COMPREHENSIVE NEONATAL CARE

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Gestation

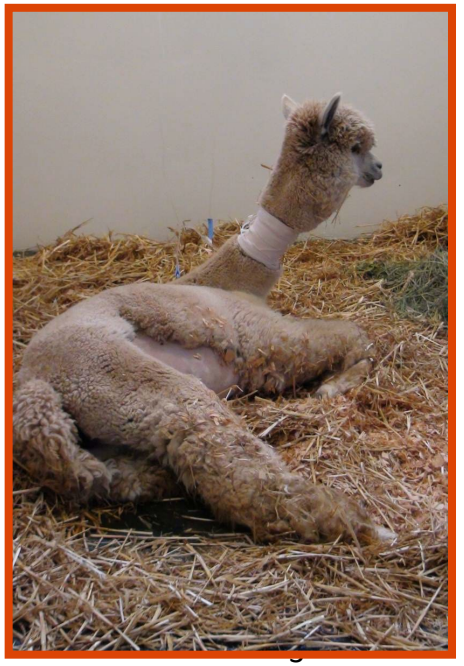
- Averages 340 days (11 m, 1 wk)
  - Range 335-360
  - Autumn conceptions shorter
  - Alpacas shorter
  - Long pregnancies often OK
    - Do not induce
- <325 days is premature
  - Dysmaturity: gestation length OK but cria under-developed
- Premature lactation is unusual
  - Inadequate lactation is not

Management of the dam

- Manage body condition throughout gestation
  - Ideally 3/5 or 6/10 at all stages
  - Keep records of score and check each month to catch concerns
- Dams are vulnerable in the final months
  - Cria weight increases 50x and is a massive energy demand
  - Dam is more vulnerable to infections and parasites
  - Late gestation diseases can be catastrophic

Management of the dam

- Minimize stress and procedures the last 60 days
  - Vaccination ideal to boost colostrum quality for specific diseases
  - *Clostridium* type C and D (pulpy kidney, diarrhea) and tetanus
  - Rabies in endemic areas
  - Deworming may be beneficial
    - Caution with albendazole
- Persistent pain in late pregnancy
  - Check for uterine torsion



Parturition

- Hard to predict
  - Breeding dates helpful
  - Gestation often consistent length each breeding
  - Usually have daylight births
  - Can delay if stressed
- Watch for subtle signs to indicate onset of phase 1 labor
  - Restless
  - Vocalizing
  - Repeat visits to the dung pile
  - Lasts 1 to 6 hours

Parturition

- Phase 2: active delivery
  - Usually deliver cria in 20 min
  - Can be up to 60 min in first time dams
  - Examine the dam if >15 min of active straining without progress
- Often deliver standing
  - Cria nose first and head on top of front limbs
  - Backwards can be normal, but may result in challenges

Parturition

- Phase 3: Placental delivery
  - Should occur in 2-6 hours but often before cria stands
- Placental retention
  - 5–10 IU oxytocin
    - Caution not to over-treat
  - Can add prostaglandin

Placenta

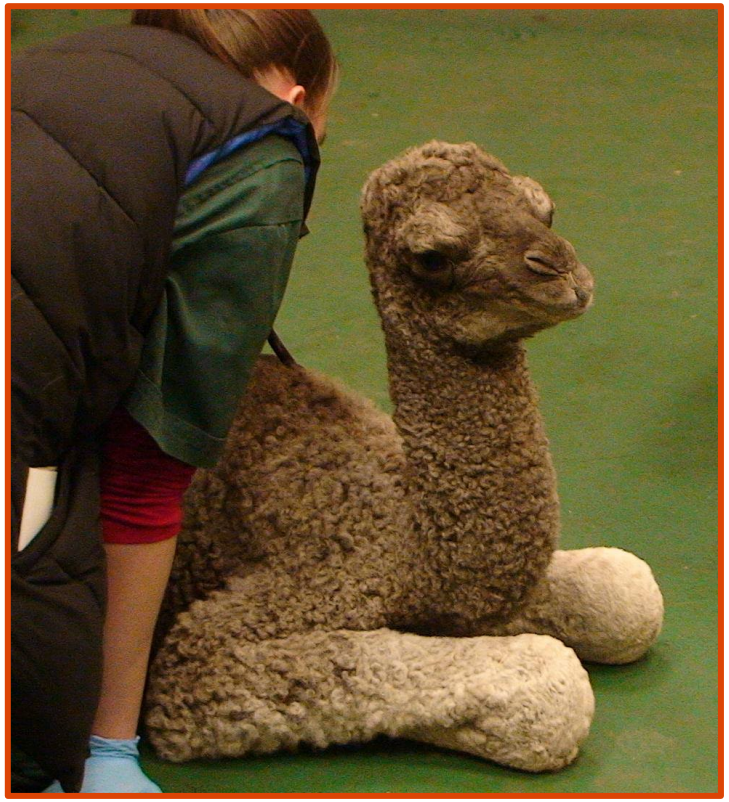
- <10-15% of cria weight
- Not thick, edematous, discolored
- 95-98% of pregnancies L horn
- Extra fetal membrane
  - Attaches at mucocutaneous junctions, coronets, umbilicus
  - Can be thick/persistent in prematurity

The healthy cria

- Temperature reflects dam's at birth
  - 100-102°F, subsequently up to 102.5°F (37.2 – 39.1°C)
- Heart rate: 60-100 beats/min
  - Usually 80 or above
  - Usually regular
- Respirations:
  - 10 to 30 breaths/min
  - May be higher first hour
  - Air flow through both nostrils
  - Primarily nasal breathing

The healthy cria

- Attempts to sit/kush by 5-15 min
- Attempts to stand by 30 min
- Walking and udder seeking in 1-2 hours
  - Ideally nursing by 2 hours
    - By 4 hours acceptable if no other concerns
  - More frequent nursing (1-4 times/h) in daylight
  - Short wandering nursing pattern normal
    - Should act sated, sleep after nursing
- Bright, responsive, not excessively sleeping



The healthy cria

- Urinates frequently
  - Prolonged posturing may occur for several days
  - Check no urine from umbilicus
    - ‘Patent urachus’
- Meconium:
  - Passed at 18 to 24 h
  - Warm soapy enema with a flexible small diameter catheter if straining is observed
    - Avoid repetition

Routine care

- Minimize unnecessary handling
  - Especially first-time dams
- Establish birthweight
  - Llama: 9-18 kg reported (20-40 lb)
  - Alpaca: 5.5-11 kg reported (12-24 lb)
  - Important for monitoring growth and for early detection of problems
- Umbilical dip
  - Chlorhexidine 1:3 ratio or 0.5% – residual action
  - 1 to 3% iodine – drying action

Routine care

- Selenium in deficient regions
  - Prevents white muscle disease (nutritional myodegeneration)
  - CAUTION not to overdose – sudden death
  - 0.05 mg/kg (0.025 mg/lb)
- Vitamin D
  - 1500-2000 IU/kg
  - Particularly dark-coated Autumn-born crias
    - ‘Glass cria’ – handle with care!
  - Overdose can be fatal
    - Single large, or moderate repeated doses
    - Kidney failure and other issues, hard to treat

Routine care

- Colostrum: what is minimally ideal?
  - >5% of bodyweight first 6 hours
  - >10% first 12 hours (1000 mls/10 kg cria)
  - 20% by 24 hours
- Needs to be good quality
  - Thick, sticky, yellow
  - Brix refractometer – 32% reflects typical alpaca colostrum quality

Preventing failure of passive transfer (low IgG)

- Observe nursing behavior
  - This may not be adequate for 1st time dams
  - Or any reason for poor colostrum quality or amount
- Intervene if cria has not nursed by 4h
  - Absorb globulins for 16-24 h but this varies
    - ~10% of crias have colostrum failure
  - 1 to 2 hourly feedings by bottle (preferred) offering 60 to 90 mls or more
  - Larger volumes often given by tube (up to 3.5% bodyweight first meal)
  - Ingestion starts a process of gut closure

Preventing failure of passive transfer (low IgG)

- Colostrum gives immunoglobulin G, but also IgA, IgM and white blood cells important to immune development
- Consuming at 2 and 4 h provides greater serum IgG than at 6 and 8 h
- Alternatives if camelid colostrum not available:
  - Goat colostrum
  - Cow colostrum: similar fat and protein
  - Sheep colostrum: high in fat
  - Choose Johne's free properties

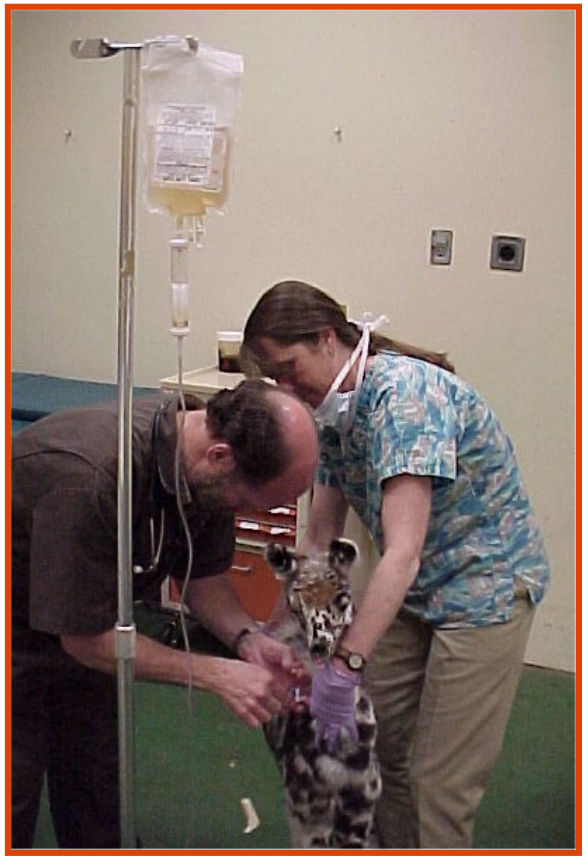
Determining success of transfer

- Indications for measuring IgG if not routinely performed:
  - Maiden dam or compromised dam
  - Previous history of failure of passive transfer from dam
  - High value bloodline
  - Crias leaving the farm
  - Insurance purposes
  - Concern regarding nursing success

Determining transfer

- Specific methods
  - Sodium sulfite Ig precipitation (llama S) – immediate but semi-quantitative
  - Radial immunodiffusion – accurate but takes 24 hours for results
  - Lateral flow reading (TargetVet) – stall side 10 mins
- Nonspecific methods
  - Measure serum or plasma total protein
  - <4.5 mg/dl - probable failure
  - 4.5-5.5 mg/dl - equivocal
  - >5.5 mg/dl - probably adequate

Addressing FPT



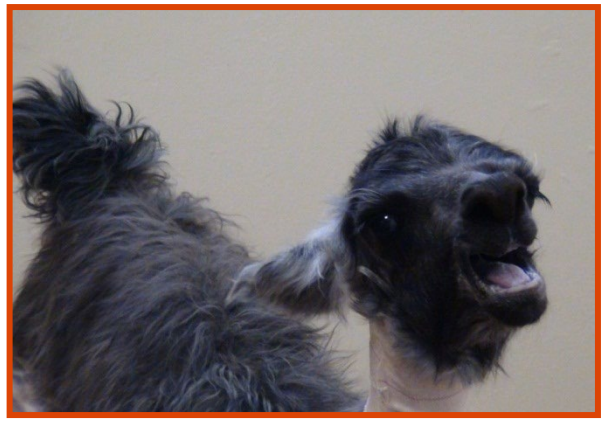
- > 16h of age: camelid plasma
  - Intravenous (at 2-4% bodyweight)
  - Intra-abdominal
    - Absorption equivalent to IV
    - Warm, give over 5-10 min
    - Mild colic common
- Whole blood: 500 cc over 2-3 h
- Plasma and blood can also be given by tube, but the cria has to be young enough to absorb and this is less effective

High risk neonates

- Born after uterine torsion correction
- Premature (especially 2 weeks or more)
- Low birth weight
- Difficult birth
- Excessive umbilical hemorrhage
- Congenital defects impeding birth, respiration, movement or cardiac function

Unhealthy neonates

- Not breathing
  - Clear nostrils and mouth
  - Mouth-to-nostril with small breaths
  - Pressure on the center of the nose
  - Vigorous rubbing
  - Emergency help from vet
    - Masking or intubation of the airway
    - Oxygen
    - Emergency drugs

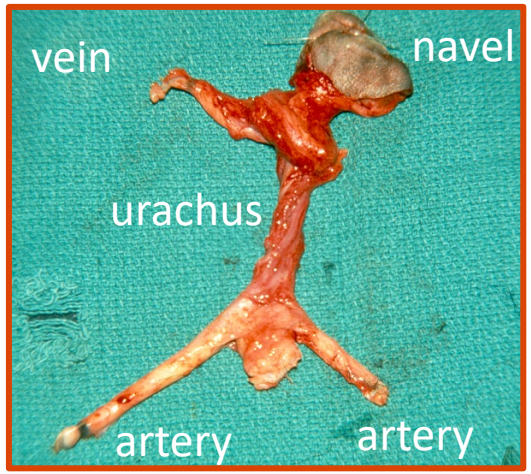


Premature neonates

- < 325d if breeding date known
  - Dysmaturity also occurs
  - Crias more than 2 weeks early often have respiratory challenges
- Signs of prematurity/dysmaturity:
  - Floppy or tipped ears, silky coat
  - < 4 erupted incisors (6 full term)
  - Low birth weight
  - Weakness, extended fetlocks
  - Persistent epidermal membrane and toenail coverings
- These crias may not absorb colostrum well

Umbilical problems

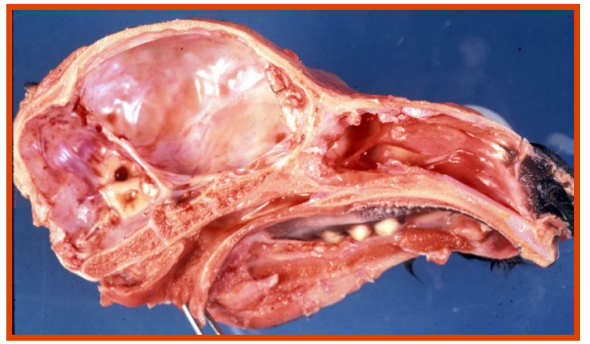
- Normally ruptures several inches from body
  - Ligate several inches from body wall for no more than an hour
  - Monitor for signs of internal hemorrhage
    - Progressing weakness, high heart rate
  - Ultrasound is necessary if internal examination of the umbilicus required
- Umbilical hernias
  - Often not visible, but palpable defect in body wall at navel
  - 2 fingers or less – should resolve in 4 weeks
    - Gentle daily reduction
    - Get help if they become larger, hot, firm
  - Inguinal hernias – more challenging - bandaging



Congenital defects

- Musculoskeletal
  - Limb anomalies – fused toes, extra digits, bone deformities
  - Tail defects – kinked or misshapen
  - Spinal malformations
- Eyes
  - Cataracts and malformations
- Other
  - Imperforate anus or parts of the colon
  - Hypoplastic vulva (can impede urination)

Facial defects

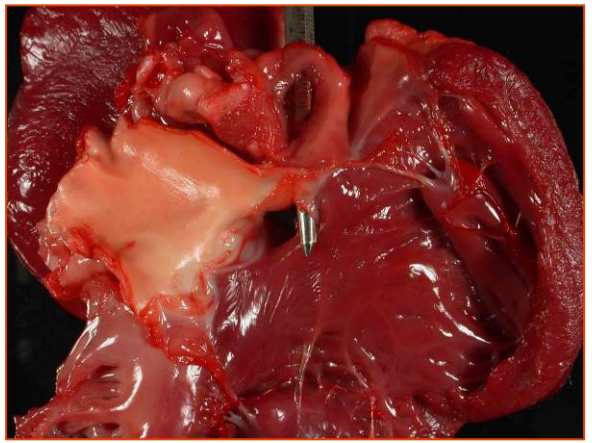


- Choanal atresia
  - Abnormal bone or tissue blocks nasal cavity at level of eye
  - One or both sides, partial or complete barrier
  - Other facial deformities can be present
    - Short nasal bones
    - Narrow nasal cavities
  - Respiratory difficulty unless subclinical
    - Asphyxiation, starvation, aspiration, sepsis
  - X-ray, scope, CT scan
- Wry face
- Cleft palate

Video courtesy of Dr. Cebra

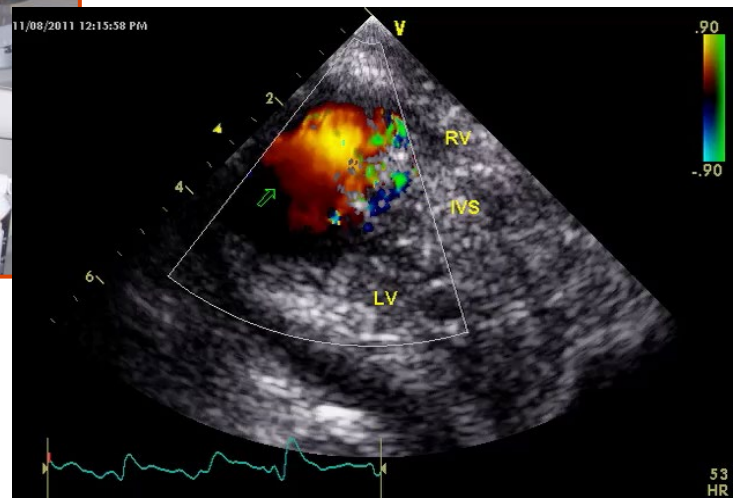
Heart defects

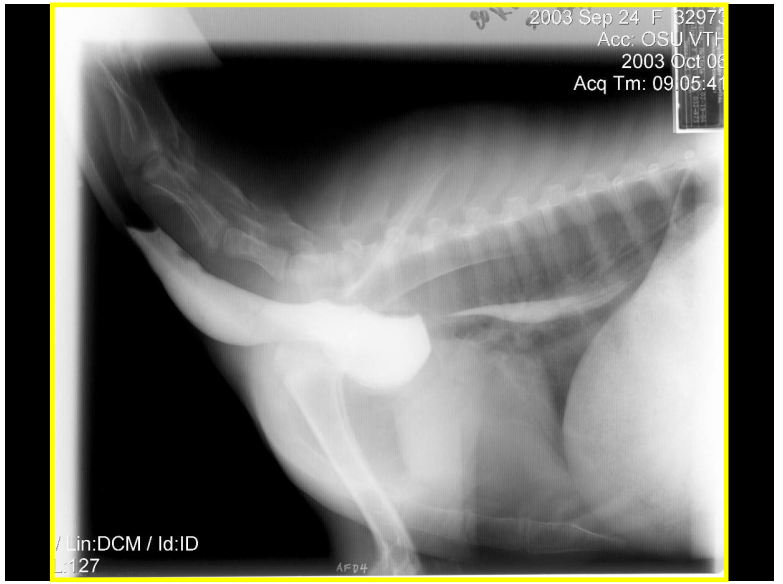
- Continuous murmur of fetal circulation resolves first week
- Innocent murmurs can be 8-12 wks
  - Usually low grade (1-3 of 6)
  - Decrease loudness with age
- Loud or R side murmurs concerning
- Weak crias that drop head
- Crias not holding temperature
- Crias with high respiratory rate or open mouth breathing



Heart defects

- Simple to complicated defects
- Often well-tolerated
  - Crias have super hemoglobin
- VSD – hole between ventricles
- PDA – fetal connection remains open between main vessels
- Vascular ring – trapped esophagus
  - Aspiration, choke
- Also have complex disorders with a range of presentations





Lactation failure

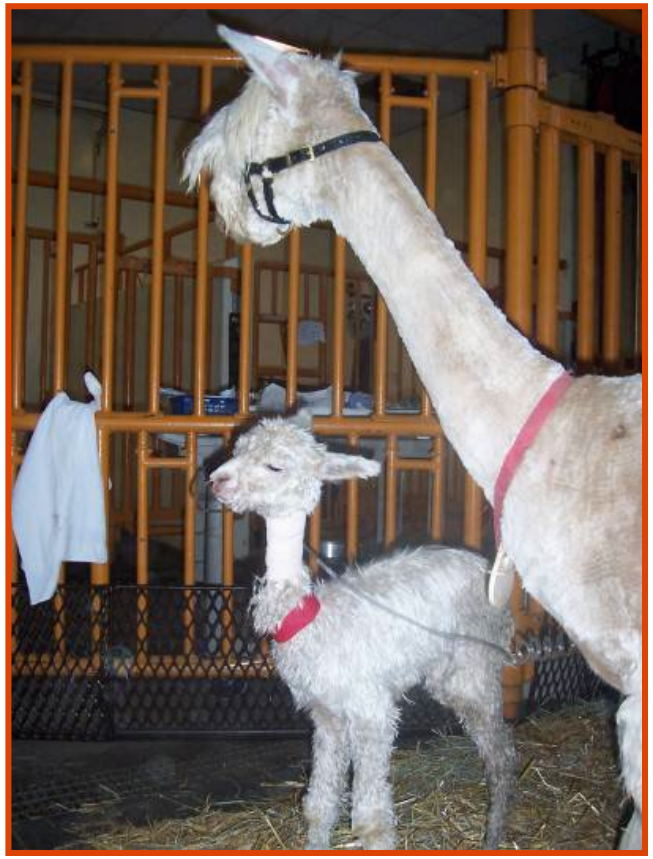
- Hard to identify
  - Common if 1st cria or premature birth
  - Can try domperiodine gel
- Successful nursing:
  - Milk around mouth
  - Sleeping after nursing
  - Appropriate frequency (1-2 times/h)
  - Adequate weight gain commencing after 48 hours – weigh daily
    - Llama: 0.5-1.0 lb/day
    - Alpaca: 0.25-0.5 lb/day
  - Failure to gain and especially weight loss after 36 hours is concerning

Inadequate nutrition

- Signs:
  - Weakness
  - Frequent nursing
  - Attempting to nurse other dams
  - Nibbling forage or dam's fiber
    - Can lead to enlarged abdomen, impaction
  - Drinking water excessively
  - Inadequate weight gain
- Supplementation:
  - Consider if no weight gain by day 3 to 4
  - If there is weight loss on day 2 to 3 and lethargy

Feeding crias

- 10-12% bwt in milk/day minimum
  - No more than 3.5% per feeding
  - Sick crias may have higher requirements
- Goat or cow milk
- Goat milk replacer (non-medicated)
- Supplemental feed to ≥ 2 months
  - Creep feed from one week



Feeding crias

- Bottle:
  - Encourages closure of esophageal groove so milk passes C1
  - Use a small nipple with a crosscut
  - Feed as much as the cria wants
  - Care after day 1 to avoid imprinting
    - Train to bowl as soon as possible, or place back with herd immediately after feeding
  - Tube feed if minimum requirements are not achieved or aspiration
    - Listen after feeding for rattle in trachea or feel chest with hand
    - Coughing, sneezing, milk out of nostrils when head down

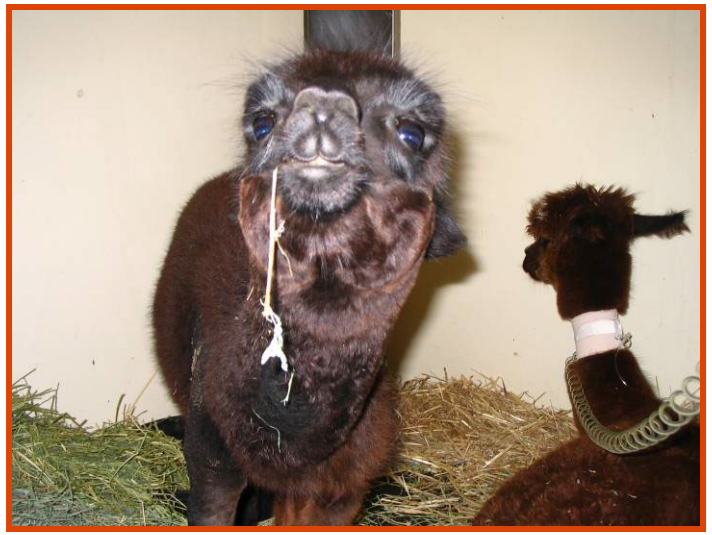
Tubing crias

- Can feed up to 3.5% bodyweight at once, but this can lead to compartment acidosis
  - Milk fermenting in C1, instead of starting digestion in C3
  - Can tube 3 to 4 times/day but can be irritating
- Ensure cria is warm enough (≥ 98°F)
- Restrain and pass soft tube through mouth
  - Gently pinch near bottom of neck to feel tube go by
  - Gravity feed
  - Do not microwave colostrum (warm water)

When to get help

- Significantly reduced nursing
  - Dehydration, fat mobilization occur which can damage kidneys and liver
- Weak, not thermoregulating well, or open mouth breathing
  - Sepsis, cardiac defects, pneumonia etc
- Congenital defects suspected
  - Often require diagnostics to fully characterize
  - Often more than one is present
- Known or suspected FPT
  - Big contributor to cria mortality
  - Less expensive to treat early (plasma) than late

When to get help



- Overdoses
  - Vitamin D
  - Ivermectin
  - Albendazole
  - Oxytetracycline
  - Non-steroidal drugs
- Antibiotics and corticosteroids can create substantial side effects
  - Helpful to work with veterinarians experienced in camelids

Cria diarrhea

- Can be mild and self-limiting
  - Small amount bismuth paste or kaopectate helps
  - Lactase for crias on cow milk
- When to get help
  - Multiple affected or mixed age ranges
  - Watery, bloody, high volume or persistent diarrhea
- Isolate affected crias
  - Use good hygiene
  - Watch late-season crias carefully - exposed to disease from older crias
  - Fecal testing helps diagnosis and therefore appropriate management
  - Crias can decline quickly – dehydration and systemic problems

Herd health

- Good herd health management enhances cria survival
  - Regular condition scoring
  - Good pasture/parasite management
  - Good biosecurity
  - Vaccine protocols
  - Supplementation protocols
- Pay offs
  - Reduced parasitism
  - Higher birth weights
  - Superior colostrum
  - Reduced disease and mortality

Questions?

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