 0 7 d

Withdrawal times (AMDUCA)
Treatment (con’t)

• Supportive care:
  – good footing/traction
  – Lots of bedding/cushion
  – Shelter
  – Access to water/feed
  – Roll frequently (q 4-6 hrs.)
  – Massage hind limbs
  – Treat decubital sores & provide excellent bedding
Supportive Care (con’t)

• Lifting devices
  – Sling
  – Hip lifters/clamp
  – Inflatable cushions
    • Only useful if animal can stand once supported
    • Only allow short-term lifting

  – Aquatank:
    • Float in warm water for 6-8 hour periods
Hip Lifters, hobbles
Inflatable Air Bag
Flotation Tank
Prognosis

- Prognosis frequently guarded & depends on:
  - Cause of recumbency
  - Duration of recumbency

- Mortality 20-67%
- Many die within 7-10 days due to sepsis or shock
- 33% recover between 3-30 days
- May continue treatment if no obvious physical abnormalities, bright, eating, and continued attempts to rise
Prevention

• Prevent metabolic disease:
  – excellent nutritional management
  – prompt treatment of milk fever to avoid prolonged recumbency
  – Monitor treated cows closely for 24-48 hrs. post-treatment

• Prevent trauma:
  – Non-slippery floor
  – Adequate bedding in calving area
  – Good design for chutes, etc. for moving cows
  – Move cows calmly, quietly and slowly
  – Supervise parturition & provide appropriate assistance to avoid prolonged calving.
Questions ?