Doppler Indices of the Equine Fetal Carotid Artery Throughout Gestation

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1. Introduction
Assessment of pregnancy viability in the equine patient is currently based on gestational profiles of limited prognostic value. In recent years, Doppler technology has been applied to uterine and umbilical arteries of pregnant mares to monitor fetal responsive hemodynamics, suggestive of compromise. To date, uterine artery Doppler indices failed to provide sufficient evidence of pregnancy viability and the umbilical cord of the equine fetus is inconsistently visualized past 250 days gestation. The objectives of this study were to 1) evaluate intracranial blood flow impedance of the fetal carotid artery, and 2) establish reference values for healthy, uncomplicated pregnancies.

2. Materials and Methods
For the purpose of this study, 12 pregnant mares were examined at 2 to 3 weeks interval by B mode and Doppler ultrasonography and a novel technique was developed for Doppler evaluation of the carotid artery in the equine fetus. Additional biophysical and biochemical parameters were collected to demonstrate appropriate pregnancy development.

3. Results and Discussion
In this study, Doppler waveform analysis of fetal intracranial vasculature demonstrated an elevated blood flow impedance, showing a significant negative correlation of carotid Doppler indices with gestational age (resistive index: \( R = -0.499; P < .001 \); pulsatility index: \( R = -0.306; P < .001 \)). Results were comparable to human fetal trends for the middle cerebral artery from mid gestation to term.

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Declaration of Ethics
The Authors have adhered to the Principles of Veterinary Medical Ethics of the AVMA.

Conflict of Interest
The Authors have no conflicts of interest.

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