Reference Values for Regional cerebral bloodflow – a study of normal databases and phantom measurements

Maria Selarp¹, David Jakobsson², Sigrid Svegborn³, Jenny Oddstå⁴, Douglas Hägerström⁴, Erik Ryding⁴, Sven-Eric Svensson¹, Lars Edenbrandt¹

¹Clinical Physiology and Nuclear medicine, Skåne University Hospital, Lund University, Malmö, Sweden
²EXINI Diagnostics AB, Lund, Sweden
³Medical Radiation Physics, Skåne University Hospital, Lund University, Malmö, Sweden
⁴Clinical Neurophysiology Unit, Dept of Clinical Sciences Lund, Lund University, Lund, Sweden

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Introduction
Regional cerebral blood flow (rCBF) measurement is used for the diagnosis of dementia, stroke, traumatic brain injuries and epilepsy. In order to make the interpretation more objective, quantitative analysis including comparison to a normal database, can be used as a complement to visual assessment. The purpose of this study was to assess if differences in normal databases from different hospitals relate to the selection criteria or to the imaging technique.

Method
Three hospitals (A, B and C) participated with their own normal databases and a study of the same phantom. All images were obtained after an $^{99m}$Tc-HMPAO i.v. injection.

A Hoffman 3-D Brain Phantom™ filled with $^{99m}$Tc was used for the brain phantom study at each hospital according to their clinical routine. Mean cortical bloodflow was calculated in the frontal, parietal, temporal and occipital lobe using the EXINI Brain™ software (EXINI Diagnostics, Lund, Sweden).

Results
Hospital A and B (subjects with eyes open) showed higher values in the occipital lobe compared to the parietal lobe. This was not the case for hospital C (subjects with eyes closed).

Hospital A (AC low dose CT)
Hospital B (AC low dose CT)
Hospital C (Uniform AC (Chang))

Uniform AC showed 10-17% higher values in the frontal and occipital regions and 9% lower values in the temporal regions.

Conclusion
• Healthy volunteers vs normal subjects show no differences
• Type of AC is important for the quantitative results
• Eyes opened or closed influences normal values of the occipital lobe