**Classic case:** Adult dairy cows, weight loss, ↓ milk, poor appetite, +/- external masses, BLV+

**PRESENTATION:** 2 syndromes – Sporadic and Enzootic

1. **SPORADIC** leukosis / lymphosarcoma – Bovine leukemia virus (BLV) negative; 3 kinds; RARE

   - **Juvenile**
     - Calves < 6 mos
     - Dairy > Beef
     - Generalized lymphadenopathy
     - Primarily B cells
     - Death w/in 2-8 wks

   - **Thymic**
     - Calves 6 mo – 2 yr
     - Beef > Dairy
     - Thymus hugely enlarged
     - Swelling in neck → bloat, edema
     - Often febrile – confuses Dx
     - Primarily T cells
     - Death w/in 2-10 wks

   Really rare - calf born with LS

2. **ENZOOTIC** leukosis / lymphosarcoma – all are (BLV) positive due to BLV infection

   - **ADULT** cattle > 2 yrs; Dairy >> Beef
   - BLV infection NOT uncommon (US/Canada)
   - Some herds-very high prevalence

   MOST subclinical; < 5% develop illness or tumors

4 scenarios in adults:
- No infection – genetic resistance
- Infection + positive Ab titer + no signs (carriers)
- Infection + benign persistent lymphocytosis (PL)
  - PL = high LC count 3 mo or more
  - B lymphocytes affected; leukemia uncommon
- **Multicentric lymphosarcoma (LS) +/- PL**

Sheep very susceptible to BLV infection
- LS induced experimentally wth BLV
- Outbreaks of LS seen in sheep exposed to BLV, eg *Anaplasma* vax

   - **Clinical signs, lymphosarcoma** – often vague at first
     - Weight loss, ↓ appetite, ↓ production, NO fever
     - Enlarged lymph nodes, internal and external
     - see peripheral LNs ↑ in 75-90% cases
     - Occasionally sudden death – splenic rupture, etc
     - Other signs - relative to affected areas
       - Heart - arrhythmia, murmur, PC effusion, failure
       - Retrobulbar – exophthalmus, blindness
       - Epidural space/spinal cord – paresis, paralysis
       - Abomasum – indigestion, ulcers, peritonitis
       - Uterus – palpable masses
       - Spleen – intra-abdominal hemorrhage
       - Kidney – hematuria, hydronephrosis, azotemia
       - Retropharyngeal, pharyngeal LNs - dyspnea
       - Pharyngeal, mediastinal LNs – bloat

   - Survival short once C/S apparent – weeks, months

   - Genetic predisposition in some breeds

**8 yr old Holstein cow with lymphosarcoma; Note large prefemoral LN (arrows) and exophthalmos.**
Differential Dx:

Diseases with internal masses
- Neoplasia – carcinoma, melanoma
- Abscess
- Fat necrosis

Diseases with external masses
- *Corynebacterium pseudo*TB – rare in cattle
- Tuberculosis – *Mycobacterium bovis* or *M. avium*
  - rare in US; more common in other countries

Test(s) of choice:

Obvious masses/enlarged LN -
- Cytology of tissue aspirate
- Histopathology of biopsies
- Cytology of effusion - Suspect abdominal or thoracic LS

Serologic tests – not diagnostic for LS, just BLV infection
- Screening of herds and groups within herds; control programs

- **AGID**
  - Very good sensitivity/specificity
  - First test used; not positive till 3-12 wks of age
  - False negatives
    - Abs low in periparturient BLV+ dams - lost to colostrum
    - False positives
    - Passive Ab in calves 6 mo. age

- **ELISA**
  - Very good sensitivity/good specificity
  - Can ID infection in herds with low prevalence
  - **Has replaced AGID in most labs**
  - ID infected herds - pooled serum/milk samples, bulk tank milk

Rx of Choice:

**No treatment for BLV; cull/slaughter in most cases**

Occasionally, valuable genetics – palliative Tx till parturition, embryo collection
- Non-abortifacient steroids, eg, prednisone
- Chemotherapeutic agents - NO slaughter
- Calves often born dysmature and may be BLV+
Prognosis:
Grave in all cases except those with cutaneous tumors that resolve spontaneously

Prevention:
Control programs in Europe and Scandinavia - effective as prevalence is low
US/Canada – prevalence quite high - control programs can be costly
Voluntary programs in US/Canada have decreased prevalence

Guidelines:
- **ID infected cows/calves** and remove
- Separate positive and negative cows
- Use **colostrum from BLV-negative cows only**
- **Feed calves pasteurized milk or milk replacer**; never use bloody milk
- Use separate calving pens for BLV + cows, etc.
- Use only BLV- bulls
- Diligent insect control
- Disinfect all common equipment;
- Use new needles, sleeves, etc
Pearls: BLV is a retrovirus; infection is permanent; virus reside/hides in lymphocyte DNA
Outbreaks of LS are seen - high prevalence herds, BLV-negative herds after new additions

Cardiac form – see tumors in the right atrium most often

Transmission:
- Horizontal most often – must pass infected lymphocytes
  - Common needles, tattoo pliers, dehorners, rectal sleeves, INSECTS
- Vertical occasionally - < 10%,
  - Usually after birth, exposure to blood or infected colostrums/milk with open gut
  - Occasionally in utero – 4-8% of BLV+ cows have infected calves

BLV+ cows cannot be exported

Studies show BLV+ cows without signs of lymphosarcoma do not stay in herd as long as BLV-negative cows Cause unknown

Lymphoma=any neoplastic disorder of lymphoid tissue

Lymphosarcoma=general term for malignant neoplastic disorders of lymphoid tissue

Leukosis= proliferation of leukocyte-forming tissue; the basis of leukemia.

Leukemia= malignant disease of the blood-forming organs, marked by distorted proliferation and development of leukocytes and their precursors in the blood and bone marrow


My Notes: