

CUTANEOUS PAPILOMA IN CATTLE

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Abstract

Bovine papilloma virus (BPV) -2 is the most common on haired skin. A 4-year-old Fleckviech Simmental cattle, weighing 650 kg, with the presence of a formation on the upper eyelid of the right eye occupying approximately one third of it, was examined. The lesion was nodular, hyperkeratotic, cauliflower-like growths. Hematological abnormalities were lymphocytopenia, neutrophilia which indicates inflammation, infection, and hemoconcentration which indicates mild dehydration. Changes in liver enzymes combined with low blood sugar and ketone bodies in urine indicated ketosis status. Histological examination showed a hyperplastic epithelium covering an ordered proliferation of mesenchymal cells. Numerous large cells with blue-gray cytoplasm were visible within the hyperplastic epithelium. Corroborating the data of the clinical and paraclinical examinations, the diagnosis of cutaneous fibropapilloma was made.

Key words: bovine papillomaviruses, fibropapilloma, koilocytes

Bovine papillomaviruses (BPVs) infections are similar to human papillomaviruses (HPVs) when the PV gains access to a basal cell, probably due to microtrauma (Schiller J.T. et al, 2010) resulting in a productive infection of cutaneous or mucosal epithelium.

Papillomavirus infection of cattle causes mucocutaneous papillomas that develop on the

haired skin, tongue, teats, penis, and vulva and upper alimentary papillomas that develop in the oral cavity, esophagus, and rumen. Mucocutaneous papillomas (warts) are more common in younger animals, and most cattle probably develop warts during their lives (Munday J.S., 2014).

MATERIAL AND METHOD

A 4-year-old Fleckviech Simmental cattle, weighing 650 kg, with the presence of a formation on the upper eyelid of the right eye occupying approximately one third of it, was examined at farm A from northeastern Romania.

Blood samples were obtained from the jugular vein using vacuum tubes containing EDTA for hematological examination of whole blood, and without anticoagulant for serum biochemical analysis.

Hematocrit, hemoglobin, mean corpuscular volume (MCV), mean corpuscular hemoglobin (MCH), mean corpuscular hemoglobin

concentration (MCHC), red and white blood cells count (RBC and WBC, respectively) analyses were done by an automatic analyzer (VetScan HM5®, Abaxis®, Germany) using reference levels for cattle (George J.W. et al, 2010).

Serum concentrations of alanine aminotransferase (ALT), alkaline phosphatase (ALP), total bilirubin, creatinine, urea nitrogen, glucose, total protein, albumin, globulin, amylase, sodium, potassium, calcium and phosphorus were determined in a biochemical automatic analyzer (VetScan VS2®, Abaxis®, Germany) using reference levels for cattle (Kaneko J.J. et al, 2008).

Fine needle aspiration biopsies (FNAB) and punch biopsy were performed from the skin lesion of the upper eyelid (*figure 1*).

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Figure 1 Punch biopsy of a cutaneous fibropapilloma in cattle

RESULTS AND DISCUSSIONS

Following clinical examination, our case was found to be clinically healthy, with no general changes in health. Examination of the skin confirmed the presence of a spherical formation, of hard consistency, located on the upper eyelid of the

right eye, measuring 2cm / 1.5cm / 2cm, showing a slight increase in sensitivity of the area and a slight discomfort in blinking. The upper surface of the formation had a rough character and a gray color (*figure 2*)

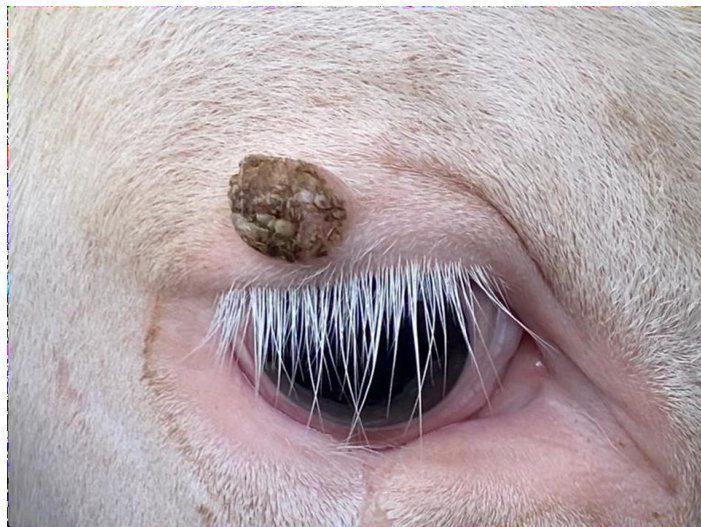


Figure 2 Fibropapilloma located on the upper eyelid of the right eye. The lesion is nodular, hyperkeratotic, cauliflower-like growths

Hematological abnormalities were lymphocytopenia ($0.88 \times 10^9/L$, normal 2.5-7.5), neutrophilia ($9.03 \times 10^9/L$, normal 1.8-6.3 $\times 10^9/L$) which indicates inflammation, infection, and haemoconcentration which indicates mild dehydration.

Serum biochemistry showed low albumin (2.2 g/dL, normal 3.03-3.55 g/dL) and high alkaline phosphatase values (199 UL, normal 27-107 U/L), indicating liver disease. Changes in liver

enzymes combined with low blood sugar (40 mg/dL, normal 40-100mg/dL) and ketone bodies in urine indicated ketosis status.

Cytological examination following fine needle aspiration biopsy revealed the presence of erythrocytes and leukocytes and round epithelial cells, with an increased ratio of basophilic cytoplasm (*figure 3*).

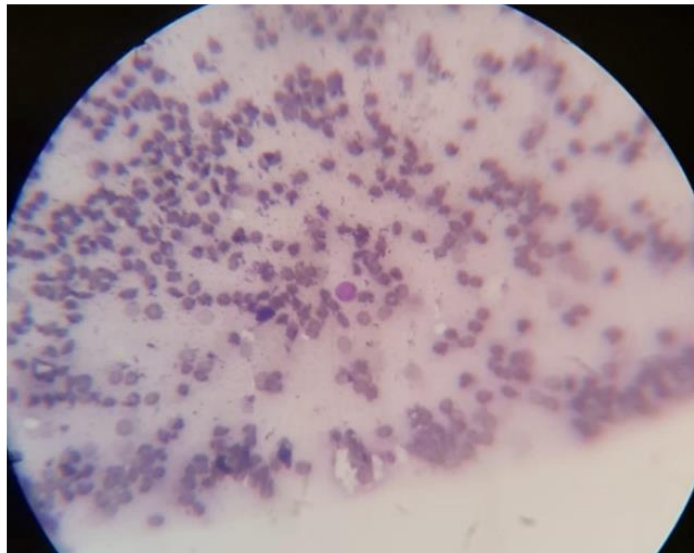


Figure 3 Erythrocytes, leukocytes and round epithelial cells with an increased ratio of basophilic cytoplasm from fine needle aspiration biopsies of a cutaneous fibropapilloma

Histological examination showed a hyperplastic epithelium covering an ordered proliferation of mesenchymal cells. The hyperplastic epithelium extends into the mesenchymal tissue. The area suggests a papillomaviral etiology, consisting of cells with clear, lightly colored cytoplasm in the superficial

epidermis (Solcan C., 2011). Large keratinocytes are observed that contain dark, reduced nuclei, surrounded by a clear halo (koilocytes) often with agglomerated keratohyalin granules indicating fibropapilloma (*figure 4*).

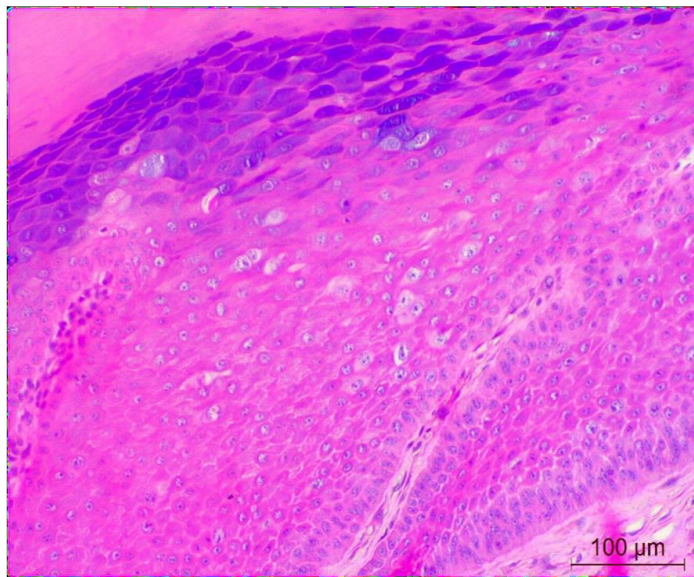


Figure 4 Cutaneous fibropapilloma in cattle. Numerous large cells with blue-gray cytoplasm are visible within the hyperplastic epithelium. Hematoxylin and eosin

Bovine mucocutaneous papillomas include squamous papillomas and fibropapillomas. Squamous papillomas have the same histological appearance as human papillomas. In contrast, fibropapillomas consist of a proliferation of mesenchymal cells covered by hyperplastic epithelium.

The mesenchymal cells are most densely packed close to the surface of the fibropapilloma (Jelinek F., Tachezy R., 2005). Fibropapillomas are generally considered to be caused by the delta-

PVs BPV-1 and BPV-2. Current evidence suggests that most cattle are infected by BPV-2, and lymphocytes may provide a reservoir for infection (Stocco dos Santos R.C. *et al*, 1998; Roperto S. *et al*, 2011).

BPV-2 is able to infect and replicate in a wider range of tissues, including the transitional epithelium of the bladder (Roperto S., 2013) and the chorionic epithelium of the placenta (Roperto S. *et al*, 2012).

BPV-2 L1 protein production has also been reported in circulating lymphocytes, suggesting viral replication in nonepithelial cells.

Regarding the treatment, it is uncertain whether vaccination influences the regression of cutaneous papillomas in cattle. Injecting wart tissue harvested from the cow (autologous vaccination) has been widely used. In humans, most studies have not detected any therapeutic effect of vaccination after papilloma development (Vandepapeliere P., 2005).

CONCLUSIONS

Corroborating the data of the clinical and paraclinical examinations, the diagnosis of fibro papillomatosis was made. Given the increased likelihood of regression of the papillomatosis neoplastic formation and the complications that may occur after trying to treat this disease, it was decided that the application of a treatment would not provide satisfactory results, but her health continued to be monitored.

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