Press release

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Basic information

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Department of: Clinical Medicine

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Title of dissertation: CAPILLARY TRANSIT TIME HETEROGENEITY IN ACUTE AND CHRONIC NEUROVASCULAR DISEASE

Date for defence: 4/5-2017 at (time of day): 14.00 Place: Bygning 10, 8. sal, Aarhus Universitetshospital, Nørrebrogade 44

Press release (Danish)

Kapillær transittids heterogenitet i akut og kronisk kredsløbssygdom - en MR undersøgelse af blodgennemstrømningen i hjernens mindste blodkar

Et nyt ph.d.-projekt fra Aarhus Universitet, Health, undersøger sammenhængen mellem forstyrrelser i blodgennemstrømningen i hjernens mindste blodkar og udviklingen af vævsskade og symptomer i forbindelse med en pludselig opstået blodprop og ved kronisk småkarssygdom. Studiet har som det første kvantificeret forstyrrelser i den kapillære blodgennemstrømning og fortolket disse i forhold til deres betydning for ilttilbuddet i patienter med en blodprop i hjernen. Projektet er gennemført af Thorbjørn S. Engedal, der forsvarer det d. 4/5-2017.

Udveksling af næringsstofffer, herunder ilt og kuldioxid, foregår i kroppens mindste blodkar, kapillærerne. Tidligere studier har vist, at ikke blot størrelsen af blodtilførslen, men også kvaliteten af dennes fordeling i de mindste blodkar, har betydning for ilttilbuddet i vævet. Ved en blodprop i hjernen ses, perifert for okklusionen, gradvis tillukning af kapillærerne. Dette fænomen kan forklare den infarkt tilvækst, som ses i timerne efter symptom debut, hvis blodproppen ikke kan fjernes. Dette ph.d. projekt har belyst, hvordan man ved hjælp af MR perfusions skanninger kan måle sværhedsgraden af forstyrrelsen i den kapillære blodgennemstrømning, og undersøgt hvordan denne relaterer til efterfølgende vævsdød. En MR perfusions skanning kan udføres på kort tid i skadestuen og kan således potentielt bruges til at identificere patienter, som er kandidater til behandling. Studiet har desuden givet et væsentligt indblik i den underliggende sygdomsudvikling. I patienter med arvelig småkarssygdom har studiet vist sammenhæng mellem forstyrret kapillær blodgennemstrømning og sygdommens progressive natur. På sigt kan resultaterne have betydning for diagnostik og behandling disse hyppige og alvorlige hjernesygdomme.

Forsvaret af ph.d.-projektet er offentligt og finder sted den 4/5-2017 kl. 14.00 i Bygning 10, 8. sal, Aarhus Universitetshospital, Nørrebrogade 44. Titlen på projektet er "CAPILLARY TRANSIT TIME HETEROGENEITY IN ACUTE AND CHRONIC NEUROVASCULAR DISEASE". Yderligere oplysninger: Ph.d.-studerende Thorbjørn S. Engedal, e-mail: tsengedal@gmail.com, tlf. 28293053.

Press release (English)

Capillary transit time heterogeneity in acute and chronic neurovascular disease – an MRI investigation of blood flow in the smallest blood vessels of the brain

A new ph.d.-project from Aarhus University, Health, investigates the relation between disturbed blood flow in the smallest blood vessels of the brain and the evolution of tissue damage and symptoms in acute ischemic stroke and in chronic small vessel disease. The study is the first to quantify the severity of capillary flow disturbance and to interpret this in relation to its effect on oxygen availability in

patients suffering an ischemic stroke. The project was carried out by Thorbjørn S. Engedal, who is defending his dissertation on 4/5-2017.

In humans, delivery of nutrients, including the exchange of oxygen and carbon dioxide, takes place in the smallest blood vessels, the capillaries. Previous studies have shown that not only the volume of blood supply to the tissue, but also the quality of its distribution between individual capillaries, influence oxygen availability. In case of a stroke caused by a blood clot in a major cerebral artery, gradual capillary failure is observed in the blood-deprived tissue. This phenomenon could explain the loss of viable tissue, observed in the hours following symptom onset, if the blood clot is not removed. The current ph.d. project shows how the degree of capillary failure can be estimated using perfusion MRI, and evaluates its relation to subsequent tissue damage. A perfusion MRI scan can be readily acquired in an emergency setting, and thus has the potential to identify patients, who will benefit from treatment. Additionally, the study provides substantial insights into the pathogenesis of the disease. In patients suffering hereditary, small vessel disease the study showed close correlation between the severity of capillary flow disturbance and progressive nature of the disease. In time, these findings may improve diagnostic and treatment options for these common and severe diseases.

The defence is public and takes place on 4/5-2017 at 14.00 in Building 10, 8th floor, Aarhus University Hospital, Nørrebrogade 44. The title of the project is ”CAPILLARY TRANSIT TIME HETEROGENEITY IN ACUTE AND CHRONIC NEUROVASCULAR DISEASE”. For more information, please contact PhD student Thorbjørn S. Engedal, email: tsengedal@gmail.com, Phone +45 2829 3053.

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