Squamous Cell Carcinoma in Horses

Dr Rick Last - BVSc; M.Med.Vet (Pathology)
Specialist Veterinary Pathologist
Vetdiagnostix – Veterinary Pathology Services Group

INTRODUCTION

Squamous cell carcinoma (SCC) is a common neoplasia of equines most often affecting the skin, eyes and genitalia, although a number of cases also affect the oral cavity, guttural pouches, stomach, and urinary bladder.

Cutaneous SCC

Cutaneous squamous cell carcinomas are the most common malignant skin tumors of horses. Tumors arise from regions in the outer root sheath of the hair follicle. Neoplasms are most commonly documented in non-pigmented, sparsely haired areas of skin near muco-cutaneous junctions. Eyes, lips, nose, anus, and external genitalia (especially sheath around penis) are the most common sites. Breeds at increased risk are Belgian, Clydesdale, Shire, Appaloosa, American Paint, Draft horses, Quarter horses and Pinto.

Chronic sunlight exposure, lack of pigmentation and thin haircoat are important predisposing factors, while cutaneous papillomavirus infection has been identified as a contributing factor in some cases, particularly those tumours involving pigmented skin. Burn scars and chronic non-healing wounds are also predisposing factors to cutaneous SCC. Metastatic rates of cutaneous tumours are reported at ±18%.

Treatment

Surgical resection forms the basis of treatment especially where primary wound closure is possible. Surgical margins should be a minimum of 1cm. If complete local excision cannot be achieved then adjunctive therapy is required and includes

- Local Chemotherapy (Topical / Intra-Lesional)

Fluorouracil based creams are commonly used topical chemotherapeutic agents. They are usually applied daily or every other day for 3–5 treatments. These agents are most effective in mitotically active lesions and so de-bulking surgery or laser debridement is advised before use. Intra-lesional cisplatin (injectable suspension or absorbable beads) is the most common locally applied chemotherapeutic agent used in the horse.
• Cryosurgery

Cryosurgery is usually applied with a thermocouple in place to monitor the temperature and depth of the freeze. Generally, three freeze and thaw cycles are used including normal tissue within 1 cm of the tumor to reduce the risk of recurrence. Post-treatment complications include local swelling, hyperemia, hemorrhage, edema and scar tissue contraction or blemishes may also occur with white hairs at the treated site.

• Hyperthermia

Hyperthermia is an easy, convenient and cost-effective adjunctive therapy and but limited by the fact that only small foci <1 cm in diameter can be treated per application.

• Radiation Therapy

Radiotherapy is considered when surgical excision would have an unacceptable functional outcome. Inhibition of tumor growth by radiation depends on tumor volume, mitotic activity and location. Fast-growing tumors are more responsive to radiation than slow-growing masses. Surgery should be combined with radiation, if possible, to minimize the radiation dose.

Occular

SCC of the orbit arise most commonly from the edge of the third eyelid followed by the limbal conjunctiva. Lack of eyelid and conjunctival pigment and exposure to UV radiation are considered important predisposing factors. In 15 - 20 % of cases bilateral involvement may be seen. All breeds of horses may be affected but there is an apparent breed predisposition in heavy draft horses. The mean age of affected animals is approximately nine years. Therapy may influence the prognosis, but even untreated neoplasms are usually slow to metastasize (in such cases usually only to the local lymph nodes). In one retrospective study 10 - 15 % of squamous cell carcinomas exhibited regional or distant spread.

At this site, SCC develops through a series of pre-malignant stages (plague, papilloma) to squamous cell carcinoma in-situ and eventually invasive SCC over several months or years. Spontaneous regression of these pre-malignant stages is reported in ± 25-50% of cases.

Treatment

Surgery alone with complete local excision has a ± 50% success rate. When used in conjunction with cryotherapy, hyperthermia or local chemotherapy the success rate is marked increased to in the region of ± 90%. Complications with larger tumours is that follow-up reconstructive blepharoplasties or corneo-conjunctival surgeries are frequently required.
Penis and Prepuce

SCC of the penis and prepuce occurs with equal frequency in stallions and geldings with an average age of onset of 12 years or older. Squamous papilloma is considered a pre-neoplastic lesion with progression from plaque to papilloma to invasive SCC. *Equus caballus* papillomavirus-2 has been implicated as a promotion factor for SCC at this site. The head of the penis is the most common location for neoplasia with ulceration and necrosis being common. Shaft of the penis and prepuce are less common while the scrotum is a rare location. Invasion of the corpus cavernosum and metastasis to the inguinal lymph nodes is common. Further spread to other organs such as the lung and the liver is less frequent.

Treatment

- Surgery is considered an effective option with larger tumours. Partial phallectomy has been effective only in cases where SCC is confined to the glands and/or body of the penis and there is no proximal spread or involvement of regional lymph nodes.
- Topical fluorouracil is reported to have a ±90% success rate for early small SCC lesions on the penis / prepuce. Fluorouracil is retained in the prepuce for 10–14 days, facilitating treatment at this site.
- Cryotherapy is best used for early pre-cancerous lesions of the penis and prepuce, as it only penetrates a short distance beneath the skin.

Guttural Pouch

Squamous cell carcinoma has been reported to arise within the squamous epithelium of the guttural pouch of aged horses. Tumours are frequently associated with vestibular and facial nerve dysfunction and nasal discharge. SCC at this location are characterised by locally infiltrative growth patterns. Neoplasia may extend into the oropharynx, into the tympanic cavity, invade through the temporal bone to the calvaria as well as through the mandible into the regional lymph node. Distal metastatic spread to the lung is rarely reported.

Treatment

Surgery remains the only viable treatment modality at this location, although locally infiltrative growth patterns complicate surgical options.
Oral Cavity

SCC of the gums and hard palate develop as a consequence of chronically irritated alveolar epithelium in cases of periodontitis. At these locations, these tumours exhibit destructive locally infiltrative growth patterns and are prone to metastasis to the regional lymph nodes. Invasion of tooth roots, with tooth loss, and maxillary / mandibular bone is common. Maxillary tumours often extend into the adjacent sinuses plus nasal, orbital and cranial cavities. Glossal SCC is an uncommon form of oral SCC in the horse.

Treatment

Combinations of surgery and metronomic chemotherapy have been attempted with varying outcomes.

Stomach

Gastric SCC are the most common tumour of the stomach of horses. They arise from the pars esophagea and are most commonly documented in middle aged to older animals. Clinical signs are non-specific including unexplained anorexia, in some instances dysphagia, and weight loss; but symptoms usually only become evident when the neoplasia is in an advanced state. Invasion through the stomach wall with peritonitis is common; while extension up the distal oesophagus with occlusion is less frequently documented.

Treatment

Treatment of gastric SCC is generally not attempted as the disease is usually advanced at presentation with the prognosis being grave.

Urinary Bladder

Although urinary bladder tumours are rare in the horse, SCC are the most common bladder tumour of horses.

Treatment

Radical surgical resection with urinary diversion is the only realistic therapy option available and so rarely performed.
DIAGNOSTICS

Cytological preparations (FNA, impression smears, scrapings) are hampered by the fact that cells are interpreted in isolation with no correlation to architecture at the site sampled. Therefore, cytology at best can suggest a diagnosis of SCC. However, biopsy of affected tissue into formalin for histopathology remains the gold standard for the diagnosis of SCC.

Histopathology allows for critical evaluation of cellular atypia, architectural changes, mitotic index, invasive growth patterns and completeness of local excision. All of this information is critical to accurate prognostication and the development of effective and relevant treatment modalities.

REFERENCES