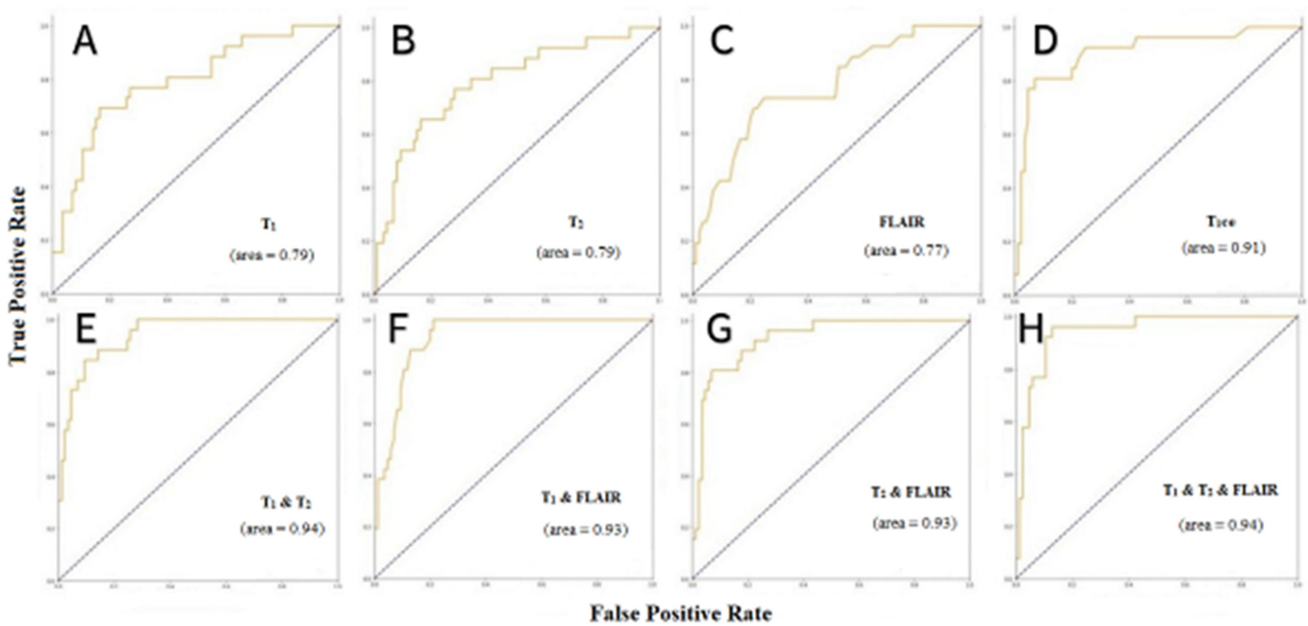

Figure 1 (abstract PS08.09): The *area under the receiver operating characteristic* (*AUROC*) curves for the classification task of differentiating between high- and low-grade gliomas. Top row (A, B, C, and D): single-contrast classifiers; Bottom row (E, F, G, and H): multi-contrast classifiers; T_1ce: post-Gd T_1-weighted; FLAIR: T_2w fluid attenuation inversion recovery.

PS08.10
DEVELOPMENT OF AN ANTHROPOMORPHIC BRAIN PHANTOM FOR MAGNETIC RESONANCE-BASED ELECTRIC PROPERTIES TOMOGRAPHY

A. Arduino[1], L. Berta[2], M. G. Coriasco[3], A. Troia[1], U. Zanovello[1], L. Zilberti[1], G. Morana[4], O. Rampado[2], O. Bottauscio[1]

[1]*Istituto Nazionale di Ricerca Metrologica, Divisione di Metrologia dei materiali innovativi e scienze della vita, Turin, Italy*
[2]*AOU Città della salute e della Scienza, Medical Physics, Turin, Italy*
[3]*Università degli studi di Torino, Dipartimento di Neuroscienze, Turin, Italy*
[4]*AOU Città della salute e della Scienza, Neuroradiologia, Turin, Italy*

Introduction: Magnetic resonance-based electric properties tomography (EPT) is a quantitative imaging technique that provides an estimate of the spatial distribution of the electric properties at radiofrequency (RF) inside the human body[1]. Recent clinical studies showed potential beneficial applications of EPT in breast cancer diagnosis[2] and treatment monitoring of glioblastoma[3]. In order to assess accuracy and precision of the EPT outcomes, a heterogeneous anthropomorphic brain phantom is developed and its stability over time will be monitored through a 3T MRI scanner.

Materials & Methods: A phantom composed of two tissue-mimicking materials reproducing the electric and magnetic properties of white matter (WM) and grey matter (GM) was produced. The molds of WM and GM were 3D-printed. First, the material was poured in the WM mold. Once the material solidified, the WM gel was extracted and placed in the GM mold, where the second material was poured. There are no layers between the two materials.

EPT input are acquired with a 3T Ingenia scanner (Philips) driven by a 3D SSFP sequence. The acquisition protocol was tested on a saline solution and will be applied to image the phantom.

Results: Figure 1a shows the 3D-printed GM mold and the obtained WM gel.

Figure 1b shows the test results. The conductivity maps obtained by phase-based Helmholtz-EPT (EPTlib 0.4.0[4]) are homogeneous and slightly overestimate (~20%) the expected conductivity in accordance with literature.

Summary: The upcoming activity will allow us to assess EPT in heterogeneous domains under controlled conditions and assess heterogeneous phantom stability.

Acknowledgements:

Appendix:

References:

[1] Katscher U. and Van Den Berg C. A. T., ‘Electric properties tomography: Biochemical, physical and technical background, evaluation and clinical applications’, *NMR in Biomedicine*, vol. 30, no. 8, p. e3729, Aug. 2017, doi: 10.1002/nbm.3729.
[2] Mori N. *et al.*, ‘Diagnostic value of electric properties tomography (EPT) for differentiating benign from malignant breast lesions: comparison with standard dynamic contrast-enhanced MRI’, *Eur Radiol*, vol. 29, no. 4, pp. 1778–1786, Apr. 2019, doi: 10.1007/s00330-018-5708-4.
[3] Park J. E. *et al.*, ‘Low conductivity on electrical properties tomography demonstrates unique tumor habitats indicating progression in glioblastoma’, *Eur Radiol*, vol. 31, no. 9, pp. 6655–6665, Sep. 2021, doi: 10.1007/s00330-021-07976-w.
[4] Arduino A., ‘EPTlib: An Open-Source Extensible Collection of Electric Properties Tomography Techniques’, *Applied Sciences*, vol. 11, no. 7, p. 3237, Apr. 2021, doi: 10.3390/app11073237.

European Journal of Medical Physics 125S1 (2024) 104203
doi:10.1016/j.ejmp.2024.104203

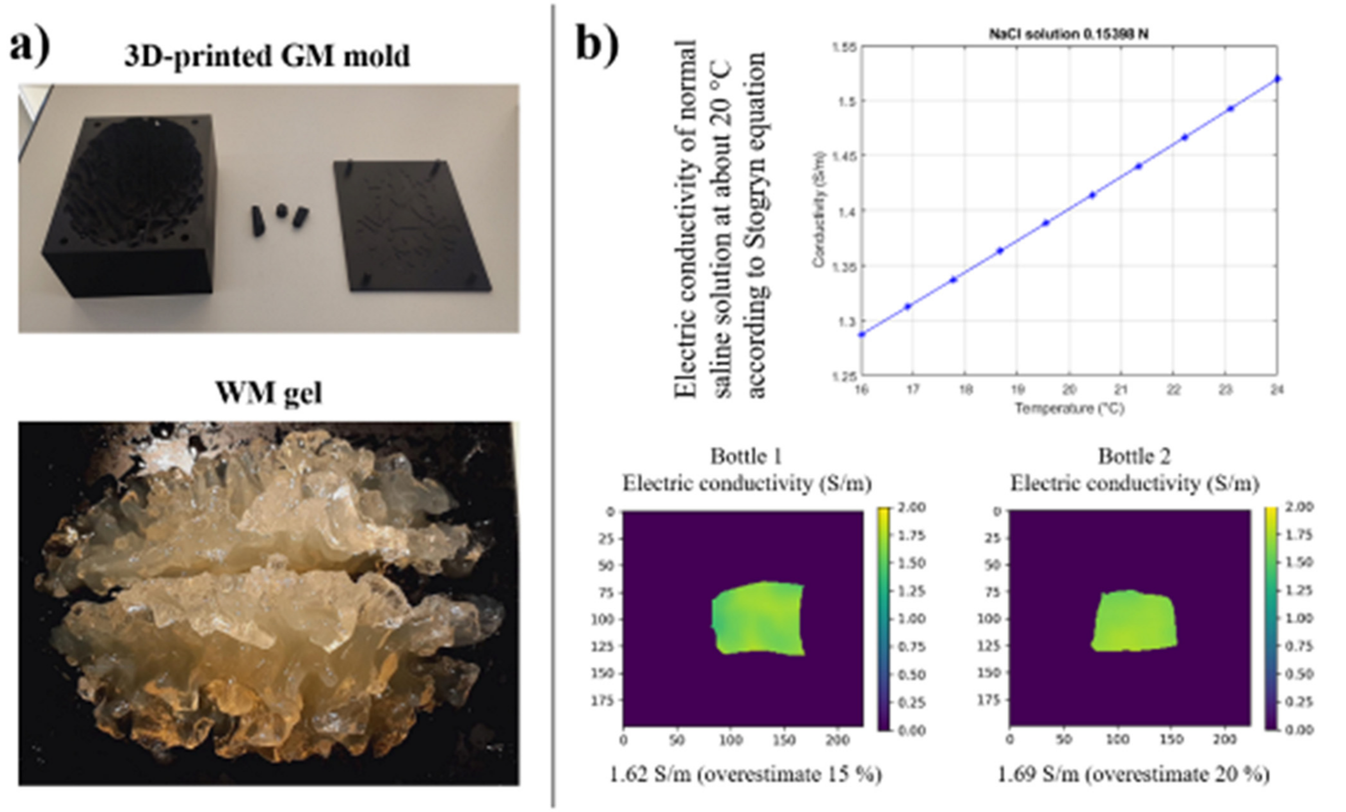

Figure 1 (abstract PS08.10): (a) 3D-printed GM mold and WM gel; (b) conductivity maps obtained with phase-based Helmholtz-EPT applied to normal saline solution. The phase-based measured conductivity is overestimated as expected by literature.

PS08.11
AN UNUSUAL PRESENTATION OF AN RF BURN ASSOCIATED WITH INVASIVE BLOOD PRESSURE MONITORING

E. Kenny[1,2], L. Lomasney[1], C. McEntee[1], J. Murray[1,2], F. Bolster[1,2], P. Gilligan[1,2]

[1]*Mater Misericordiae University Hospital, Dublin, Ireland*
[2]*University College Dublin, Dublin, Ireland*

Introduction: This work describes the initial presentation, follow-up and learnings from an unusual RF burn noted at one of our sites on a 1.5T scanner. The particular burn was associated with invasive blood pressure monitoring.
Methods: An ICU patient had a transducer fitted in ICU prior to their scan and, when brought to MR, the transducer was connected to an MR Conditional monitor and associated cable. The mechanically ventilated patient had been positioned in the routine manner using the standard departmental setup for invasive blood pressure monitoring. There were no loops in the cabling, however, the cable was within the bore of the magnet while scanning and it was in contact with the patient's shoulder. Upon completion of the exam, a 2 cm linear wound indicating a potential burn was visible on the patient's shoulder.
Results: The multidisciplinary response to the RF burn raised issues in terms of in-house procedures for invasive monitoring of critically ill patients in MR. Issues were raised regarding the education and training associated with each piece of equipment brought into the MR scan room. In some cases the information on conditions was not readily available. Further issues came to light around CE marking of combined products and the MR conditions of such devices.
Summary: This was the first report of a burn at any of our sites. The follow-up from the burn enabled us opportunity to review safety protocols and governance for invasive monitoring of critically ill patients in MR while being cognisant of balancing MR risks with clinical risks.

European Journal of Medical Physics 125S1 (2024) 104204
doi:10.1016/j.ejmp.2024.104204

PS08.12
HOW CAN THE LEFT ATRIAL STRAIN BE CORRECTLY DETERMINED BY CARDIOVASCULAR MAGNETIC RESONANCE FEATURE TRACKING?

H. Körperich[1], N. Shanmugarajah[1], G. Patel[1], M. Neufeld[1], W. Burchert[1], J. Eckstein[1]

[1]*Herz- und Diabeteszentrum NRW, Institut für Radiologie, Nuklearmedizin und Molekulare Bildgebung, Bad Oeynhausen, Germany*

Introduction: Left atrial (LA) strain marks a highly valuable clinical parameter for discrimination of various cardiovascular diseases, partially due to its mechanical interplay with the left ventricular (LV) filling process. LA strain is routinely evaluated by echocardiography, although there are considerable limitations, such as operator