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CONTRIBUTION OF FINITE ELEMENT MODEL OF ANIMALS TO DATA BASE

Andreas Waldmann*¹, Carolina Meira², Ulrike Auer³,
Stefan Böhme⁴, Christina Braun³, Stephan Böhm¹, Martina Mosing²

¹Swisstom AG, Landquart, ²Vetsuisse Faculty, University of Zurich, Zurich, Switzerland,
³Anaesthesiology & Intensive Care, University of Veterinary Medicine Vienna, ⁴Department of Anesthesia,
Pain Management and General Intensive Care Medicine, Medical University of Vienna, Vienna, Austria

INTRODUCTION Finite element (FE) models are used to reconstruct electrical impedance tomography (EIT) images from boundary voltage measurements. Usually, these models are created by segmenting computer tomography (CT) scans of individual subjects and by building respective FE models from these segments. While for humans several pre-complied modes have become publicly available, animal models are obtainable only for those species (sheep and pig) frequently used as experimental models in human medicine.

OBJECTIVES The objective of this study was to create FE models for veterinary use of four different species, to integrate them into ibex [1] and to contribute them to EIDORS [2].

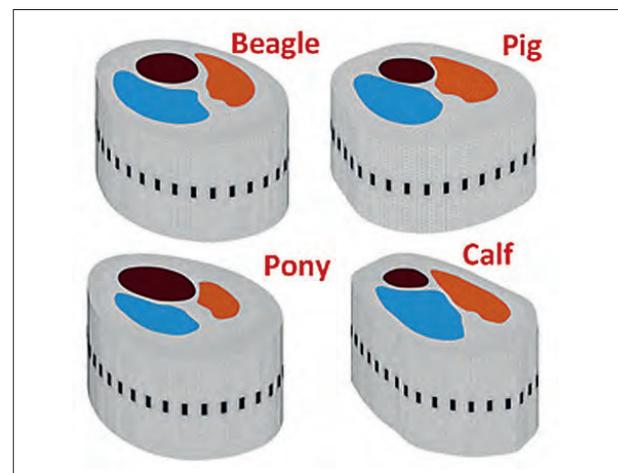
METHODS CT scans from 8 individuals per species were evaluated. One CT image corresponding with the electrode plane in beagles (6th intercostal space [ICS]), calves (6th ICS), pigs (5–6th ICS) and in ponies (7–8th ICS) were manually segmented. In order to increase the robustness of these models the 8 segmented scans were averaged to obtain a mean model per species. Lungs, heart and thorax were segmented in the electrode plane and mean contours were calculated. The corresponding FE model was created by extruding the models along the animals' caudal to cranial axis. 32 electrodes were then placed equidistantly onto the models.

RESULTS The models for the first four species are illustrated in Fig. 1 with obvious anatomic differences between them. These finite element models will be made publically available on EIDORS. In addition, the models were converted into a reconstruction matrix and integrated in ibeX. This way,

recorded animal EIT data can easily be reconstructed and analysed.

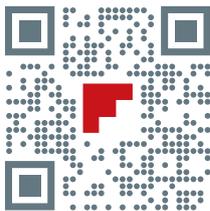
CONCLUSION The importance of accurate boundary shapes for EIT was emphasized by Grychtol et al. [3]. We believe that the models developed in this project will facilitate and improve the image reconstruction of these four species.

IMAGE



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