BJVP
Brazilian Journal of Veterinary Pathology
ISSN 1983-0246

Case Report

Sporadic multicentric lymphoma in a Nelore calf

Alexandre O. Bezerra, Stephanie C. Lima, Marcelo A. Araújo, Valdemir A. Oliveira, Larissa G. Ávila, Claudio S. L. Barros[4*]

Program Large Animal Veterinary Medicine and Surgery, Faculty of Veterinary Medicine and Animal Husbandry (FAMEZ), Universidade Federal de Mato Grosso do Sul (UFMS), Campo Grande, MS, Brazil.
***Corresponding author:** Faculty of Veterinary Medicine and Animal Husbandry (FAMEZ), Universidade Federal de Mato Grosso do Sul (UFMS), Av. Senador Filinto Müller 2443, Campo Grande, MS 79074-460, Brazil. E-mail: claudioslbarros@uol.com.br

Submitted February 19th 2015, Accepted June 23th 2015

Abstract

A case of sporadic multicentric lymphoma in a Nelore calf is reported. Anatomic presentation, age of affected animal, and cytology done on fine needle aspiration biopsy from lymph node supported a presumptive clinical diagnosis. At necropsy there were multiple cream or white soft to firm masses of varying sizes, affecting lymph nodes, kidneys, myocardium, liver, retrobulbar tissues, lymph nodes, bone marrow, spleen, and dura mater; with a mitotic index of 90%. A tentative classification of the neoplasm as lymphoblastic lymphoma was made based on immunohistochemistry.

Key words: diseases of cattle, hematopoietic system, neoplasia, sporadic lymphoma, tumors of calves.

Introduction

Lymphoma (bovine lymphoma, bovine lymphosarcoma, bovine leukosis) is the most common cause of neoplasia affecting cattle (4). Bovine leukosis has been classified as either enzootic bovine leukosis (EBL) or sporadic bovine leukosis - SBL - (Table 1) (1-5, 8). EBL is an infectious disease with a worldwide distribution and a long incubation period (1). Usually occurs in cattle over three years of age and most affected cattle are 5-8 yeas (7); it affects several animals in an individual herd. The infection by a transforming retrovirus, bovine leukemia virus (BLV), is associated with the condition (1) and antibodies against this specific virus can be detected in the serum of affected cattle (10).

The etiology of SBL is unknown. It occurs in young cattle usually under one year of age. It is non contagious, non-transmissible and usually occurs as a single case in a herd. Although occasional reports suggest that some sort of virus can be the cause of SBL, viral etiology was never confirmed (3, 5, 8). Three forms of SBL have been described (Table 1): (a) A juvenile multicentric form with generalized lymphadenopathy and involvement of several organs occurs in 5-6-month-old calves; (b) An adolescent-thymic form is observed in 1-2-year old calves; and (c) a cutaneous form affects adult cattle of all ages (mainly ≅ 2 years of age) with localized skin lesions and occasional generalized lymphadenopathy (1). The juvenile and thymic forms usually cause death within four to six weeks of the first clinical signs. Regression of the tumors sometimes has been reported for the cutaneous form (2).

Case report

A 4-month-old calf developed apathy and bilateral exophthalmos, which was more severe in the right eye (Fig. 1). The calf was presented to the Veterinary Hospital of the FAMEZ/UFSM on January 9, 2014. It was the only bovine affected in a herd of 200 Nelore cattle in a farm in the municipality of Campo Grande (20º26'34" South and 54°38'47" West) in the state of Mato Grosso do Sul. At the physical exam, a body condition score of 3 (9) was attributed to the calf. Pallid mucous membranes, sternal

 All rights reserved 2007.

Table 1. Classification of bovine leucosis.

Anatomical distribution	Category of affected cattle	Epidemiology	BLV*
Multicentric	Adult	Enzootic	+
Multicentric	Juvenile 6-5y.o.	Sporadic	-
Cutaneous	Adult	Sporadic	-
Thymic	Adolescent (1-2 y.o.)**	Sporadic	-

***BLV = Bovine leukemia virus; **y.-o. = year-old**

recumbency, absence of ruminal movements, and lymphadenomegaly were observed. The right ocular globe was perforated and there was myiasis in the third eyelid. Complete blood cell count performed at two occasions 10 days apart from each other revealed normochromic normocytic anemia and thrombocytopenia. Cytology done on sample collect by fine needle aspiration biopsy of an affected lymph node revealed medium and large lymphocytes with prominent nucleoli and frequent mitosis. The serum was tested for BLV antibodies by an agar gel immunodiffusion commercial kit (Tecpar, Curitiba, PR, Brazil) using a procedure recommended by the OIE Terrestrial Manual 2012, chapter 2.4.1.1 (enzootic bovine leukosis). The test resulted negative. The calf was humanely euthanatized due to poor prognosis.



Figure 1. Nelore calf. Sporadic multicentric lymphoma. Tumor in the retrobulbar tissues produces exophthalmos.

At necropsy neoplasm consisted of cream or white soft to firm multicentric masses of varying sizes. The larger one was located in the thoracic inlet (Fig. 2) affecting the thoracic lymph nodes which coalesce in a large (15 cm in diameter) whitish homogenously mass (Fig. 3). Other anatomical sites involved were the kidneys (Fig. 4), myocardium, liver, retrobulbar tissues, lymph nodes, bone marrow, spleen and dura mater. The dura-mater at the tentorium cerebelli was thickened by tumor cell infiltration (Fig. 5). Bone marrow was obliterated by neoplastic growths similar to the ones previously described.

Microscopically the tumor cells were neoplastic lymphocytes distributed in sheets obliterating partially or completely the architecture of the organ (Fig. 6). The phenotype of tumor cells was the same in all anatomic sites. Immunohistochemistry tests were positive for Tdt and the proliferation index of the tumor was 90% as measured by ki-67 (MIB1 clone). The positivity for Tdt raises the possibility of this tumor being the equivalent of lymphoblastic lymphoma of human beings.

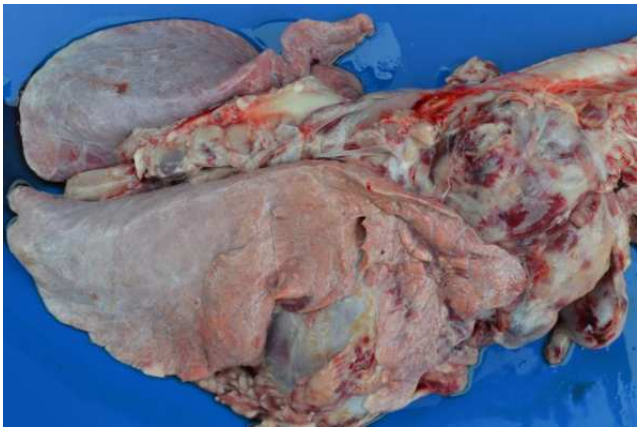


Figure 2. Nelore calf. Sporadic multicentric lymphoma. A large tumor is present in the thoracic inlet.

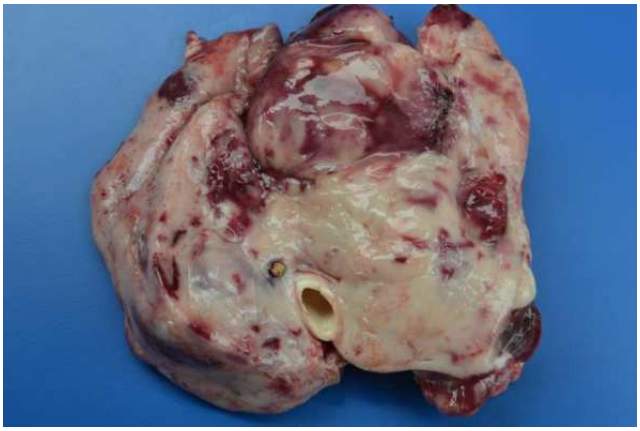


Figure 3. Nelore calf. Cut surface of the mass in Fig. 2. Note the homogenous cream whitish neoplastic tissue. Sections of arteries of the base of the heart can be seen embedded in the neoplasm.

The diagnosis of SBL in this case was base in the multicentric distribution of the lesions and on the age of the calf. The absence of antibodies for BLV is a clear evidence that the tumor should not be include in the enzootic infectious transmissible form. Although the distribution of tumors in SBL is somewhat similar to that in multicentric form of the adult EBL, some morphological

 All rights reserved 2007.

FINAL



Figure 4. Nelore calf. Kidney. Sporadic multicentric lymphoma. Notice round prominent whit neoplastic foci in both kidneys.

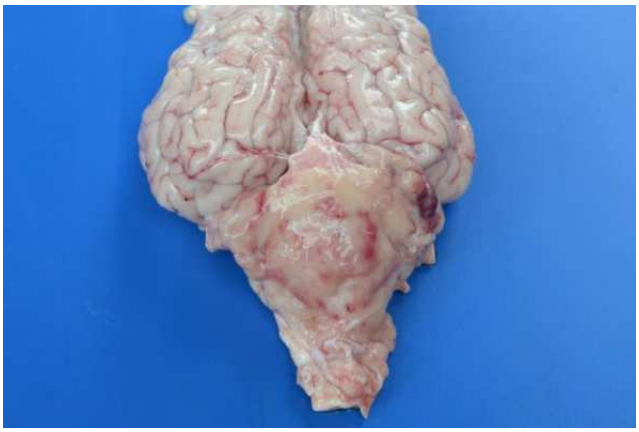


Figure 5. Nelore calf. Cerebellum. Sporadic multicentric lymphoma. The dura-mater at the tentorium cerebelli thickened by tumor infiltration.

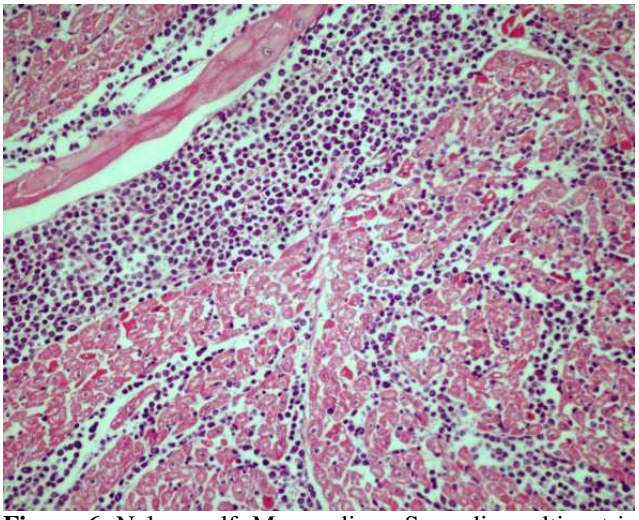


Figure 6. Nelore calf. Myocardium. Sporadic multicentric lymphoma. Microscopically the tumor consisted of neoplastic lymphocytes distributed in sheets and obliterating partially or completely the architecture of the organ. HE. 40x.

differences exist: In SBL there is a preference for tumors to affect hematopoietic organs as the bone marrow and spleen as was the case of the calf from this report. It is possible that the bone marrow obliteration by the tumor was the cause for the myelophtisis anemia and thrombocytopenia. Myelophthisis refers to the displacement of hemopoietic bone-marrow tissue either by fibrosis, tumor or granulomas (10).

References

1. BARROS CSL. Leucose bovina. RIET-CORREA F., SCHILD AL., LEMOS RAA., BORGES JRJ. (Eds.) **Doenças de Ruminantes e Equídeos**. 3. ed., vol. 1. Santa Maria, Pallotti 2007:159-169.
2. BUNDZA A., GREIG AS., CHANDER S., DUKES TW. Sporadic bovine leukosis: A description of eight calves received at Animal Diseases Research Institute from 1974-1980. **Can. Vet. J.**, 1980, 21, 280-283.
3. BURNY AF., BEX H., CHANTRENNE H., CLEUTER Y., DEKEGEL D., GHYSDAEL J., KETTMANN R., LeCLERCQ M., LEUNEN J., MAMMERICKX M., PORTETELLE, D. Bovine leukemia virus involvement in enzootic bovine leukosis. **Adv. Cancer Res.**, 1978, 28, 251-311.
4. BURTON AJ., NYDAM DV., LONG ED., DIVERS TJ. Signalment and clinical complaints initiating hospital admission, methods of diagnosis, and pathological findings associated with bovine lymphosarcoma (112 Cases). **J. Vet. Intern. Med.**, 2010, 24, 960-964.
5. GENTILE G., SCHIAVO A. Sporadic or enzootic leukosis in Italy? Data on experimental transmission. **Vet. Microbiol.**, 1976, 1, 337-345.
6. MARSHAK RR., HARE WCD., DUTCHER RM., SCHWARTZMAN RM., SWITZER JW., HUBBEN K. Observations on a heifer with cutaneous lymphosarcoma. **Cancer**, 1966, 19, 724-734.
7. PANZIERA W., BIACHI RM., GALIZA GJN., PEREIRA PR., MAZARO RD., BARROS CSL., KOMMERS GD., IRIGOYEN LF., FIGHERA RA. Aspectos epidemiológicos, clínicos e anatomopatológicos do linfoma em bovinos: 128 casos (1965-2013). **Pesq. Vet. Bras.**, 2014, 34, 856-884.
8. RESSANG AA. Preliminary communication on results on juvenile bovine leukaemia. **Vet. Microbiol.**, 1976, 393-396.
9. STÖBER M. Identificação, Anamnese, Regras Básica da Técnica de Exame Clínico Geral. DIRKESEN G., GÜNDNER HD., STÖBER M. (Eds) **Rosenberger Exame Clínico dos Bovinos**. Guanabara-Koogan, Rio de Janeiro, 1993:44-80.
10. VALLI VEO. Lymphoid neoplasms. MAXIE MG. (Ed.) **Jubb, Kennedy, and Palmer's Pathology of Domestic Animals**. 5 ed., vol. 3. Saunders Elsiever, St. Louis 2007:151-210.

 All rights reserved 2007.