

## Histopathological and immunohistochemical characterization of testicular T-cell lymphoma in a dog

Fatemeh Namazi<sup>1\*</sup>, Aidin Shojaee Tabrizi<sup>2</sup>, Forough Zarei Kordshouli<sup>1</sup>

<sup>1</sup> Department of Pathobiology, School of Veterinary Medicine, Shiraz University, Shiraz, Iran; <sup>2</sup> Department of Clinical Sciences, School of Veterinary Medicine, Shiraz University, Shiraz, Iran.

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### Abstract

Canine lymphoma is the most common neoplasm of the hematopoietic system with the most frequently diagnosed malignancy. Also, dogs affected by T-cell lymphoma displayed a lower rate of complete chemotherapy response and have a high risk of death in the early stage of the disease. A 5-year-old male mixed dog was presented to the Small Animal Hospital, School of Veterinary Medicine, Shiraz University, Shiraz, Iran with a history of left testicle swelling for four months. The testicle had approximately 13.00×10.00 cm size with a greyish-white cut surface. Histopathologically, the testicular tissue was infiltrated by neoplastic cells as only a few degenerated seminiferous tubules have remained. The neoplastic cells were round to oval with pleomorphic nuclei and single or multiple prominent nucleoli. Immunohistochemical analysis revealed positive and negative immunoreactivity for CD3 and CD20, respectively. According to histopathological and immunohistochemical features, the tumor was concluded as a testicular T-cell lymphoma. It seems that recognition of lymphoma type could be helpful for clinicians therapeutic protocols.

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### Introduction

It is estimated that, in the dog, 4.00 to 7.00% of all tumors are testicular tumors.<sup>1</sup> Canine lymphomas are similar in many ways to the non-Hodgkin's lymphomas in humans; Hodgkin's lymphoma has not been recognized yet in this species. Canine lymphoma is the most common canine hemato-lymphatic neoplasm with the most frequently diagnosed malignancy incidences 24 to 33 cases per 100,000 dogs.<sup>2</sup> Primary extranodal forms of lymphoma such as those occurring in the central nervous system, eyes, bone, testes, and nasal cavity are less commonly reported in the dog.<sup>3</sup> The tumor was classified by anatomical locations, clinical stages and immunophenotyping.<sup>4</sup> Determination of the specific lymphoma subtypes (derive from T or B cells) is essential to prognosis and treatment in survival times.<sup>5</sup> The prevalence of canine T-cell lymphomas is less than type B, but they showed shortened remission and the lack of a complete response to chemotherapy.<sup>6</sup> Although the etiology of canine lymphoma is unknown, many hypotheses are supporting

the effect of retroviral infection, exposure to herbicides and magnetic field, chromosomal abnormalities, and immune dysfunction.<sup>7</sup> The present study describes the histopathological and immunohistochemical features of a canine T-cell lymphoma diagnosed in the testis.

### Case Description

A 5-year-old male mixed dog was presented to the Small Animal Hospital, School of Veterinary Medicine, Shiraz University, Shiraz, Iran with a history of left testicle swelling for 4 months. Castration was performed and the left testicle was sent for histopathological examination. The samples were taken, fixed in 10.00% neutral buffered formalin, routinely processed, embedded in paraffin, sectioned at 5.00 µm and stained with Hematoxylin and Eosin. Moreover, immunohistochemical analysis of CD3 and CD20 was applied using avidin-biotin-peroxidase complex method in the formalin-fixed paraffin-embedded tissues. Mayer's hematoxylin was used for counter staining. Appropriate controls were also used.

#### \*Correspondence:

Fatemeh Namazi. PhD

Department of Pathobiology, School of Veterinary Medicine, Shiraz University, Shiraz, Iran

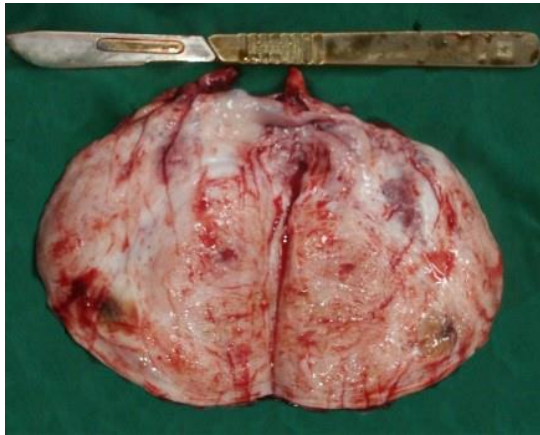
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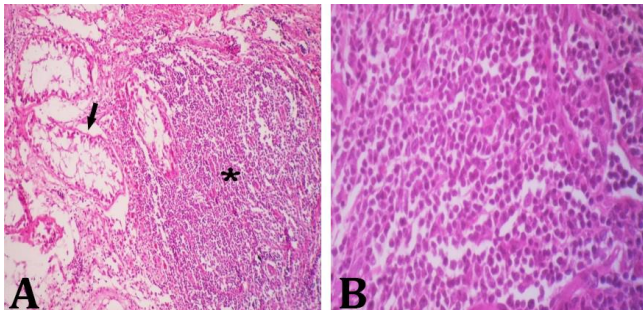
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## Results

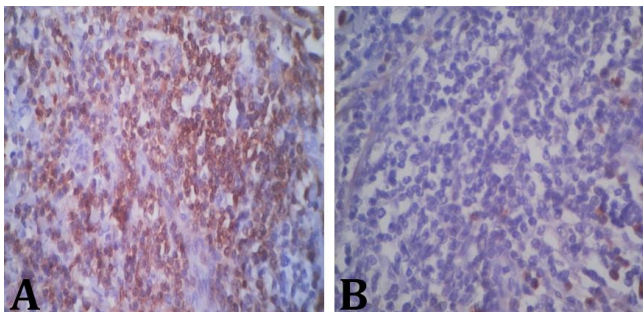
Grossly, the left testicle had approximately 13.00 × 10.00 cm size with a greyish-white cut surface (Fig. 1). Histopathologically, the testicular tissue was infiltrated by neoplastic cells as only a few degenerated seminiferous tubules were remained (Fig. 2A). The neoplastic cells were round to oval with pleomorphic nuclei and single or multiple prominent nucleoli (Fig. 2B). The tumor cells expressed CD3 but displayed negative staining for CD20 (Fig. 3). Based on the histopathological and immuno-histochemical findings, the tumor was diagnosed as a T-cell lymphoma.



**Fig. 1.** Gross appearance of the left testis with a greyish-white cut surface.



**Fig. 2. A)** The testicle infiltrated by neoplastic cells (Asterisk sign). Black arrow indicates the degenerated seminiferous tubules; **B)** Infiltration of neoplastic cells in testicular tissue (H & E; 40× and 100×, respectively).



**Fig. 3. A)** The neoplastic cells were positive for CD3. **B)** Immunolabelling with CD20 was negative for neoplastic cells (IHC; 100×).

## Discussion

The third most common malignant neoplasm is canine lymphoma.<sup>8</sup> Although lymphomas affect dogs of all ages, they are predominant in middle age.<sup>9</sup> Although there is no gender tendency related to lymphoma, males were higher in many studies.<sup>10</sup> In the present study, the case was a 5-year-old male dog. It is great to mention that histopathology supported by immunohistochemistry is the basic method in oncology for diagnosing canine lymphoma. Many studies have shown a higher occurrence of B-cell type,<sup>5,6</sup> though the findings of the present study are more similar to the others with T-cell type.<sup>11</sup> World health organization classification is the most commonly used system for canine lymphoma classification due to its correlation between cytomorphological, immunophenotypical, and clinical criteria.<sup>12</sup> Immunophenotyping is a valuable potential prognostic factor in the classification of lymphomas. The CD3 is widely used for immunophenotyping because of its high sensitivity and specificity.<sup>12</sup> In the present case, the T-cell type of lymphoma was revealed by the strong cytoplasmic positivity of the tumor cells for CD3. Previous studies of the canine lymphoma have shown that the CD3 antibody is closely associated with T-cell lymphoma.<sup>12,13</sup> In the present study, the neoplastic cells displayed negative immunoreactivity for CD20, and this result is in consistent with the previous studies reporting that B-cell lymphoma can be identified by expression of CD20.<sup>12</sup> Furthermore, proliferative activity of the neoplasm describes the biological behavior and prognosis of the tumor.<sup>14</sup> In the present study, the infiltration of proliferative neoplastic cells was observed in the testicular tissue associated with high biological malignancy. To gain major details about the behavior and malignancy of lymphoma, the immunohistochemical description can be a useful tool.<sup>15</sup> Dogs affected by T-cell lymphoma displayed a lower rate of complete chemotherapy response and have a high risk of death in the early stage of the disease.<sup>6</sup>

Conclusively, histopathology confirms canine lymphoma and the accuracy of diagnosis can be increased by immunohistochemical method. As the definitive diagnosis of tumors is necessary for some therapeutic protocols, it seems that recognition of lymphoma type could be helpful for clinicians.

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## Conflict of interest

The authors declare no conflict of interest.

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