BOVINE PAPILLOMAVIRUS LOAD IN EQUINE SARCOIDS AND NORMAL EQUINE SKIN

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Background: Sarcoids are common in the horse, but their pathogenesis remains poorly understood. The role of bovine papillomavirus (BPV) remains controversial, partly because BPV is found in both sarcoids and normal skin. While viral load has been shown to vary between sarcoi clinical types, no attempt has been made to investigate whether there is an association between BPV load and sarcoi development.

Objectives: To quantify the relative load of BPV in sarcoids and normal equine skin.

Study design: Case–control study.

Methods: Fibroblasts were dissected from formalin-fixed paraffin-embedded (FFPE) biopsies of 16 histologically confirmed periorbital fibroblastic sarcoi and 9 normal periorbital skin specimens, and DNA isolated. The presence of BPV DNA was initially assessed by end-point PCR assay of a 244 bp E2-E5 gene fragment. Viral copy number was subsequently measured by quantitative PCR assay of an 86 bp E2 gene amplicon.

Results: BPV DNA was detected in 16 sarcoids and 6 normal skin biopsies, and was quantifiable in all sarcoids and four normal skin specimens. The BPV E2 amplicon appeared to be generated from the remaining five normal skin sample DNAs, but the copy number was too low to quantify. A significant difference between the sarcoid and normal skin BPV loads was observed (t-test; P = 0.003). The BPV load of sarcoids ranged from 32 to 1905 copies/cell, and of normal skin from 0.01 to 0.67 copies/cell.

Main limitations: Small sample size; low quantities of degraded FFPE tissue DNA and RNA.

Conclusions: Although BPV was found in normal equine skin samples, the viral load was 47–2,843 times lower than in equine sarcoids. BPV load may be important in the development of equine sarcoids, and differences in viral load may at least partially explain why the presence of BPV DNA is not always coincident with sarcoi development.

Competing interests: None declared.

Ethical animal research: This study was approved by the Animal Health Trust's Ethics Committee, application number 53-2016.

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A COMPUTER MODEL OF THE EQUINE ARTERIAL CIRCULATION TO GAIN DEEPER INSIGHTS INTO EQUINE ARTERIAL HAEMODYNAMICS

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Background: Arterial rupture in horses is not uncommon and may occur during exercise, after phenylephrine administration or during delivery (uterine artery). In human medicine, computer models are frequently used to study arterial haemodynamics and understand normal and abnormal characteristics of pressure and flow waveforms. However, large differences exist between human and equine aortic arch and arterial branching patterns.

Objectives: To develop a computer model of the equine arterial circulation, in order to study local intra-arterial pressures and flow dynamics.

Study design: Experimental.

Methods: To create a mathematical model based upon equine anatomical and haemodynamic data, post-mortem anatomical data of the arterial tree (arterial lengths, diameters and branching angles) were obtained from five horses, combined with in vivo collected ultrasonographic flow profiles from the common carotid artery, external iliac artery, median artery and aorta, and invasively collected pressure curves from carotid artery and aorta.

Results: With a resting heart rate set at 40 beats/min, the model was able to simulate an aortic systolic/diastolic pressure of 136/81 mmHg, a cardiac output of 33 L/min, and a stroke volume of 816 mL. A good match between the modelled and in vivo measured flow profiles was found, with discrepancies for peak flow velocity of only 10 ± 8% (mean ± s.d.).

Main limitations: Data from a limited number of horses were used.

Conclusions: The modelled flow profiles closely matched true, ultrasonographic flow profiles. This model might be used to predict changes in flow profiles and local pressures as a result of strenuous exercise or altered arterial wall properties. As such, the model may contribute to a better understanding of the pathophysiology of arterial rupture in horses.

Competing interests: None declared.

Ethical animal research: The procedures were approved by the Ethical Committee, Faculty of Veterinary Medicine, Ghent University (EC 2016/104). For the privately owned horses, informed owner consent was obtained.

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