ABSTRACTS

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PREGNANCY MONITORING IN DOGS BY 3D AND 4D ULTRASONOGRAPHY

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Objectives - The purpose of this study was to evaluate the use of 3D and 4D ultrasound for staging embryonic/fetal development and for predicting pregnancy outcome.

Materials and methods - 11 ultrasound (US) exams were performed on 22 embryos/fetuses in 7 bitches (6 Labradors, 1 collie, aged from 2-7 y) with known LH surge and birth date. Each Labrador had a single US exam (ranging from 26 to 37 days after LH surge) and the collie was scanned 5 times on day 27, 35, 37, 43, 59 after LH surge. The bitches were transabdominal examined in standing position or in lateral recumbency without any restraint. For this study two different 3D-ultrasound systems (stationary Voluson 730 Expert, portable Voluson i; GE Medical Systems Kretztechnik GmbH, Austria) were used. Both were equally equipped with a 3D microconvex transducer (RNA 5-9 MHz) and a 3D linear transducer (RSP 6-16 MHz).

Results - Between the first and the second exam the collie lost one of the six concepti due to partial resorption. Four of the six Labradors have had viable embryos/fetuses and there was no loss during the remaining pregnancy until birth. One female Labrador showed clear signs of a total embryonic resorption (2 empty embryonic cavities) and one Labrador was not pregnant and suffered from a subclinical purulent urinary bladder infection. On the basis of the measurements in the 3D data set using the tomographic ultrasound imaging mode (TUI) [1], detailed growth graphs for the normal embryogenesis (crown-rump-length, biparietal diameter, femur length, thorax diameter were calculated and compared with the literature [2]. There was no significant difference between our results and the body growth curves from England and Russo (2006). In render mode the surface structures were imaged, depicting the transition of the oval shaped embryos to the complete foetus with its characteristic head and leg formations as well as the relationship between the conceptus and the formation of the extraembryonic organs and their role in placenta development [3]. In inverse render mode the fluid filled compartments of the amnion and allantois were displayed separately. In addition to the morphometric study, there was also an interest in intrauterine behaviour as marker for viability. For this purpose, 4D-ultrasound technology (3D in real-time) was applied. We did not find behavioural differences between the Labrador and the collie fetuses in context of their intrauterine behavioural pattern. However, we found dramatic differences between the different foetal stages ranging from simple body shaking (day 27) to clear barking behaviour (starting day 35). According to these preliminary findings we concluded that intrauterine behaviour is an important element during embryogenesis. There is also a strong indication that intrauterine behaviour shows parallels to known postnatal behaviour. 4D-ultrasound is, therefore, of great importance in identifying species specific behavioural elements during intrauterine development. The definition of these key behaviours and the consequences of their presence or absence for the life history of an individual will improve our understanding of evolution and may, help in clinical diagnosis of behavioural disorders.

Conclusions - the application of 3D and 4D ultrasound offered a new, not fully explored field of the intrauterine assessment of the health in canine pregnancies.
References

