



Hendrik Schröder^a, Kristin Brandes^b, Alexander Merz^a

^aTierklinik Telgte gbR, Kiebitzpohl 35, 48291 Telgte, Germany, ^bTierpathologie Augsburg, Mittenwalder Str. 38, 86163 Augsburg

Background & Objective

Lymphoma is reported the most common hemopoietic neoplasia in horses¹. The disease originates in lymphnodes and lymphatic tissues outside the bone marrow, although metastasis may lead to involvement of the bone marrow. It accounts for 1.3–2.8% and one study even reported an incidence as high as 14% of all tumors diagnosed in horses². Topographically, lymphoma could be classified in one of five forms: multicentric, alimentary, cutaneous, mediastinal and solitary tumors of extranodal origin. Though there is no age bias, multicentric lymphoma are commonly associated with horses between 4 and 10 years old, and alimentary in horses aged over 16 years. Interestingly, Quarter horses and Thoroughbreds have been overrepresented in some studies, even though neither sex nor breed are relevant. Data by means of polymerase chain reaction method provided some evidence of equine herpesvirus 5 causing equine lymphoma irrespective of the topographical form; as the virus is endemic to the population the exact role of the virus in equine lymphoma has not yet been determined. Treatment options are limited to chemotherapy and radiation therapy. Late diagnosis often leads to euthanasia as horse's condition progressively declines². This case report examines an alternative treatment option namely immunotherapy based on autologous dendritic cells (DCs) in a 24-year-old Quarter Horse gelding diagnosed with subcutaneous T-cell lymphoma of the left lower eyelid.

¹Mufcoz A. et al., 2009. Hematopoietic neoplasias in horses: myeloproliferative and lymphoproliferative disorders. J. Equine Sci. 20(4):59–72. <https://doi.org/10.1294/jes.20.59>; ²Sheard L., McGovern K., Equine lymphoma: a review, 2021. Equine 5(5):206–214. <https://doi.org/10.1016/j.tvjl.2024.106196>

Anamnesis & Diagnosis & Prognosis

Anamnesis

- On 29/11/2023, a Quarter horse gelding, date of birth 27/06/1999, body weight 480 kg, was presented for an eye examination. General body condition, respiration and circulation were normal. Unlike the right eye, the left eye was swollen periorcular. Particularly the left lower eyelid was severely swollen and had discharge, and the conjunctiva was severely reddened (Fig. 6). Clinically a marked edema of the lower conjunctiva was noticeable. Other extraocular areas such as third eyelid, the cornea and the sclera were not affected. There was no report on systemic or intraocular medical treatment.

Pathohistology

- 10/2023, incisional biopsy of conjunctiva (4x4x5 cm) and tissue/skin sample (1,5x1x1 cm) of the left lower eyelid was performed.
- Material and methods: The formalin-fixed biopsies were dehydrated overnight, embedded in paraffin blocks and four µm-thick histological sections were prepared and stained with hematoxylin and eosin (H&E).
- Histological and immunohistochemical findings: the biopsies showed a diffuse infiltration by a population of polygonal to round cells, 20–25 µm in size, with large, oval nuclei and prominent nucleoli, few mitoses, accompanied by small lymphocytes in roughly equal numbers. CD3-positive T-cells were the predominant cells detected (90%), along with a few scattered MAC387-positive macrophages and no B-cells expressing CD20 (Figs. 1–4).

Diagnosis

- Subcutaneous extraocular T-cell lymphoma
- The tumor affected about three quarter of the lower eyelid and extended ventrally for up to three cm.

Prognosis

- Uncertain
- Grade malignant
- Metastatic possible, high recurrence rate.

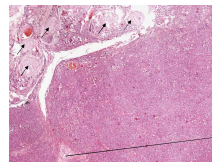


Figure 1. Overview: dense cell infiltration, even around nerve cross-sections (arrows top left) and with necrosis (bottom edge). 20x, H&E.

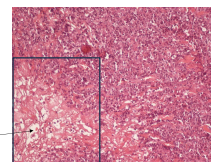


Figure 2. Infiltrate of numerous round cells; necrosis at bottom left; 100x; H&E.

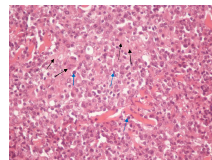


Figure 3. Infiltrate of approximately 25–30 µm round tumor cells with light oval nuclei (black arrow) and light reddish cytoplasm, surrounded by numerous small lymphocytes, (blue arrow) 400x, H&E



Figure 4. Immunohistochemical staining revealed most notably the presence of CD3-positive T-cells, 100x, DAB (3,3'-diaminobenzidine) and hematoxylin).

Dendritic Cells

Dendritic cells (DCs)³

- DCs derived from peripheral blood monocytes of the equine patient.
- ≥ 4 x 10⁶ cells required for in-vitro culture in RPMI 1640, rhGM-CSF and reIL-4, autologous plasma (5%), seven days, GMP.
- Acceptance criteria for release: ≥ 10% of MHC-II positive cells, cell viability ≥ 90%.

³Spiller, V., Vetter, M., Dettmer-Richardt, C., Grammel, T., 2024. Vet. J. 306, 106–96. <https://doi.org/10.1016/j.tvjl.2024.106196>



Figure 5. Preparation and quality control of equine autologous dendritic cells by means of cellular methods and FACS analysis; data plot of fourth vaccine (V4) shown, commenced 24/07/2024 (Ko = negative control, MHC II = positive cells).

DC-Immunotherapy & Progression of Disease

DC Immunotherapy

- Vaccination (V) schedule:
 - V 1) 11.96 x 10⁶, 06/12/2023
 - V 2) 12.62 x 10⁶, 31/01/2024
 - V 3) 15.60 x 10⁶, 06/03/2024
 - V 4) 7.37 x 10⁶, 31/07/2024
- A cycle of three intradermal injections about one month apart, followed by another injection four months later.

Progression of Disease

- After three injections, the tumor worsened and grew larger. The eyelid was strained and cracked at the edges.
- Three months after the 3rd injection, the swelling gradually subsided and the eyelids returned to normal.
- At the time of fourth injection, the eye was already clinically normal (Fig. 7).
- The T-cell lymphoma was completely cured and didn't recur until the horse was euthanized for other causes in 12/2025.

Discussion & Conclusion

- A 24-year-old Quarter horse gelding was diagnosed with a subcutaneous T-cell lymphoma on his left lower eyelid. Aside from this finding there were no clinical signs that other organs were affected.
- Prognosis was deemed uncertain because horses with lesions confined to the eyelid or other non-extraocular cutaneous locations had a significantly higher risk of negative outcome when compared to the horses without involvement of the eyelid or skin (P = 0.019)⁴.
- Immunotherapy was found an easy-to-administer and effective treatment option to enucleation⁵, and radiation- and chemotherapy without suffering from their adverse effects described elsewhere².
- To conclude: Treatment with autologous DCs could improve the prognosis for preserving the eyeballs and visual function in conjunctival T-cell lymphoma with fair to good prognosis. To support the scientific evidence, close collaboration with veterinary clinics treating similar patients is strongly encouraged.

⁴Schnoke A. T. et al., 2012. Extraocular lymphoma in the horse. <https://doi.org/10.1111/j.1463-5224.2012.01016.x>; ⁵Töth et al. 2013. Fallbeschreibung eines malignen T-Zell-Lymphoms in der Konjunktiva beim Pferd. Prakt. Tierarz. 94, 38–41.

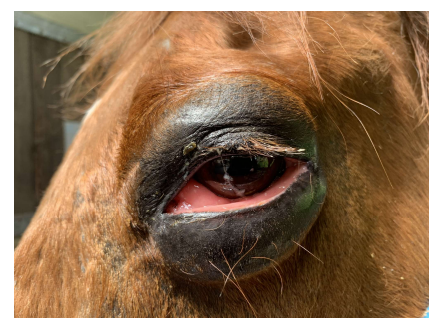


Figure 6. Lower eyelid with T-cell lymphoma prior to DCs treatment (29/11/2023).



Figure 7. The lower eyelid during the healing process prior to 4th DCs injection on 31/07/2024.

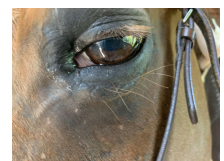


Figure 8. Cured lower eyelid after 4th DCs injection on 09/2024.