Assessment of tumour cell plasticity in feline and equine papillomavirus-positive versus -negative oronasal SCC

Carina Strohmayer, Andrea Klang, Ingrid Walter, Stefan Kummer, Christoph Jindra, Torben Redmer, Sibylle Kneissl, Sabine Brandt | Vetmeduni Vienna, Veterinärplatz 1, A 1210 Vienna

Objective

Squamous cell carcinoma of the head and neck (HN-SCC) is a common malignant tumour in humans and animals (Fig. 1-3).[1-3] The ability of tumour cells to switch from epithelial to mesenchymal, endothelial or therapy-resistant stem cell-like phenotypes promotes disease progression and metastasis.[4] In animals, phenotype-switching is poorly understood. We screened papillomavirus (PV)-positive versus -negative equine and feline oronasal SCCs for expression of selected endothelial, mesenchymal and stem cell markers by immunohistochemistry (IHC) to address tumour cell plasticity.

Mat & Meth

DNA extracted from formalin fixed paraffin embedded (FFPE), histopathological confirmed, feline and equine oronasal SCC was PCR-screened for presence of carcinogenic PVs. FFPE-sections of PV-positive versus PV-negative tumours were analysed by IHC for the expression of cytokeratin, vimentin, COX2, β-catenin, CD271, and CD44.

Results

PV-PCR scored positive for 5/85 feline and 11/49 equine tumours. IHC from 15 PV-negative and one PV-positive feline, and 11 PV-negative and 11 PV-positive equine SCC revealed epithelial-to-mesenchymal transition events (Fig. 4), with vimentin-positive cells ranging between <10 and >50% (Fig. 5). The vast majority of tumours stained positive for CD44 and CD271, indicating the presence of stem cell-like cell phenotypes within lesions and infiltrative tumour cell fronts (Fig. 6-7). These findings were in accordance with tumour stages.

Conclusion

Currently, reliable imaging markers for oronasal SCC prognosis and response to treatment in cats and horses are lacking. Our findings are suggestive for CD44 and CD271 representing interesting prognostic marker candidates for **sensitive gadolinium-enhanced MR imaging** of these tumours. In this context, we are looking for **research cooperation to develop and test** such a system.

Funding Source: PhD Project Vetmeduni Vienna

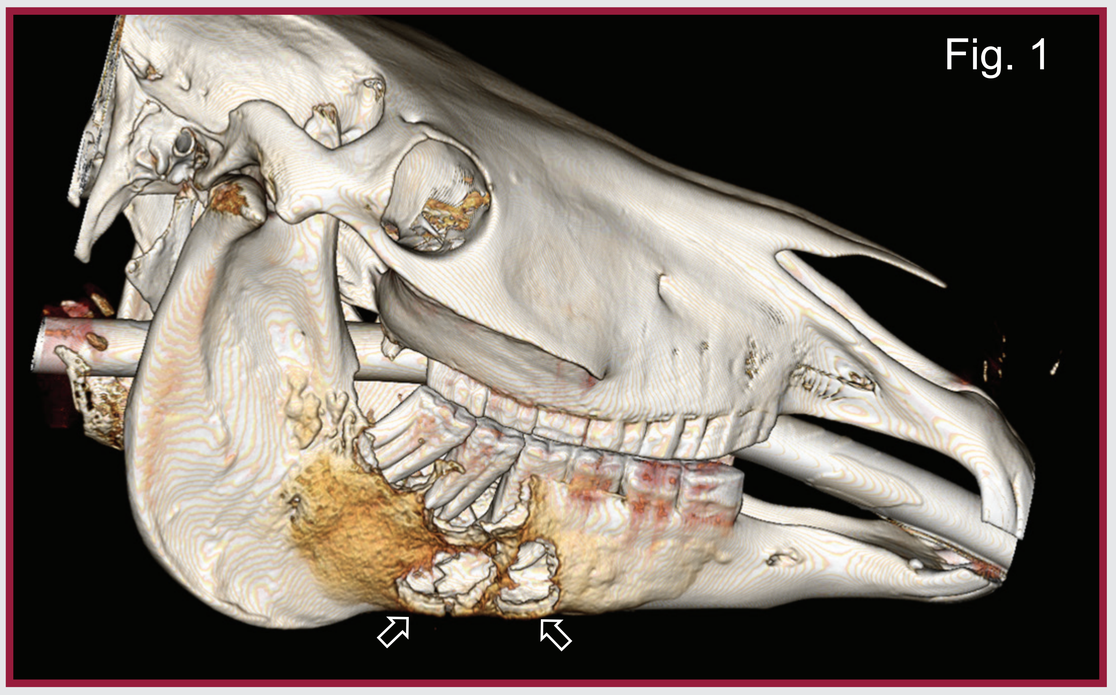
Literature

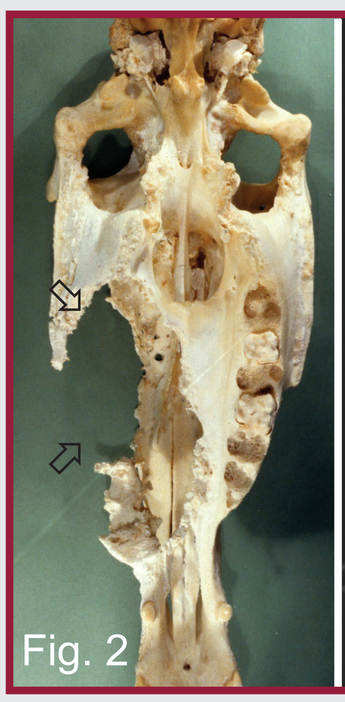
1. Paver EC, Currie AM, Gupta R, Dahlstrom JE. Human papilloma virus related squamous cell carcinomas of the head and neck: Diagnosis, clinical implications and detection of HPV. Pathology. (2020) 52:179–191. doi: 10.1016/j.pathol.2019.10.008.

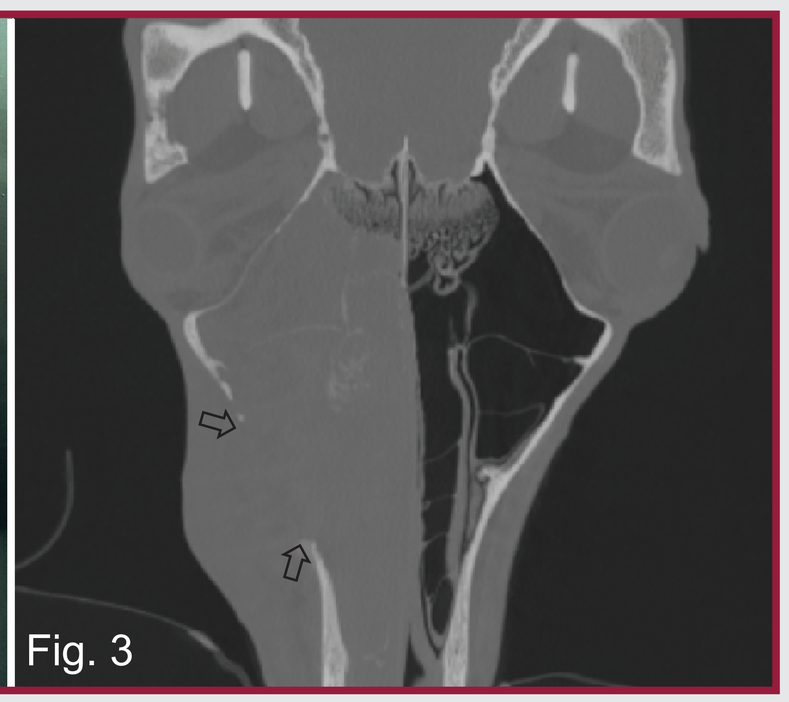
2. Head KW, Dixon PM. Equine nasal and paranasal sinus tumours. Part 1: Review of the literature and tumour classification. Vet J. (1999) 157:261–278. doi: 10.1053/tvjl.1998.0370.

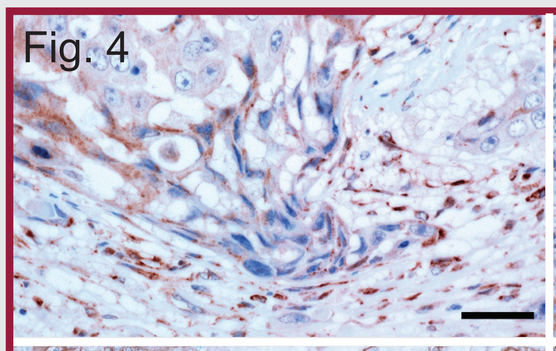
3. Bilgic O, Duda L, Sánchez MD, Lewis JR. Feline oral squamous cell carcinoma: Clinical manifestations and literature review. J Vet Dent. (2015) 32:30–40. doi: 10.1177/089875641503200104.

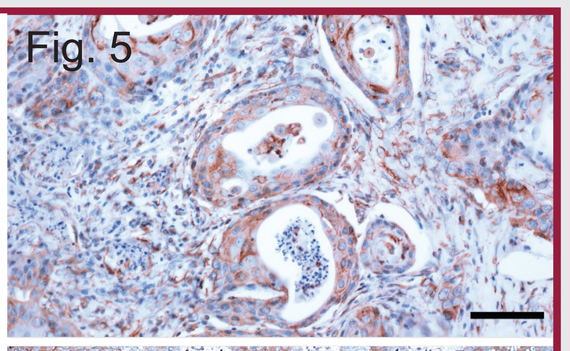
4. Jayanthi P, Varun BR, Selvaraj J. Epithelial-mesenchymal transition in oral squamous cell carcinoma: An insight into molecular mechanisms and clinical implications. J Oral Maxillofac Pathol. (2020) 24:189. doi: 10.4103/jomfp.JOMFP_334_19

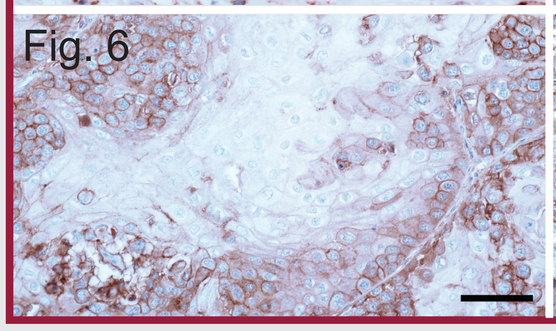












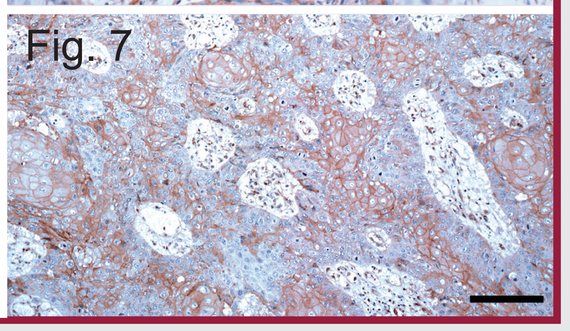


Fig. 1 3D surface model of a horse with oral squamous cell carcinoma. The right mandibula shows a large osteolytic defect (arrows). **Fig. 2** A macerated equine head with the mandibula excluded and viewed from ventral. Most of the right maxilla was replaced by sinonasal squamous cell carcinoma which caused severe osteolysis (arrows). **Fig. 3** A dorsal CT image in bone window of an equine head at the level of the paranasal sinuses. The nasal and paranasal sinuses are filled by a soft tissue mass (arrows) which is extending through an osteolytic defect of the maxilla. **Fig. 4** Transformation of polygonal epithelial tumour cells in spindle cell morphology phenotype indicating epithelial-mesenchymal transition in a PV-negative, lingual squamous cell carcinoma of a horse. Immunohistochemical staining with CD271 antibody, Bar = 40 µm. **Fig. 5** Detection of Vimentin in a PV-negative, maxillary sinusoidal squamous cell carcinoma of a horse. Bar = 80 µm. **Fig. 6** Marginally emphasized membranous immunostaining of CD44 in a PV-negative, mandibulomaxillary squamous cell carcinoma of a horse. Bar = 80 µm. **Fig. 7** Detection of CD271 in a PV-positive, oral squamous cell carcinoma of a horse. Bar = 60 µm.

Address correspondence
Dr. Carina Strohmayer, Dipl.ECVDI
A 1210 Vienna, Veterinärplatz 1
T +43 664 60257- 6456
E carina.strohmayer@vetmeduni.ac.at

vetmeduni

Download this Poster using QR-Code >>>
Presented at the Medical Imaging Cluster Festival 2022