

Bovine Leukosis (BLV)

Extended Version

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

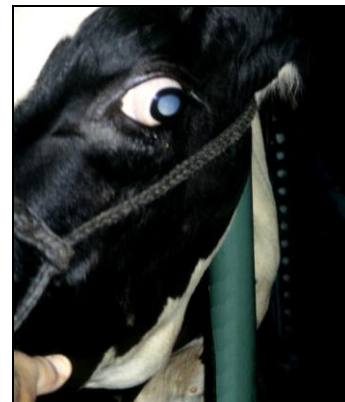
PRESENTATION: 2 syndromes – Sporadic and Enzootic

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

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| <ul style="list-style-type: none"> • Juvenile <ul style="list-style-type: none"> ▪ Calves < 6 mos ▪ Dairy > Beef ▪ Generalized lymphadenopathy • Primarily B cells • Death w/ in 2-8 wks | <ul style="list-style-type: none"> • Thymic <ul style="list-style-type: none"> ▪ 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 | <ul style="list-style-type: none"> • Cutaneous <ul style="list-style-type: none"> ▪ 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

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| <ul style="list-style-type: none"> • ADULT cattle > 2 yrs; Dairy >> Beef • BLV infection NOT uncommon (US/Canada) • Some herds-very high prevalence • MOST subclinical; < 5% develop illness or tumors <p>4 scenarios in adults:</p> <ul style="list-style-type: none"> • No infection – genetic resistance • Infection + positive Ab titer + no signs (carriers) • Infection + benign persistent lymphocytosis (PL) <ul style="list-style-type: none"> ♦ PL = high LC count 3 mo or more ♦ B lymphocytes affected; leukemia uncommon • Multicentric lymphosarcoma (LS) +/- PL <p>Sheep very susceptible to BLV infection</p> <ul style="list-style-type: none"> • LS induced experimentally with BLV • Outbreaks of LS seen in sheep exposed to BLV, eg <i>Anaplasma vax</i> | <ul style="list-style-type: none"> • Clinical signs, lymphosarcoma – often vague at first <ul style="list-style-type: none"> ▪ Weight loss, ↓ appetite, ↓ production, NO fever ▪ Enlarged lymph nodes, internal and external <ul style="list-style-type: none"> ♦ see peripheral LNs ↑ in 75-90% cases ▪ Occasionally sudden death – splenic rupture, etc ▪ Other signs - relative to affected areas <ul style="list-style-type: none"> ♦ Heart - arrhythmia, murmur, PC effusion, failure ♦ Retrobulbar – exophthalmos, 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.

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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:

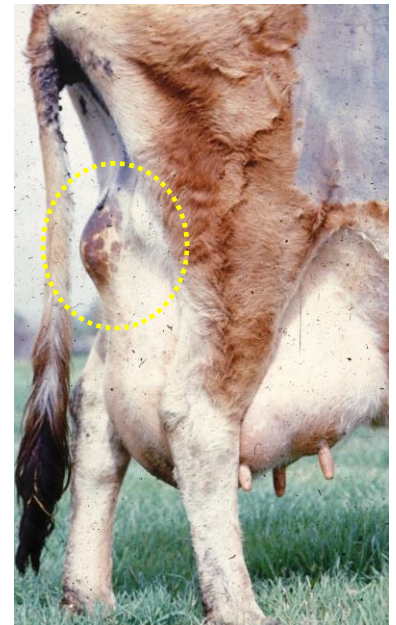
No treatment for BLV; cull/slaughter in most cases

Occasionally, valuable genetics – palliative Tx till parturition, embryo collection

- Non-abortionifacient steroids, eg, prednisone
- Chemotherapeutic agents - NO slaughter
- Calves often born dysmature **and** may be BLV+



Down sheep with lymphosarcoma of lumbar spinal cord



Lymphosarcoma, udder lymphadenopathy

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Prognosis:

Grave in all cases except those with cutaneous tumors that resolve spontaneously

Prevention:

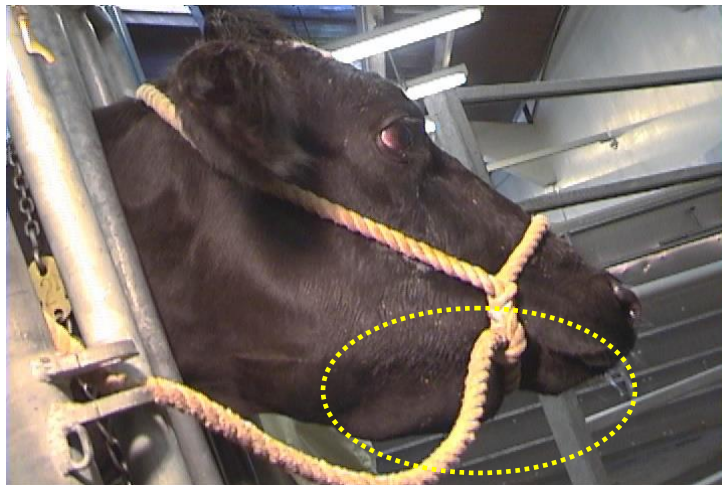
Control programs in Europe and Scandinavia - effective as prevalence is low
US/Canada – prevalence quite high - control programs can be costly
Voluntary programs in US/Canada have decreased prevalence

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

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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



Epidural lymphosarcoma

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](#).

References: Pasquini, Guide to Bovine Clinics 4th, pg 268-9, Divers and Peek, Rebhun's Diseases of Dairy Cattle, 2nd ed., pp. 624-33, and the [Merck Veterinary Manual](#). Images courtesy Drs. Erwin Pearson, Jennifer Adams and Lisle George

My Notes: