**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
   
   - **Cutaneous**
     - 1-3 yr. cattle - rare
     - Raised nodules/plaques in skin
     - Primarily T cells
     - May regress spontaneously
     - If relapse - fatal

   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 with 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

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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 pseudoTB* – 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.

Cow, ocular lymphosarcoma
Lymphosarcoma, submandibular lymphadenopathy
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

Images worth a look
NY State Cattle Health program brochure (Cornell Univ) - good discussion of control programs for farms;
Cytology of Bovine LS for more good images
More images at Skin lesions with BLV.


My Notes: