

Press release

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Basic information

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Department of: Clinical Medicine

Main supervisor: Professor Anne Grethe Jurik

Title of dissertation: Bone marrow lesions in knee osteoarthritis: Quantification by MR imaging and clinical significance

Date for defence: 20.04.2018 at (time of day): 14:00 Place: Palle Juul-Jensen Auditoriet, bygning 10, Aarhus Universitetshospital, Nørrebrogade 44, 8000 Aarhus C.

Press release (Danish)

Kvantificering og klinisk betydning af konglemarvsødem ved knæartrose

Slidgigt i knæet (artrose) er en hyppig årsag til ledsmerter og funktionsnedsættelse, men vores viden om sygdommen og de smerteforårsagende mekanismer er fortsat mangelfuld. Konglemarvsødem (bone marrow lesion (BML)), visualiseret ved magnetisk resonans (MR) skanning, er et hyppigt fund ved artrose og har vist sig associeret med smerter og risikoen for sygdomsprogression. BML kan derfor måske bruges som en biomarkør i kliniske studier, men det kræver dog, at BML kan kvantificeres sensitivitet og med høj følsomhed for ændringer over tid. Formålet med denne ph.d.-afhandling har været at udvikle en BML-segmenteringsmetode og at teste metoden i et klinisk materiale. Projektet er gennemført af Flemming Kromann Nielsen, der forsvare sin afhandling d. 20.04.

Vi udviklede en manuel og en computerassisteret BML-segmenteringsmetode og fandt, at BML-segmentering kan udføres med høj sensitivitet og følsomhed ved hjælp af begge metoder. Den computerassisterede metode var dog en anelse mere følsom og væsentlig hurtigere end den manuelle metode. Graden af BML viste sig associeret med langtidsrisikoen for knæprotese hos personer med knæartrose efter 15 års follow-up. Desuden fandtes en lille, men statistisk signifikant forskel i BML-volumen i et randomiseret klinisk behandlingsstudie, der testede effekten af intraartikulær steroid kontra saltvand forud for et 12-ugers motionsprogram, hvor interventionsgruppen oplevede en lille bedring i forhold til placebogruppen. Effekten var imidlertid kortvarig.

Vi fandt, at BML-segmentering kan udføres kvantitativt med høj grad af følsomhed for ændringer over tid, og at BML-kvantificering kan benyttes som en biomarkør i kliniske artrosetudier.

Forsvaret af ph.d.-projektet er offentligt og finder sted den 20.04.2018 kl. 14:00 i Palle Juul-Jensen Auditoriet, bygning 10, Aarhus Universitetshospital, Nørrebrogade 44, 8000 Aarhus C. Titlen på projektet er "Bone marrow lesions in knee osteoarthritis: Quantification by MR imaging and clinical significance". Yderligere oplysninger: Ph.d.-studerende Flemming Kromann Nielsen, e-mail: flemming.kromann@aarhus.rm.dk, tlf. 26834489.

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Press release (English)

Quantification and clinical significance of bone marrow lesions in knee osteoarthritis

Knee osteoarthritis (OA) is a major cause of pain and functional impairment. The treatment options are limited and the pain-causing mechanisms are only partly understood. Bone marrow lesion (BML) visualized by magnetic resonance imaging (MRI) is a frequent finding in knee OA and have been found

associated with pain and the risk of structural progression. BML monitoring might prove to be a useful imaging marker in clinical OA trials but this requires sensitive quantification methods with a high sensitivity to change. The aim of this dissertation was to develop a sensitive method for BML-segmentation and to test the method in a clinical setting. The project was carried out by Flemming Kromann Nielsen who is defending his dissertation on 20/04.

We developed two quantitative segmentation methods, one manual and one computer assisted. Computer assisted BML segmentation proved faster and slightly more sensitive than manual segmentation. The degree of BML involvement was significantly associated with the risk of total knee arthroplasty during a 15 year follow-up period in patients with knee OA. A small but significant change in BML volume was observed following one intra-articular injection of corticosteroid and saline, respectively, followed by a 12-week exercise programme favouring the group receiving corticosteroid.

In conclusion, we found that BMLs could be measured using quantitative methods with a high sensitivity to change and may be used as a sensitive imaging biomarker in clinical OA trials.

The defence is public and takes place on 20/04 at 14:00 in Palle Juul-Jensen Auditoriet, building 10, Aarhus University Hospital, Nørrebrogade 44, 8000 Aarhus C. The title of the project is "Bone marrow lesions in knee osteoarthritis: Quantification by MR imaging and clinical significance". For more information, please contact PhD student Flemming Kromann Nielsen, email: flemming.kromann@aarhus.rm.dk, Phone +45 26834489.

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