Deep Learning for PSC: Diagnosis and Prediction in MRCP

Background

In recent years, deep-learning based image classification and segmentation algorithms have proven outstanding in the field of medical image analysis. We plan to leverage these algorithms for diagnosis of PSC in MRCP images. In a later stage of the project, we will examine the use of object detection methods for early diagnosis of cholangiocarcinoma.

Hypothesis

Modern deep learning algorithms can learn to differentiate between patients with and without PSC and have the ability to transfer to data from other centers without re-training.

Study design

Retrospective study.
Training Cohort (UKE Hamburg):
PSC: PSC-positive patients who received MRCP at the UKE, starting 2010. Only include MRCP images taken at 3T.
Control: 3T – MRCP of patients with no history or suspicion of PSC, no PSC-typical changes in MRCP. Exclusion of patients with liver cirrhosis.
External validation is planned – we are looking for partnering centers!

Endpoint

PSC yes/no.

Data collection

At least 200 patients each for PSC and control cohort. 2D-PSC images (DICOM format) at 3 T.

Approvals

Internal research approved according to HmbKHG. Ethical approval under way.

Time plan

Feb. 2021 – initial training of ML algorithms
April 2021 – finalization of data collection at UKE
June 2021 – final algorithm selection.
– validation on external cohort(s)
– publication of results

Contact details

Christoph Schramm: c.schramm@uke.de
Anne Ernst: anne.ernst@zmnh.uni-hamburg.de