

Construction of a robust beagle model for EIT applications

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CONSTRUCTION OF A ROBUST BEAGLE MODEL FOR EIT APPLICATIONS

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INTRODUCTION Finite element (FE) models are used to reconstruct electrical impedance tomography (EIT) images from surface voltage measurements. The main objective of this abstract was to calculate an averaged FE model using helical CT scans.

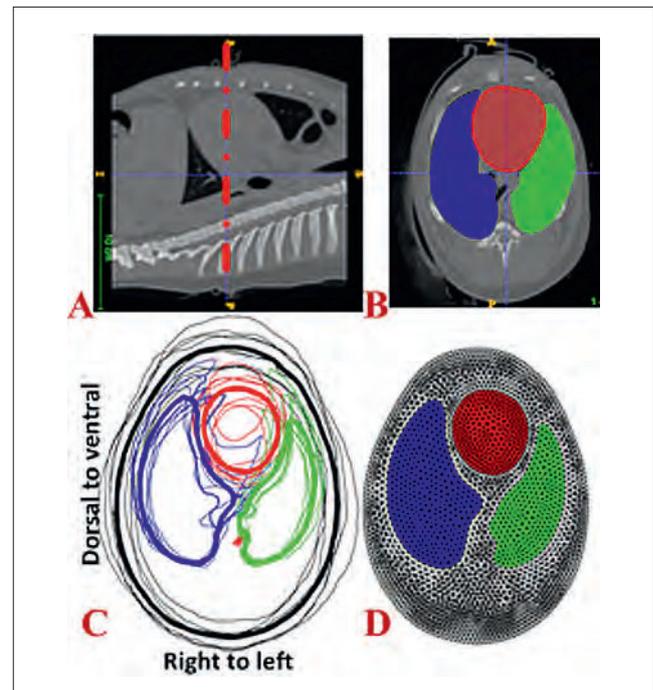
METHODS The anatomical landmark-based “best belt position” was determined according to the equation: sternum-length in cm \times 0.17 = cm cranial to xyphoid [1] and an EIT belt without metal electrodes placed around the thorax of 9 healthy anaesthetised supine (dorsal recumbency) beagles (12.9 \pm 1.7 kg, 2.8 \pm 0.2 yrs). Inspiratory apnoea CT images were acquired of the whole thorax. The CT slice from the intervertebral space (IVS) where the belt was identified was exported as DICOM file. Thereafter heart, lungs and thorax contours were segmented by ITK-SNAP [2] and exported as vtk-files. Matlab was used to align, to calculate an average contour from all dogs and to generate the corresponding average FE model.

RESULTS AND CONCLUSION It was easy to find the landmark. However, based on the CT scout view the belt was too caudal in three dogs due to the relocatable skin. CT scans were redone after correcting the belt position. The belt was identified in the CT images in all dogs over the 6th intercostal space and at the level of the 6th (n=5) and 7th (n=4) sternebrae. Contours of thorax shape were similar in all animals. The left lung shape varied in the ventral non-dependent parts, while the right lung shape varied in the medio-ventral parts. As could be expected the heart contours differed substantially between individuals. Further studies and calculations are necessary to validate the contours

in other breeds and to characterize the differences between an averaged and an intra-individual model.

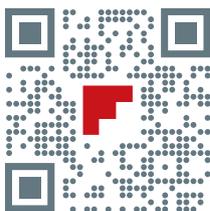
This study gained governmental approval from the Canton Zürich, Switzerland (Nr. 185/2012).

IMAGE



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