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FACULTEIT GENEESKUNDE EN FARMACIE

Doctoraat Medische Wetenschappen
Academiejaar 2007-2008

UITNODIGING

Voor de openbare verdediging van het doctoraatsproefschrift van

Smitha MAKKAT

woensdag 16 april 2008

U wordt vriendelijk uitgenodigd op de openbare verdediging van het proefschrift van

Smitha MAKKAT

'Study of Vessel Mediated Physiological Parameters by Perfusion Magnetic Resonance Imaging'

Op **woensdag 16 april 2008** om **17 uur**
in auditorium **3** van de
Faculteit Geneeskunde & Farmacie
Laarbeeklaan 103, 1090 Brussel

Situering van het proefschrift

This study investigates the use of vessel mediated physiological parameters derived from perfusion Magnetic Resonance (MR) imaging to better understand breast pathology and enable more accurate clinical decision making. The acquisition/post processing strategies of deconvolution based perfusion MR imaging applied to breast pathology were explored. It was demonstrated that the deconvolution of relative enhancement data based on Turbo Field Echo images acquired after a second bolus injection of Gadolinium chelate (added to a routine breast MR imaging protocol) enables the quantification of perfusion parameters in human breast tumors. Tumor Blood Flow (TBF), Tumor Volume of Distribution (TVD) and Mean Transit Time (MTT) were derived and compared with the classic (age, size, grade and lymph node status) as well as molecular (hormone receptor (HR) status, HER-2 protein and gene status) prognostic markers. It was shown that the high TBF found in poor prognostic cases (HER-2 positive and HR negative groups) is an early and physiologically specific indicator of the biological activity. Thus, TBF and its pattern may deliver supporting prognostic information for breast tumors in a non-invasive manner. The mean TBF values from these initial studies were higher than the results from Positron Emission Tomography (PET) studies. The potential causes for this overestimation were further explored and a modification of the method (addition of a prebolus) to overcome these issues was proposed and successfully implemented in a small cohort of patients. The resulting TBF values were shown to fall well within the PET literature data range.

Curriculum Vitae

Dr. Smitha Makkat received her medical degree from Calicut Medical College, University of Calicut, India in 1995. Her training in radiology research started at University Hospital Antwerp (UZA) in 1998. Dr. Jan Vandevenne and Prof. Dr. Paul M. Parizel were instrumental in providing guidance during the early years. In 2000, she moved to Vrije Universiteit Brussel (VUB), where she completed her Masters in Medical and Pharmaceutical Research (2002). During this period, she worked with Prof. Tadeusz Stadnik for her thesis on perfusion MR imaging of ischemic penumbra in acute stroke patients in the radiology department (BEFY) of University Hospital Brussel. In 2003, under the guidance of Prof. Dr. Tadeusz Stadnik and Prof. Robert Luypaert, she extended her research to vessel mediated physiological parameters derived from perfusion MR imaging of tumors specifically applied to breast pathologies. This research was based on the doctoral work performed earlier by Dr. Steven Sourbron in the same department on perfusion quantification with bolus tracking MRI. The resulting non-invasive methodology has potential for the differentiation of breast tumors, for the prognostic assessment and also for tumor follow-up after anti-angiogenic therapy. She received the AstraZeneca Clinical Scholar award at the San Antonio Breast Cancer Symposium (SABCS 2007) in Texas, USA. She has more than 10 papers published/accepted for publication in leading peer-reviewed journals and has presented regularly in international conferences.