

Test-retest Repeatability of PSC specific imaging biomarkers from quantitative MRCP.

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Background: Quantitative Magnetic Resonance Cholangiopancreatography (qMRCP) offers non-invasive, quantification of the biliary tree. This is particularly relevant for biliary diseases such as Primary Sclerosing Cholangitis (PSC) where disease progression is characterized by increasing levels of strictures and dilatations throughout the biliary tree. Seven measurements have been reported to have utility in PSC for either monitoring or risk stratifying. The aim of the study was to investigate the precision and accuracy of these measurements.

Methods: Forty healthy volunteers and 20 patients with reported biliary or other liver disease were scanned twice on up to six different scanners from three manufacturers. MRCP data were acquired using heavily T2-weighted 3D multishot fast/turbo spin echo acquisitions at 1.5T and 3T and scan data processed using a dedicated qMRCP software. Repeatability and reproducibility were calculated and are reported as intraclass coefficients. Data are presented here from the reference scanner (Siemens 3T) using the Siemens 1.5T as the comparator in the case of reproducibility.

Results: All seven measurements had good agreement for all measures with observed repeatability and reproducibility respectively of ICC 0.97 and 0.92 for total number of ducts, ICC 0.97 and 0.96 for total number dilatations, ICC 0.90 and 0.88 for total number of strictures, ICC 0.95 and 0.93 for total ducts with a stricture or dilatation, ICC 0.71 and 0.32 for percentage of ducts with diameter 3-5 mm, ICC 0.79 and 0.84 for overall sum of stricture lengths, and ICC 0.91 and 0.88 for overall sum of dilatation lengths. For all measurements repeatability across scanner field strengths and vendors was also good, with values very similar for the cross-scanner reproducibility coefficients.

Conclusion: These early data suggested that certain metrics from qMRCP should be well suited for multi-centre trials and longitudinal assessment of the health of the biliary tree and provide further evidence in support of quantitative MRCP metrics as clinical biomarkers.