



Lymphoma

Lymphoma is a tumour originating from lymphoid tissue, either nodal (lymph nodes) or extranodal (thymus, spleen, mucosa, conjunctiva, or skin-associated lymphoid tissue). It is one of the most common neoplasms of the horse. Representing around 1.5-14% of all equine tumours reported in large surveys of clinical and necropsy data. It is the most common malignant neoplasm of the equine gastrointestinal tract and of the thorax.

- Lymphoma affects horses of all ages
- All breeds and genders can be affected
- It is always malignant

Types of Lymphoma

The classification of lymphoma is based on three factors:

1. **Morphology** of the basic cell types: small-cell, large-cell, or mixed
2. **Cell lineage**: B-cell, T-cell, mixed B- and T-cell, or NK-cell
 - a. T-cell tumours are usually more aggressive
3. **Anatomic distribution**: multicentric/generalized (the most common form), alimentary, thoracic, solitary, or cutaneous

Clinical signs

These vary depending on the tumour location and stage (early and small, or late and large. **The most common signs are nonspecific** – weight loss, apathy, anorexia and tachycardia. Fever, ventral oedema, recurrent colic and diarrhoea are frequently seen. **At the end-stage, the signs reflect dysfunction of organs involved.**

Paraneoplastic signs are common – these include weight loss, anaemia, and significant changes in blood composition such as hypercalcaemia and hypoglycaemia.



A 22-year-old WB horse with generalized lymphoma showing weight loss, loss of muscle mass and paraneoplastic hypotrichia (hair loss)



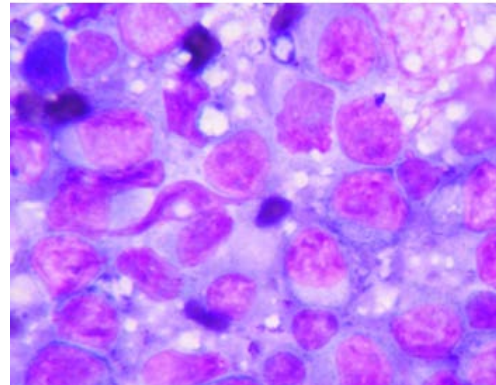
Characteristics:

Distribution	Localisation	Signs	Progression	Cell lineage
Multicentric (Generalized)	Lymph nodes Extranodal lymphoid tissue	Lethargy Anorexia Pyrexia Weight loss Edema Enlarged lymph nodes Ocular signs possible	End-stage Common metastasis to other organs Leukemia possible (bone marrow infiltration)	Any
Alimentary or intestinal	Small intestine more frequent Rest of GI tract	Lethargy Anorexia Weight loss Edema Recurrent colic Diarrhea	Metastasis can occur	T-Cell common B-Cell or T-cell rich B-cell possible
Thoracic (Mediastinal or Thymic)	Mediastinal lymph nodes Thymus	Respiratory signs (nasal discharge, cough, respiratory distress) Edema Jugular vein distension Enlarged lymph nodes	Common metastasis to other organs	T-cell more common B-cell or mixed possible
Cutaneous	Skin Subcutaneous tissue	Single or multiple subcutaneous, firm, non-painful nodules (1-20cm diameter) Wax and wane lesions due to sex-hormones, season, or steroid therapy	Rare involvement of lymph nodes or metastasis	Usually B-cell (T-cell rich B-cell type) T-cell possible
Solitary	Different organs: Liver, Spleen, Upper respiratory airway	-	-	Any



Diagnosis

1. Clinical pathology
 - a. Anaemia, neutrophilia, hyperfibrinogenemia, hypergammaglobulinemia and hypoalbuminemia without other signs of infectious disease (lymphocytic leukemia uncommon), selective IgM absence is possible
2. Body cavity ultrasound examination
 - a. Free fluid detection
 - b. Soft tissue masses
 - c. Abnormal pathologic architecture of parenchymatous organs such as the spleen and liver in particular
3. Body cavity effusion cytology (abdomen or thorax)
 - a. Presence of neoplastic lymphocytes: pleural fluid is mostly diagnostic, peritoneal fluid can be falsely negative to the neoplastic cell presence
4. Ante-mortem confirmation
 - a. Histopathological analysis of biopsy or cytological analysis of fine needle aspirate of lesion and/or body effusion and/or biopsy collected from masses



Liver histopathology of generalized lymphoma. The normal liver architecture is obliterated by tumour cells – note the wide variation in size and morphology of the tumour cells.

How to differentiate from chronic inflammation with reactive lymphocytes: Immunostaining

- Polyclonal population of lymphocytes supports inflammation
- Monoclonal population supports neoplasia

How to differentiate from lymphoid hyperplasia:

- Compression or destruction of normal tissue architecture
- Single population of neoplastic cells:
 - Large cell size
 - Unorganised chromatin pattern
 - Variably sized and shaped nuclei
 - Atypical mitotic figures
 - Immunostaining



Treatment options and prognosis

The treatment options depend on the form of lymphoma. Limited options are available if end-stage/advanced disease is present. Usually treatment is not curative, only palliative – although some solitary and cutaneous lymphoma do respond well to surgical excision.

1. Surgical excision of solitary tumours
 - a. The best site for this is the unusual form of lymphoma that occurs in the conjunctiva of the eye region
2. Radiation of solitary tumours in suitable areas
 - a. There are very few centres that will undertake radiation therapy in horses
3. Chemotherapy
 - a. Multi-drug protocols
 - b. Corticosteroids alone
4. Hormonal therapy
 - a. Some are responsive to progesterone therapy (especially cutaneous forms of lymphoma).

Prognosis in the short-term is fair to poor with therapy, however in the long-term it is extremely poor. In long-term cases of lymphoma, death or euthanasia is the common outcome.

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