Obstetrical Topics

- What do we know about Yaks (Bos grunniens)?
- Stages of Labor
- Normal Presentation and Delivery
- Malpresentation
- Support

Resources

- USYAKS: Emergency Calf Management after Dystocia (Difficult Birth)
  - http://www.usyaks.org/?p=7003
- Zi XD (2003). "Reproduction in female yaks (Bos grunniens) and opportunities for improvement." Theriogenology 59(5-6): 1303-1312
- Internet Images

What About Yaks?

- Warm Season Breeders
- Puberty at 13 to 36 months
  - Nutrition is main determinant
  - Milking of a dam delays puberty of the calf
  - Winter supplementation
- Gestation 250-260 days
  - Bos indicus and Bos Taurus ~ 279-287 days
  - Cows calving early in the season are more likely to have a fertile estrus the following season
  - Calving once every 2 years or twice in 3 years
- Abortion?
  - 5-10% reported
  - Winter supplementation ↓ pregnancy loss
  - 90% Calf Survival Rate
  - Better survival if cows are not milked

Zi XD (2003). "Reproduction in female yaks (Bos grunniens) and opportunities for improvement." Theriogenology 59(5-6): 1303-1312
**Stage 1 Labor**
- Preparation
  - Fetal Stress
    - Fetal ACTH & Cortisol
    - Placental Progesterone, Placental PGF2α
    - Myometrial Contractions
  - Relaxation of the Pelvic Ligaments
  - Restless Behavior Abdominal Discomfort
  - Distension of the Teats
  - Relaxation & Dilation of the Cervix
  - Initiation of Ferguson Reflex
  - Ends with rupture of allantois

**Stage 1 Labor Duration**
- Average Duration 6 hours
  - Up to 24 hours
- Evaluation
  - >6 Hours since first observing Stage 1 Labor
  - Vaginal Exam
    - Who can do this?

**Call For Veterinary Assistance**
- Stage 1 Labor
  - Cervix is dilated and there is no further progression within 30 minutes.
  - Cervix is dilated and you can feel the fetus but the feet are not coming through the cervix.
  - It feels like there is a twist in the vagina.
  - Any other concerns.

**Stage 2 Labor**
- Rupture of Allantois
- Appearance of Amniotic Sac
- Presentation of Fetus
- Ferguson Reflex
  - Oxytocin
  - Uterine & Abdominal Contractions
- Delivery of Fetus

**Stage 2 Labor Duration**
- Beef Cows
  - <30 minutes
  - Up to 4 hours
- Beef Heifers
  - <60 minutes
  - Up to 8 hours
- Assistance?
  - >60 minutes in Stage 2 Labor

**Call For Veterinary Assistance**
- Stage 2 Labor
  - Calf fetlocks or hocks cannot be exteriorized within 30 minutes
  - Abnormal position cannot be corrected within 30 minutes
  - Retained head position
  - True Breech position
  - Cervix not dilating within 30 minutes
**Stage 3 Labor**
- Detachment and Expulsion of the Placenta
- Average 8 hours (bovine)
  - Minutes
  - 12 hours
- Retained Placenta
  - Detachment
  - Expulsion

**Evaluating Parturition**
- Yak Shaving

> The phrase comes from the Ren & Stimpy show that aired on Nickelodeon in the early 90’s.
https://medium.com/@firehoseproject/a-guide-to-yak-shaving-your-code-5139f993475

**Vaginal Exam**
- Cleanliness!!

**Vaginal Exam**
- Cleanliness!!

**Vaginal Exam**
- Evaluate Vaginal Vault
- Evaluate Cervix
- Evaluate Fetus

**Lubricants**
- Polyethylene Polymer (PEP)
  - Toxic in the peritoneum
  - 1.25g Fatal in cow
- Caution if performing a cesarean section
- Carboxy Methylcellulose
**Lubricants**

- Thin Lubricant with warm water and pump into uterus with stomach tube.

**Obstetrical Equipment**

**Dystocia Decision Making**

1. Calving?
   - Normal Delivery
   - Dystocia
     - Normal PPP
     - Abnormal PPP
   - Traction Guidelines
     - Mutate
     - Viable Fetus?
     - Cesarean Section
2. Normal Pull
   - Hiplock & Live Pull
   - Hiplock & Dead Pull
   - Fetotomy
   - Medical Support or Euthanasia

**Presentation: Anterior Longitudinal**

- Position: Dorsosacral
- Posture: Head, Neck & Forelimbs Extended

**Anterior Traction Guidelines**

- Assure Proper Anterior Presentation, Position, and Posture
- Place Obstetrical Chains.
- Cast the cow in Right Lateral Recumbency.
- Traction on down (calf’s left) leg by 1 person until the fetlock is 1 hand’s breadth past the vulva.
- Traction on up (calf’s right) leg by 1 person until both fetlocks are 1 hand’s breadth past the vulva.
- Calf’s shoulders are now through the pelvis and the calf can be delivered vaginally.

**Why Lay the Cow Down?**

- 30% Less Force to Extract the Calf!
  - Gravity
  - Pelvic Brim
  - Rumen Contents
- Better For The Cow
  - Natural Position
- Better For The Calf
  - Less Traction Force
Rotating the Hips
- Prevention of Hip Lock

Anterior Presentation Delivery

Stretching Vulva Over Hips

Fetal Mutation
- Correcting an abnormal Presentation, Position, or Posture.
- Easier the earlier you are in Stage 2 Labor.
  - Less uterine contraction
  - More uterine fluid
- Tocolytics?
  - Produce Uterine Relaxation
  - Epinephrine, 1ml/100lb BW, IV or IM
  - β-2 Agonist → Smooth Muscle Relaxation

Front Leg Retained

Retained Carpus
- Pull the carpus upward and lateral while turning the hoof medially and extending the leg.
- A chain or rope may be placed on the distal portion of the limb and traction applied while the carpus is repelled upwards and laterally.
Retained Shoulder

Repel the calf to create more room to grasp the carpus and then the foot.

Further repulsion of the calf to bring the carpus dorsal and within reach.

The humerus is grasped and the carpus is twisted medially.

The carpus is lifted up and directed medially while the forelimb is extended.

The metacarpus is grasped and the carpus is twisted upwards and laterally to direct the pastern medially.

The metacarpus is grasped firmly and the carpus is twisted upwards and laterally to lift the claw above the level of the pubic brim.

Protect the tight ventral wall of the uterus against the pointed claw by cupping the hand around the hooves.

Presentation: Posterior Longitudinal

- Position: Dorsosacral
- Posture: Hindlimbs Extended

Posterior Traction Guidelines

- Assure Proper Posterior Presentation, Position, and Posture
- Place Obstetrical Chains.
- Cast the cow in Right Lateral Recumbency.
- Traction on down (calf’s right) leg by 1 person until the hock is beyond the vulva.
- Traction on up (calf’s left) leg by 1 person until both hocks are past the vulva.
- Calf’s hips are now through the dam’s pelvis and the calf can be delivered vaginally.
**Rear Leg Retained**

- Repel Calf
  - Hock pulled upward and lateral

- Hock pushed upward and lateral
  - Chain attached to foot, hock pushed anterolateral while leg extended

**Rear Leg Retained**

- Cupping the foot to protect the uterus
  - Both legs extended

**Lateral Deviation of Head**

**True Breach**

- Posterior longitudinal presentation
- Dorsosacral position
- Both hind legs retained at the hips.
- Failure of the Ferguson reflex.

**Breach**

- Repel the fetus anteriorly and upwards to retrieve a hock.
**Breach**

Push the hock laterally and forwards which aids in bringing the fetlock medially.

- Final extension procedure is repeated for the second leg which should be relatively easier because there is more room to maneuver.

**Dogsitting Position**

- Anterior presentation with hind legs extended and in the pelvic inlet.
- Correction is very difficult.
- Front half of the fetus can be repelled and the fetus extracted by the hind legs.
- Traction on the front limbs with partially repelled hindlimbs can result in perforation of the uterine wall below the pubic brim.

**Dorso-Pubic Position**

- Unusual for bovine
- Suspect a uterine torsion

**Swollen Head & Tongue**

- Occasionally when the head of a live calf becomes wedged in the birth canal for a prolonged period of time, the jugular veins are compressed while the carotid arteries continue to pump blood to the head. The result is venous congestion and a swollen head.

**Fractured Ribs**

- Excessive force of extraction
- >3 Ribs fractured will often result in death due to the reluctance to breath from the pain
**Fetotomy**

**Uterine Torsion**
- Rectal Palpation
- 81% Full Term
- 34% Precervical
- 63% Counterclockwise
- Mostly Large Calves
- Retained Placenta
- Dead Calf
  - Cervix is less likely to dilate for vaginal delivery.

**Uterine Torsion - Rolling**
- Roll in the direction of the torsion
  - Trying to catch the cow up with the fetus.
Uterine Torsion - Rolling

Uterine Torsion - Rolling

Uterine Torsion - Rolling

Uterine Torsion - Rolling

Uterine Torsion – Other Methods

- Manual Detorsion
  - Grasp legs and detorse with a rocking motion
  - Detorsion Rod
- Surgical Detorsion
- How do you know when to deliver?
  - Cervix Dilation
  - May not dilate further and cesarean section may still be required.

Physiologic Parameters

- Calf Vigor
- Breathing
  - 30 seconds
- Hold Head Up
  - 15 minutes
- Sternal
  - 30 minutes
**Sternal Physiologic Parameters**
- Suckle Reflex: 60 minutes
- Standing: 60 minutes
- Nursing: 120 minutes

**Nursing Physiologic Parameters**
- Temperature: 101-103°F
  - 1-2 °F higher than dam at birth
- Heart Rate: 100-140/minute
- Respiratory Rate: 30-60/minute

**Beef Calf Mortality**
- Birth to Weaning - 6-8% average
  - 57% in first 24 hours
  - 75% in first 7 days
- Causes
  - Dystocia - 17.5%
  - Stillbirth - 12.5%
  - Hypothermia - 12.2%
  - Diarrhea - 11.5%
  - Respiratory - 7.6%

**Stimulating Respiration**
- Clear Fetal Membranes
- Clear Airway Fluids
  - Suction
  - Paper Towel
  - Gravity Not Effective
- Sternal Recumbency
- Stimulate Breathing
  - Thoracic Massage
  - Nasal Stimulation
**Pulmonary Treatment**

- Inadequate $O_2$ Exchange
  - Supplemental Oxygen
  - Nasal Insufflation
  - 50-100 ml/kg/min Flow Rate
  - $PaO_2 > 55$ mmHg increased survival

- Hypoventilation
  - Mechanical Ventilation
  - Tracheal Intubation
  - Manual (Ambu Bag)
  - Mechanical Ventilator

**Passive Immunity**

- Colostrum
  - Produced last 4-6 weeks of gestation
  - Maternal Antibodies (IgG₁)
  - Energy Rich!

- Requirements
  - Adequate Production from Dam
  - Adequate Intake
  - Adequate Absorption

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**Adequate Colostrum Absorption**

- Within First 6 hours
- “Open Gut”
- Decreased Absorption
  - Hypoxia
  - Compromised Circulation
  - Hypothermia
  - Competing Proteins
  - Too Late

**If you don’t see the calf nurse**

- Give Colostrum
  - 10 ml/lb BW at 2 hours
  - Watch to see if the calf is up and nursing
  - If not, give another 10 ml/lb colostrum at 6 hours

- Colostrum Sources
  - Yak Colostrum
    - Milked from Dam
    - Stored (frozen) Yak colostrum
  - Beef Cow Colostrum
    - Fresh
    - Frozen
  - Commercial Colostrum Replacer
  - Avoid Dairy Cow Colostrum

**Total Protein and Disease Risk**

- Calf Blood Total Protein (TP) is an indicator of passive transfer
- Adequate $\rightarrow$ TP $> 5.5$ mg/dl
- Partial or Complete Failure $\rightarrow$ TP $< 5.0$ mg/dl

**Colostrum Storage**

- Frozen Colostrum
  - 1 Quart Ziploc Bags
  - Collect From Mature Cow
    - After vigorous calf has nursed for 2 hours
  - Clean Udder
  - Filter through gauze or cheesecloth
    - Good For 12 months

- Thawing
  - Warm Water - 110° F

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[Esophageal Tube Feeding](http://www.usyaks.org/?p=6921)
Colostral Replacers

- Calf needs ≥ 2 grams IgG per Kg BW
  - 4 grams even better
- Yak and Beef Cow colostrum contain about ~100-200 mg/ml
- Colostrum Supplements <25 mg/ml
  - Inadequate
- Colostrum Replacers 50-80 mg/ml
  - $30 to $40
- Compete with maternal IgG absorption
- Plasma or Whole Blood Transfusion

Colostrum Replacers

<table>
<thead>
<tr>
<th>Product Name</th>
<th>Immunoglobulin (grams)</th>
<th>Manufacturer</th>
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<tr>
<td>Colostrix Plus</td>
<td>55</td>
<td>AgriLabs</td>
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<td>Colostrix 130</td>
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<td>APC, Inc.</td>
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<td>Acquire</td>
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<td>Lifeline Rescue</td>
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<td>APC, Inc.</td>
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<td>Calf’s Choice Total Gold</td>
<td>60 (per bag (two bags for replacement, 1 bag for supplement)</td>
<td>ALTA Genetics USA Inc.</td>
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<td>Calf’s Choice Total HI Cal (Bronze)</td>
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<tr>
<td>Sav-A Calf Ultra Start 100</td>
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<tr>
<td>Secure IgG Colostrum Replacement</td>
<td>100</td>
<td>Land O Lakes Animal Milk Products Co.</td>
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Energy Metabolism

- Energy sources
  - Hepatic and other glycogen stores
    - Utilized within 4-6 hours
  - Brown adipose tissue
    - Utilized within 1-5 days
    - Nutrition of dam
  - Colostrum and Milk
    - Required for survival
    - 10% BW Maintenance

Hypoglycemia

- Inadequate Nursing
  - Weakness
  - Dummy
  - Maternal Factors (mothering, teats, mastitis)
- Environmental Exposure
  - Temperature
  - Wind & Moisture
  - Shelter
  - Septicemia

Thermoregulation

- Environment
  - Moisture
  - Wind
  - Temperature
- Maternal Behavior
- Energy
  - Colostrum!
- Activity

Temperature <101 °F Indicates Fetal Stress!

Hypothermia

- Body Temp < 101 °F
  - Suckle reflex?
  - Shivering?
  - <98° F is CRITICAL
- Energy
  - Colostrum!
- Warm Calf
Warming the Neonate

- Dry
- NUTRITION!
  - Warm Colostrum
- Bedding (6” minimum)
- Body Coats
- Warm Air

Calf Warming Methods

Recognize the High Risk Situation

- Any Abnormal Birth
  - Premature
  - Dystocia
  - Meconium Staining
  - Twins
  - Etc.
- Inclement Weather
- Weak Dam
- Malnourished Dam

Recognize the High Risk Calf

- Normal
  - Head Up – 15 minutes
  - Sternal – 30 minutes
  - Standing – 1 hour
  - Suckle – 1 hour
  - Nursing – 2 hour
  - Temp > 100° F
- Problems
  - Failure of Above
  - Sepsis

Proactive Intervention

- Administer Colostrum
  - Give about 10 ml per lb BW within 2 hours
  - Bottle Feed
  - Tube Feed
- Provide Warmth & Shelter for 24 Hours
- Keep Nursing
  - Needs the energy!
- Oxygen?
  - Will improve survival

Newborn Checklist

- Immediately: Clear Airway → Breathing
- 15 Minutes: Head Up
- 15 Minutes: Dip Navel
- 30 Minutes: Sternal Position
- 60 Minutes: Standing + Suckle Response
- 120 Minutes: Nursing
- 120 Minutes: Temp > 100° F

If ANY of these not met, Institute Intervention
Newborn Intervention

- Move dam and calf to warm shelter
  - 6 inches bedding
  - Dry calf
- Administer Colostrum
  - About 10 ml/lb BW
  - Nurse
  - Tube
  - If T < 100° F
  - Calf Warming Hutch
  - Calf Coat

Newborn Intervention

- If Respiration > 60 Breaths/Minute
  - Thoracic Massage
  - Prop in Sternal Position
  - Call for Veterinary Support
    - Supplemental Oxygen
- Check TP at 24-48 hr
  - Assesses Passive Transfer
- When In Doubt

CALL!

Newborn Calf Checklist

<table>
<thead>
<tr>
<th>Date</th>
<th>Dam Ch</th>
<th>Calf Ch</th>
<th>Weather</th>
<th>Stage 2 Labor Time</th>
<th>Birth Time</th>
<th>Outdoor Temp</th>
<th>Calving Score</th>
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Vital E – Newborn

- ALL Newborn Calves
  - Administer 4 ml SQ within 6 hours of birth
- Vitamin E, A, and D
- Why?
  - Vit E – Colostrum
  - Vit A – Colostrum and Milk
  - Vit D – Placenta
  - Required for proper immunity, organ function, and bone development.

Questions?