Received: 25 November 2023 | Revised: 28 July 2024 | Accepted: 2 September 2024

DOI: 10.1002/vrc2.994

Vet Record CaseReports

CASE REPORT

Companion or pet animals

Epitheliotropic T-cell lymphoma in a Syrian hamster (*Mesocricetus auratus*)

Sandro Stalder[1] | **Nicolas Kühn**[2] | **Maria Wegelin**[2] | **Judith Howard**[3] | **Morena Bernadette Wernick**[1]

[1]Exotic Pet Department, Ennetseeklinik für Kleintiere, Hünenberg, Zug, Switzerland

[2]Kühn Pathologie, Hünenberg, Zug, Switzerland

[3]Clinical Diagnostic Laboratory, Vetsuisse Faculty, University of Bern, Bern, Switzerland

Correspondence
Morena B. Wernick, Exotic Pet Department, Ennetseeklinik für Kleintiere, Hünenberg, Zug, Switzerland.
Email: grafmorena@gmx.com

Present address
Sandro Stalder, Clinic for Zoo Animals, Exotic Pets and Wildlife, Vetsuisse Faculty, University of Zurich, Zurich, Switzerland

Abstract

A 2-year-2-month-old, male Syrian hamster (*Mesocricetus auratus*) was referred for ulceration and encrustation of the abdominal skin. The affected skin was surgically excised. Histological examination revealed changes consistent with an epitheliotropic T-cell lymphoma. Two months after the surgery, no clinical signs of disease or tumour recurrence were evident. When patients with consistent clinical signs are presented, cutaneous neoplasia should be considered, especially in older animals. Surgical excision may offer short-term remission for epitheliotropic lymphoma.

BACKGROUND

Cutaneous disorders can have an infectious or noninfectious origin and can be characterised by several clinical signs including alopecia, crusting, erosion, nodules, pruritus, ulceration and scaling.[1] In this case report, the clinical, histological findings and short-term follow-up of epitheliotropic T-cell lymphoma (resembling mycosis fungoides) in a Syrian hamster are reported. Epitheliotropic T-cell lymphoma is a progressive disease, characterised by infiltration of neoplastic T-lymphocytes with a tropism for the epidermis and adnexal structures. T-cell lymphoma can develop spontaneously or can be associated with Hamster polyomavirus (HaPyV) infection.[2]

CASE PRESENTATION

A 2-year-2-month-old, male Syrian hamster (*Mesocricetus auratus*), weighing 155 g was presented to the veterinary clinic because of ulceration and encrustation of the abdominal skin, observed by the owner less than a week before. The hamster had been housed alone in a cage indoors, with regular free access to the apartment. A commercial diet and water were available at all times. The owner reported no prior medical issues and no other clinical signs besides the skin changes. On physical examination, the animal was alert and in good nutritional condition (body condition score 3/5). The skin of the cranial abdomen was ulcerated over an area of approximately 15 × 8 mm with crust formation. No skin nodules or lymphadenopathy were detected. Pruritus was not reported by the owners nor evident during the examination. The presumptive diagnosis was a wound and secondary infection, and due to financial reasons, no additional diagnostic tests were performed at this time.

TREATMENT

The animal was treated with trimethoprim-sulfonamide (8 mg/kg and 40 mg/kg, respectively, twice a day) and meloxicam (1 mg/kg once a day) by the owners for 10 days. After 10 days, a follow-up examination was performed revealing an unchanged general condition, but extension of the area of dermal ulcerations of the abdomen to approximately 35 × 20 mm. The owner was in favour of further investigation, including excisional biopsy.

The hamster was sedated with fentanyl (0.033 mg/kg; Fentanyl Sintetica, Streuli Pharma, www.streuli-pharma.ch), midazolam (3.3 mg/kg; Dormicum, www.roche.ch/pharma) and medetomidine (0.33 mg/kg; Medetor, www.ch.virbac.com) intramuscularly. Meloxicam (1 mg/kg; Metacam, www.boehringer-ingelheim.com) and lactated Ringer's solution (20 mL/kg) were administered subcutaneously. Anaesthesia was maintained with isoflurane (1.5%–2%) in oxygen delivered via facemask. The hamster was positioned in dorsal recumbency, and the abdominal skin was aseptically prepared. The affected skin was marginally excised. The subcutis and cutis were closed with single button sutures using PDS II 4-0 (Ethicon) and Monosyn 4-0 (B. Braun Surgical), respectively. The sedation was antagonised using flumazenil (0.1 mg/kg subcutaneously; Flumazenil Mepha, https://

www.mepha.ch/) and atipamezole (1 mg/kg intramuscularly; Alzane, https://www.graeub.com). Recovery was quick and uneventful.

OUTCOME AND FOLLOW-UP

Tissues were fixed in 4% buffered neutral formalin, and a piece of thickened skin measuring 3.5 × 2 × 0.5 cm with ulcerations and crusts was submitted for histological examination. Grossly, the lesion extended to the margins of the excised tissue. Tissues were trimmed and embedded in paraffin. Sections were cut at 4 µm and stained with haematoxylin and eosin. Histopathological examination revealed a monomorphic population of large, round lymphoid cells, four to five erythrocytes in diameter, invading the dermis, subcutis and cutaneous muscle (Figures 1 and 2). Cells contained moderate amounts of eosinophilic to amphophilic cytoplasm, with a round, eccentric nucleus. The chromatin structure was coarse and one to five nucleoli of different sizes were present. There were one to seven mitotic figures per high power field (×400) (Figure 3).

Groups of tumour cells were also found within the wall of hair follicles and, to a lesser extent, within the epidermis (Pautrier microabscesses) (Figure 4). The epidermis was partly hyperplastic, partly ulcerated and covered by thick serocellular crusts containing numerous coccoid bacteria. Tumour cells were locally extending to the lateral margins. Immunohistological stains routinely used in a variety of species were performed on serial sections, including CD3 (monoclonal antibody, DAKO M725401) for T cells, and CD45R (BD Pharmigen 553084, monoclonal antibody) for B cells. An equally treated serial section with omission of the primary antibody served as control. Tumour cells were strongly positive for CD3, but negative for CD45R, confirming a diagnosis of epitheliotropic T-cell lymphoma (mycosis fungoides) (Figures 5 and 6).

Two months after surgery, the hamster was presented to the clinic for follow-up examination. The owners reported a good general condition, the hamster weighed 151 g, and no clinical signs of disease or tumour recurrence were present at clinical examination. Following this, the hamster was lost to follow-up.

LEARNING POINTS/TAKE-HOME MESSAGES

- Cutaneous neoplasia should be considered as a differential diagnosis in pet Syrian hamsters with skin lesions.
- Immunohistological staining is useful in the diagnosis of epitheliotropic T-cell lymphoma in pet Syrian hamsters.
- Early excisional biopsy of epitheliotropic T-cell lymphoma may offer good short-term outcome in pet Syrian hamsters.

DISCUSSION

In exotic pets with dermatological disorders, a problem-oriented approach (POA) was recently described to diagnose these conditions based on the predominance of their main clinical sign. This POA can help in selecting and interpreting the appropriate diagnostic tests to achieve a diagnosis.[3] In the present case, ulceration of the skin was the major clinical sign.

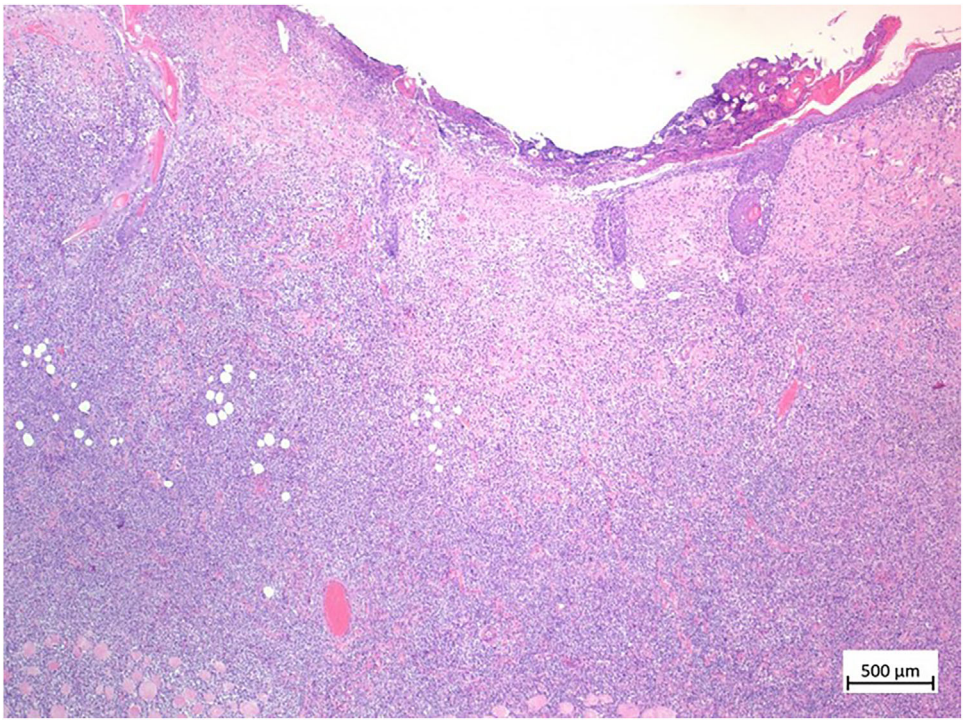

FIGURE 1 Photomicrograph of a histological section of the skin of a 2-year-2-month-old, male Syrian hamster with epitheliotropic T-cell lymphoma. Note the diffuse infiltration of the dermis, subcutis and cutaneous muscle with a monomorphic population of lymphoid cells. Haematoxylin and eosin stain, 20× magnification.

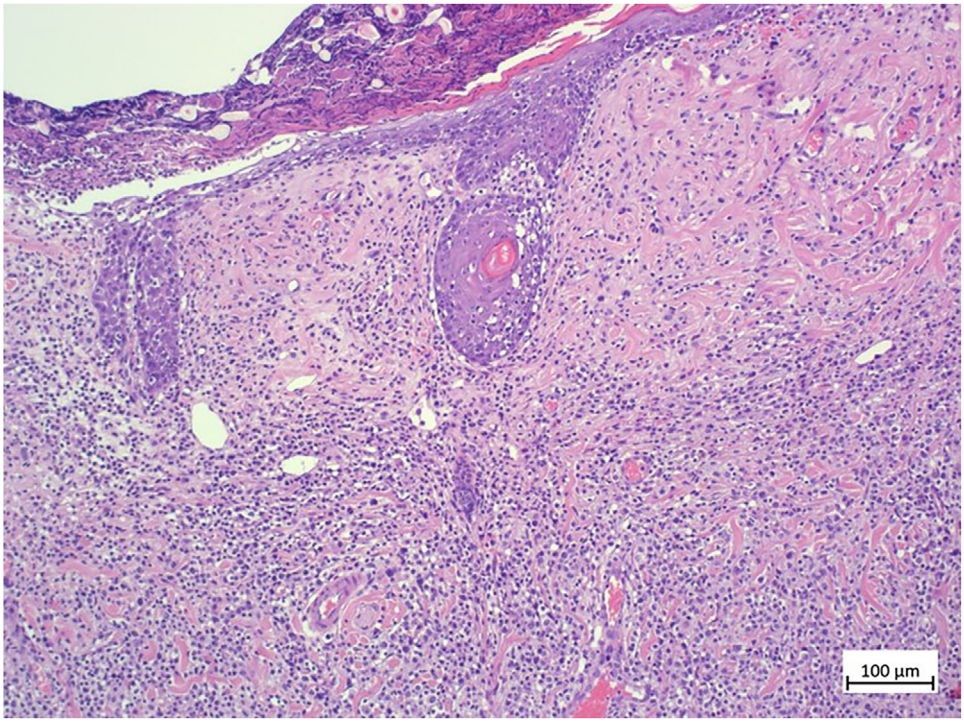

FIGURE 2 Photomicrograph of a histological section of the skin of a 2-year-2-month-old, male Syrian hamster with epitheliotropic T-cell lymphoma. Note the diffuse infiltration of the dermis, subcutis and cutaneous muscle with a monomorphic population of lymphoid cells, with groups of tumour cells in the epidermis and in the wall of hair follicles. Haematoxylin and eosin stain, 100× magnification.

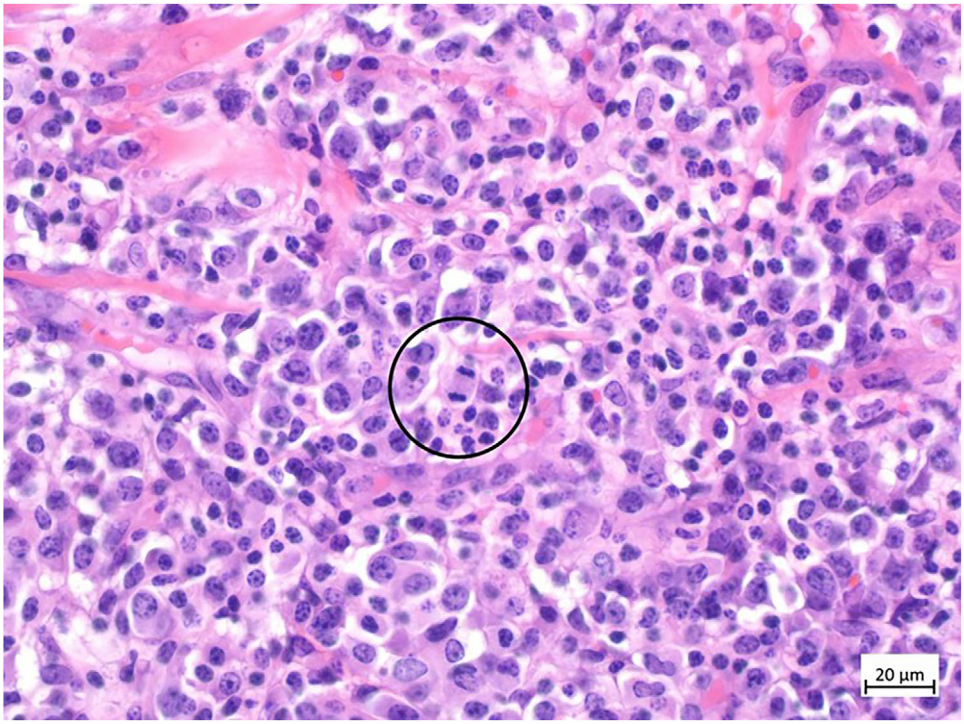

FIGURE 3 Photomicrograph of the dermis of a 2-year-2-month-old, male Syrian hamster with epitheliotropic T-cell lymphoma. Note the diffuse infiltration of the dermis with a monomorphic population of lymphoid cells. The details show large lymphocytes with a round nucleus, coarse chromatin and sometimes prominent nucleoli. Mitotic figures are seen (circle). Haematoxylin and eosin stain, 400× magnification.

Using the POA, epitheliotropic lymphoma was listed among the possible differential diagnoses for skin ulceration.[3]

In animals, epitheliotropic T-cell lymphoma has been reported in dogs,[4–7] cats,[8–10] horses,[11,12] a donkey,[13] cows,[14] a coati,[15] rabbits,[16] guinea pigs,[17,18] a degu[19] and Syrian hamsters.[19–22] Neoplasia involving the integument is common in hamsters and is most commonly due to epithelial tumours such as trichoepithelioma, trichofolliculoma and papilloma.[23] HaPyV has been shown to be highly prevalent in lymphomas of pet Syrian hamsters, and both polymerase chain reaction

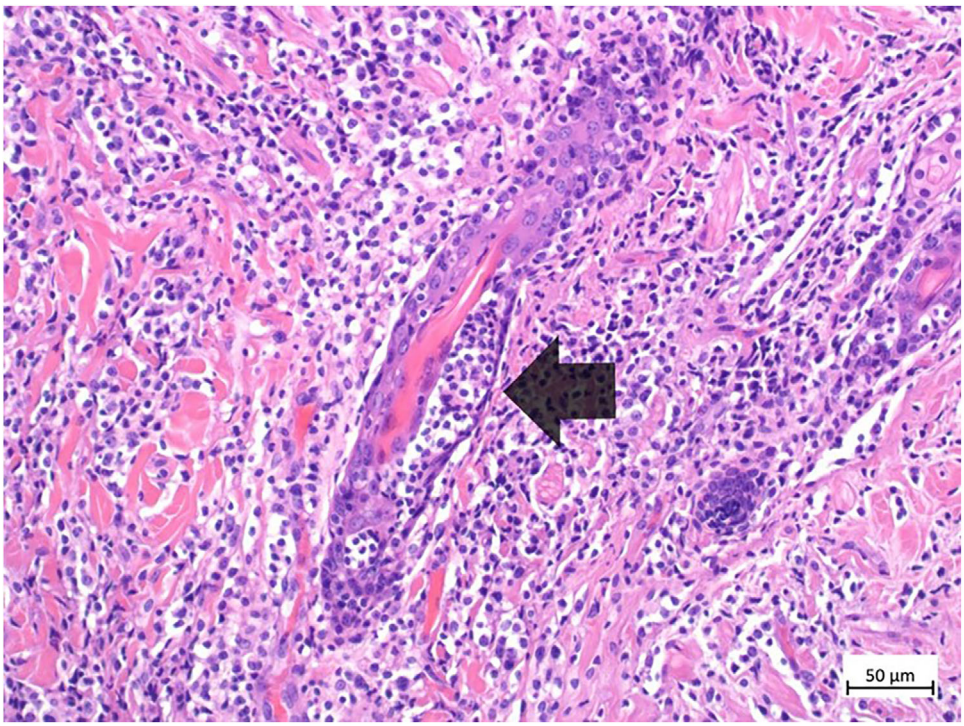

FIGURE 4 Photomicrograph of the skin of a 2-year-2-month-old Syrian hamster with epitheliotropic T-cell lymphoma. Note the diffuse infiltration of the dermis with a monomorphic population of lymphoid cells, with groups of tumour cells in the wall of hair follicles (Pautrier microabscesses, arrow). Haematoxylin and eosin stain, 200× magnification.

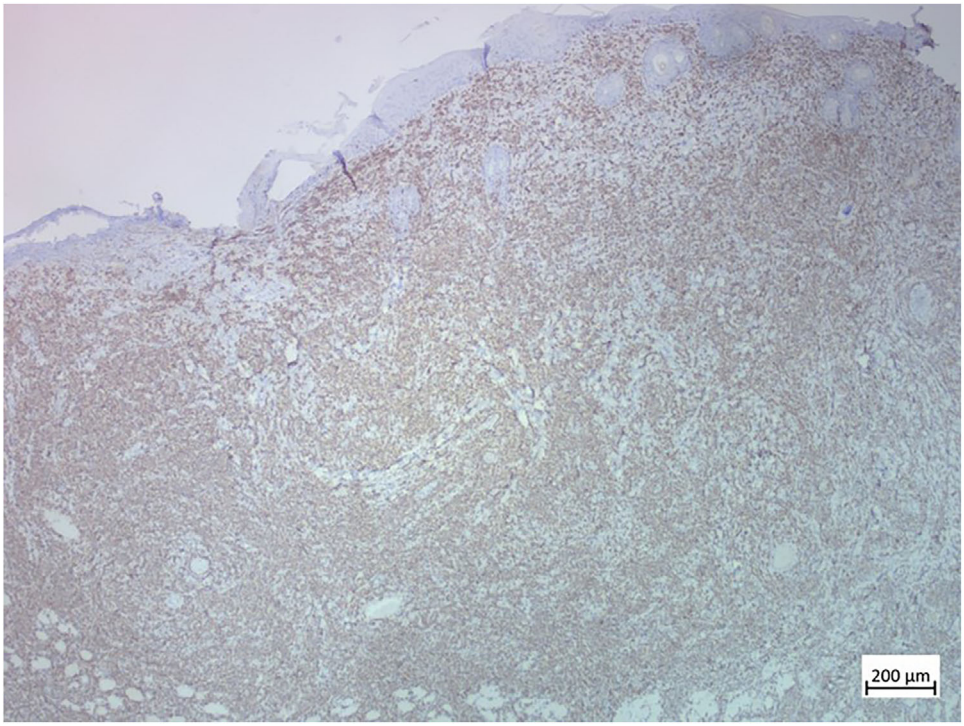

FIGURE 5 Photomicrograph of the skin of a 2-year-2-month-old Syrian hamster with epitheliotropic T-cell lymphoma. Note the diffuse labelling of the neoplastic lymphocytes. CD3 immunohistochemistry, 40× magnification.

(PCR) and in situ hybridisation were useful tools for identifying the involvement of HaPyV.[2] Although HaPyV seems to primarily affect mesenteric lymph nodes, biopsy of regional lymph nodes for PCR and in situ hybridisation for detection of HaPyV should be considered in Syrian hamsters with neoplastic skin lesions. All cutaneous lymphomas associated with HaPyV were diagnosed as nonepitheliotropic T-cell lymphomas in one study.[2] Clinical signs of epitheliotropic lymphoma in hamsters can be similar to those of the multicentric form if it is at an advanced stage of disease, and include

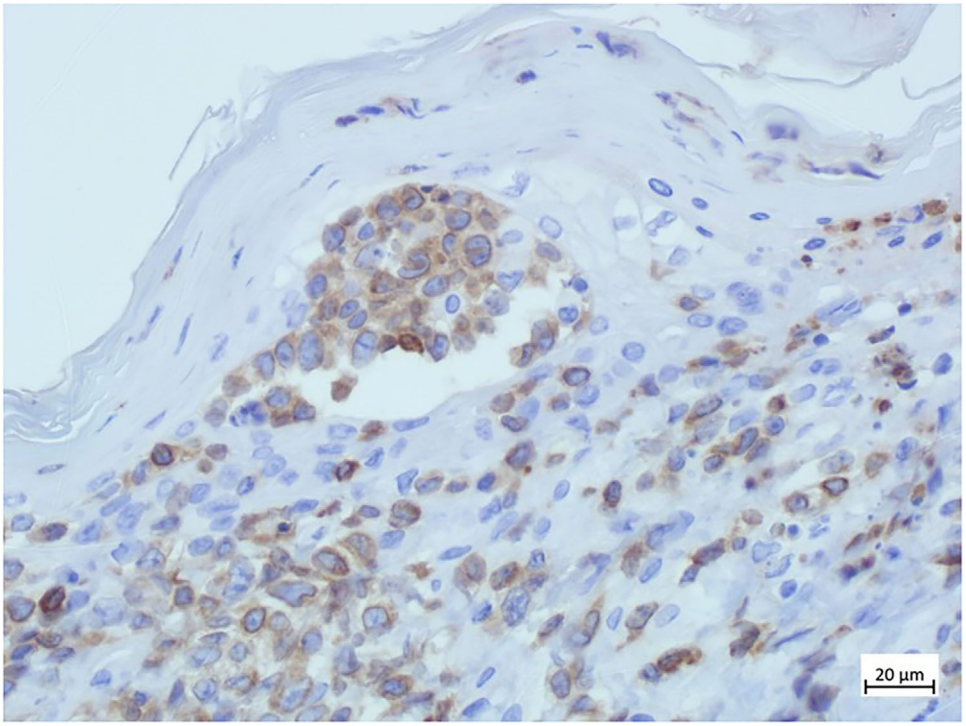

FIGURE 6 Photomicrograph of dermis and epidermis of a 2-year-2-month-old Syrian hamster with epitheliotropic T-cell lymphoma. Note the diffuse labelling of a large group of neoplastic lymphocytes located within the epidermis (Pautrier microabscess). CD3 immunohistochemistry, 400× magnification.

anorexia, lethargy, alopecia, pruritus and encrustations.[24–26] Although not performed in this case, tumour staging could be useful for the diagnosis and assessment of prognosis. Anorexia, lethargy and pruritus were not, or not yet, present in this case. In the cases previously described, only alopecia was evident at initial presentation.[20] Alopecia progressed and encrustation became apparent over a period of a few weeks, at which time pruritus was present in all cases, followed by marked weight loss.[20] History and clinical examination can allow a tentative diagnosis of epitheliotropic lymphoma, but definitive diagnosis requires biopsy.[26] To the best of the authors' knowledge, treatment of epitheliotropic T-cell lymphoma has not been previously reported in hamsters and euthanasia is often recommended.

Therapies used in dogs and cats include chemotherapy, radiation therapy and corticosteroids.[27] Lymphomas in exotic pets might also respond to these treatments; however, there are several limitations to their applicability in pet rodents, including small patient size and rodents' sensitivity to corticosteroids.

In the present case, the hamster recovered well after surgery, and did not show any clinical signs of disease 2 months after the surgery. The operation wound have healed and no signs of recurrence were evident despite marginal excision.

The prognosis of epithelial T-cell lymphoma in hamsters is poor, with a reported mean time from first presentation to euthanasia of 9.6 weeks without treatment.[20] In most previously reported cases, skin lesions progressed over periods between 4 and 20 weeks, leading to generalised dermatitis, deterioration in body condition and weight loss before euthanasia.[20] In the case presented herein, duration of survival is unknown. However, excisional biopsy resulted in remission of clinical signs for at least 2 months. The majority of Syrian hamsters reported with epitheliotropic lymphoma are elderly, with a mean age of 20 months.[20] Early excisional biopsy may therefore offer good short-term outcome, given the limited life expectancy for the age at presentation.

AUTHOR CONTRIBUTIONS

Sandro Stalder and **Morena Bernadette Wernick** designed the project. **Nicolas Kühn** and **Maria Wegelin** performed the laboratory work. All authors contributed significantly to the writing and editing of the draft of this article.

CONFLICT OF INTEREST STATEMENT

The authors declare no potential conflicts of interest with respect to the research, authorship or publication of this article.

FUNDING INFORMATION

The authors received no financial support associated with this case, authorship and/or publication of this article.

ETHICS STATEMENT

Ethical approval was not required as this paper documents a clinical case managed according to best practice and with the informed consent of the owner.

ORCID

Morena Bernadette Wernick https://orcid.org/0000-0002-6584-0057

REFERENCES

1. White SD, Bourdeau PJ, Brément T, Bruet V, Gimenez-Acosta C, Guzman DSM, et al. Companion hamsters with cutaneous lesions; a retrospective study of 102 cases at two university veterinary teaching hospitals (1985–2018). Vet Dermatol. 2019;30(3):243–74.

2. Ito S, Chambers JK, Son NV, Kita C, Ise KI, Miwa Y, et al. Hamster polyomavirus-associated T-cell lymphomas in Syrian hamsters (*Mesocricetus auratus*). Vet Pathol. 2023;60(2):267–75.
3. D'Ovidio D, White S, Santoro D. Problem-oriented approach in exotic companion mammals. Vet Clin North Am Exot Anim Pract. 2023;26(2):309–26.
4. Fournel-Fleury C, Ponce F, Felman P, Blavier A, Bonnefont C, Chabanne L, et al. Canine T cell lymphomas: a morphological, immunological, and clinical study of 46 new cases. Vet Pathol. 2002;39(1):92–109.
5. Bhang DH, Choi US, Kim MK, Choi EH, Kang MS, Hwang CY, et al. Epitheliotropic cutaneous lymphoma (mycosis fungoides) in a dog. J Vet Sci. 2006;7(1):97–99.
6. Risbon RE, de Lorimier LP, Skorupski K, Burgess KE, Bergman PJ, Carreras J, et al. Response of canine cutaneous epitheliotropic lymphoma to lomustine (CCNU): a retrospective study of 46 cases (1999–2004). J Vet Intern Med. 2006;20(6):138–97.
7. Tzannes S, Ibarrola P, Batchelor DJ, Burrow RD, Blackwood L. Use of recombinant human interferon alpha-2a in the management of a dog with epitheliotropic lymphoma. J Am Anim Hosp Assoc. 2008;44(5):276–82.
8. Caciolo PL, Hayes AA, Patnaik AK, Nesbitt G, Pack F. A case of mycosis fungoides in a cat and literature review. J Am Anim Hosp Assoc. 1983;19:505–12.
9. Baker JL, Scott DW. Mycosis fungoides in two cats. J Am Anim Hosp Assoc. 1989;25:97–101.
10. Tobey JC, Houston DM, Breur GJ, Jackson ML, Stubbington DA. Cutaneous T-cell lymphoma in a cat. J Am Vet Med Assoc. 1994;204(4):606–9.
11. Hilbe M, Meier D, Feige K. A case of cutaneous epitheliotropic malignant lymphoma (mycosis fungoides) in a horse. Berl Munch Tierarztl Wschr. 1997;110(3):86–89.
12. Potter K, Anez D. Mycosis fungoides in a horse. J Am Vet Med Assoc. 1998;212(4):550–52
13. Kondratjeva J, Julien F, Coutelier C, Humeau L, Moog F, Combarros D, et al. Cutaneous epitheliotropic T-cell lymphoma in a donkey—a case report. BMC Vet Res. 2022;18(1):267.
14. Peleteiro MC, Pinto C, Correia JJ, Silva JF, Branco S. Two cases of cutaneous T-cell lymphoma in Friesian cows in the Azores. Vet Dermatol. 2008;11:299–304.
15. Skorinsky I, Papadogiannakis E, Horowitz I, Anug AM. Epitheliotropic cutaneous lymphoma (mycosis fungoides) in a coati. J Small Anim Pract. 2007;49(4):204–7.
16. White SD, Campbell T, Logan A, Meredith A, Schultheiss P, Van Winkle T, et al. Lymphoma with cutaneous involvement in three domestic rabbits (*Oryctolagus cuniculus*). Vet Dermatol. 2000;11(1):61–67.
17. Koebrich S, Grest P, Favrot C, Wilhelm S. Epitheliotropic T-cell lymphoma in a guinea pig. Vet Dermatol. 2010;22(2):215–19.
18. Sommerey CC, Koehler K, Reinacher M. Diseases of guinea pigs from the pathologist's point of view. Tierarztl Prax. 2004;32(6):377–83.
19. Otrocka-Domagała I, Paździor-Czapula K, Fiedorowicz J, Mikiewicz M, Piotrowska A, Gesek M. Cutaneous and subcutaneous tumours of small pet mammals—retrospective study of 256 cases (2014–2021). Animals. 2022;12(8):965.
20. Harvey RG, Whitbread TJ, Ferrer L, Cooper JE. Epidermotropic cutaneous T-cell lymphoma (mycosis fungoides) in Syrian hamsters (*Mesocricetus auratus*). A report of six cases and the demonstration of T-cell specificity. Vet Dermatol. 1992;3(1):13–19.
21. Miles S. Hamster cutaneous lymphoma. Vet times. 2017;47(26):6.
22. Saunders GK, Scott DW. Cutaneous lymphoma resembling mycosis fungoides in the Syrian hamster (*Mesocricetus auratus*). Lab Anim Sci. 1988;38(5):616–17.
23. Rother N, Bertram CA, Klopfleisch R, Fragoso-Garcia M, Bomhard WV, Schandelmaier, et al. Tumours in 177 pet hamsters. Vet Rec. 2021;188(6):e14.
24. Hoppmann E, Barron HW. Rodent dermatology. J Exot Pet Med. 2007;16:238–55.
25. Paterson S. Skin diseases and treatment of hamsters. In: Sue Paterson, editor. Skin diseases of exotic pets. Wiley-Blackwell; 2006. p. 260–63.
26. Hocker SE, Wouda RM. Rodent oncology: diseases, diagnostics, and therapeutics. Vet Clin North Am Exot Anim Pract. 2017;20(1):111–34.
27. Thamm DH. Novel treatments for lymphoma. Vet Clin North Am Small Anim Pract. 2019;49(5):903–15.

How to cite this article: Stalder S, Kühn N, Wegelin M, Howard J, Wernick MB. Epitheliotropic T-cell lymphoma in a Syrian hamster (*Mesocricetus auratus*). Vet Rec Case Rep. 2024;e994.
https://doi.org/10.1002/vrc2.994