

Acute Tumour Lysis Syndrome associated with mediastinal lymphoma in a dog

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Abstract

An eleven-year-old non-descript female dog weighing about 27 kg presented to small animal clinical complex was diagnosed with lymphoma (Stage IV) based on the clinical signs, serum biochemistry, radiography, ultrasonographical examination and histopathological examination of FNAC sample taken from superficial lymph nodes. The University of Wisconsin -Madison Lymphoma CHOP-19 protocol was initiated on day one with vincristine and prednisolone acetate. On day three dog was presented with signs of dyspnoea, vomiting and generalized edema. Metabolic acidosis, hyperphosphatemia, hyperkalemia, hyperchloremia, azotemia were observed. These abnormalities led to a tentative diagnosis of acute tumor lysis syndrome (ATLS). Aggressive Fluid therapy and other supportive therapy was initiated but the animal died due to multiple organ failure.

Keywords: Lymphoma, Dog, ATLS, CHOP

Lymphoma is the most prevalent type of hemopoietic neoplasm in dogs. Acute Tumor Lysis Syndrome (ATLS) is a rare but potentially fatal constellation of metabolic abnormalities leading to oncologic emergency in veterinary patients with hematologic cancer. It occurs consequence of chemotherapy or radiotherapy-induced cellular death, leading to the release of intracellular ions and metabolic products of purine bases into the bloodstream. ATLS is caused by release of the intracellular contents by lysed tumor cells into the blood following rapid cytorreduction of bulky tumors with resultant azotemia, hyperphosphatemia, hyperkalemia, lactic acidosis, and hypocalcaemia (Cohen *et al.*, 1980 and Brooks, 1995). Multiple organ failure may follow and these patients may rapidly deteriorate even with swift intervention (Estrin, 2009)

Case History and Observations

An eleven year old mon-descript female dog weighing 27 kg was presented to Small Animal Medicine Unit with dyspnea, anorexia and vomiting for a period of 3 days and having treated by a veterinarian. Dog was dull, lethargic and dehydrated. Elevated temperature, congested mucus membrane, generalized lymphadenopathy, splenomegaly and

crackles on auscultation of lung were appreciated. Non-regenerative, hypochromic and microcytic anemia with normal leucocyte and platelet counts was noticed. Blood smear did not reveal any blood parasites and the serum biochemistry analysis revealed within normal hepatic and renal parameters. Ultrasonography evaluation of organs revealed reticular pattern of spleen, enlarged inguinal and mesenteric lymph nodes. Thoracic radiography revealed involvement of mediastinal lymph node (Fig 1). Histopathological evaluation of fine needle aspiration smears from the popliteal and right prescapular lymph node revealed a predominance of lymphoblasts and prolymphocytes indicative of lymphoma (Fig 2). The case was diagnosed as canine lymphoma - Stage IV- sub stage b. Wisconsin (UW)-Madison Lymphoma CHOP-19 protocol (cyclophosphamide, doxorubicin, vincristine and prednisone) with Vincristine (@0.5 mg/m²) and prednisolone acetate (@ 2mg/kg) was initiated. By day 3 of treatment, owner reported that animal developed emesis, dyspnoea, and edema. The dog was recumbent, febrile (104⁰7F), tachycardic (150 beats/minute), and tachypneic (75 breaths/minute). Congested mucous membrane, weak femoral pulses were noticed. Blood gas analysis revealed severe metabolic acidosis with hyperphosphatemia, hyperkalemia, hyperchloremia and azotemia.

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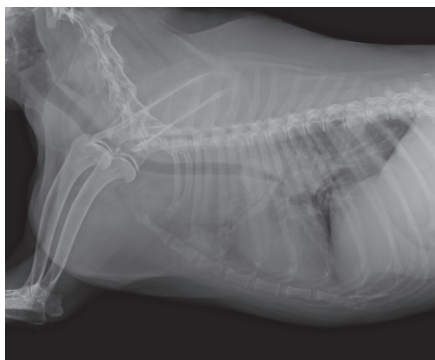


Figure 1. Radiographic image showing mediastinal lymphoma

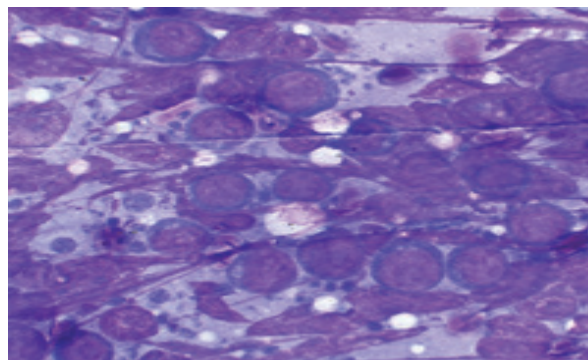


Figure 2. Monomorphic population of lymphocytes with high cellularity and lympho-glandular bodies (Leishman's stain- 100X)

Table 1. Clinical biochemistry findings observed at two time points before and at the onset of acute tumor lysis syndrome in a dog

PARAMETER	DAY 1 (Before Chemotherapy)	DAY 3 (After Chemotherapy)
GLUCOSE (mg/dL)	41.0	117
TOTAL PROTEIN (g/dL)	6.80	6.0
ALBUMIN (g/dL)	2.40	2.5
BUN (mg/dL)	24.11	97.18
CREATININE (mg/dL)	1.011	11.16
ALT (U/L)	95.0	161
ALP (U/L)	119	150
SODIUM (mmol/L)	151.3	144
CHLORIDE (mmol/L)	113.9	161
POTASSIUM (mmol/L)	4.62	8.3
CALCIUM (mg/dL)	11.02	9.49
PHOSPHOROUS (mg/dL)	5.28	19.2
TOTAL BILIRUBIN (mg/dL)	1.71	1.2
DIRECT BILIRUBIN (mg/dL)	1.43	0.9

Table 2. Findings of venous blood gas analysis profile

Parameter	Case value
PH	7.186
PCO ₂ (mmHg)	21.6
PO ₂ (mmHg)	60.3
HCO ₃ (mmol/L)	8.2
BE (mmol/L)	20.1
CO ₂ (%)	85
TCO ₂ (mmol/L)	8.5
ANION GAP	CNC (max)
BE (mmol/L)	-20.1
LACTATE (mmol/L)	1.06
UREA (mg/L)	37.5



Figure 3. Dog undergoing oxygen therapy and fluid therapy

Oxygen therapy was initiated (Fig 3) and the dog was administered with normal saline to restore tissue perfusion and reduce the hyperkalemia and hyperphosphatemia. Vital signs were monitored regularly. The dog remained tachycardic, tachypneic, febrile, and had multiple episodes of vomiting. Animal had collapsed few hours after initiation of treatment.

Discussion

Acute tumor lysis syndrome (ATLS) is an uncommon condition in canine practice. ATLS is a potential lethal combination of metabolic abnormalities which may be observed hours to a few days following treatment in individuals with disorders that respond to radiation or chemotherapy, such as lymphomas or lymphoid leukemias. In the following case, metabolic profile indicated azotemia, hyperphosphatemia, hyperkalemia, hypocalcaemia with metabolic acidosis which is in agreement with Brooks (1995). Laing (1987) reported that hyperphosphatemia was an indicator of canine acute tumor lysis syndrome (ATLS), and might be present either in isolation or in conjunction with renal azotemia. Since potassium and phosphates were primarily intracellular ions, the massive death of tumor

cells lead to a rise in their levels in the blood (Estrin, 2009). Once a diagnosis of TLS is made, the mainstays of therapy are restoration of tissue perfusion with aggressive administration of fluids and stabilization of the cardiovascular system in severely affected patients. Secondary end points for therapy will then also include the correction of electrolyte and acid-base disturbances and renal indexes (Bergman, 2009).

References

- Bergman. P.J. Tumor Lysis Syndrome, Editor(s): Deborah C. Silverstein, Kate Hooper, Small Animal Critical Care Medicine, W.B. Saunders, 2009, Pages 737-738.
- Brooks .D.G. (1995). Acute tumor lysis syndrome in dogs. *Comp. Cont. Educ. Pract. Vet.*, **9**:1103–1106.
- Cohen. L.F., Balow. J.E., Magrath. I.T., Poplack. D.G. and Ziegler. J.L. (1980). Acute tumor lysis syndrome. A review of 37 patients with Burkitt, s lymphoma. *Am. J. Med* .**68**, :486–491.
- Estrin L, 2009. Medical emergencies in the companion animal oncology patient .W.B. Saunders, pp. 37-38.
- Laing. E.J, and Carter. R,F. (1987). Acute tumor lysis syndrome following treatment of canine lymphoma. *J. Am. Anim. Hosp. Assoc.*, **24**:691–696.