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Effect of time between gadoxetic acid injection and MRCP imaging on T2-weighted MR cholangiography (MRCP) images in living donor liver transplantation donors

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PURPOSE: To assess whether T2-weighted MR cholangiography (MRCP) images obtained before and after injection of gadoxetic acid injection are clinically adequate in living donor liver transplantation donors and whether the length of time between injection and imaging has an impact on image quality. To determine whether hepatobiliary phase images offer additional value.

MATERIALS AND METHODS: 71 consecutive living donor liver transplantation donor patients who had liver MR imaging including T2-weighted MRCP images between February, 2011 and March, 2012 were included in this study. During this period, there were protocol changes regarding the use of gadoxetic acid and whether MRCP imaging was taken before or after the injection of gadoxetic acid. The time length between MRCP imaging and injection of contrast, MRCP image quality scoring by a three point scale emphasizing the visualization of second order intrahepatic duct branches, assessment of the additional value of hepatobiliary phase images, and signal-to-noise ratio (SNR) and contrast-to-noise ratio (CNR) of the common bile duct in MRCP images were measured. Image quality scoring and assessment of the additional value hepatobiliary phase images were independently evaluated by two radiologists.

RESULTS: There was a significant difference (p = 0.000) between the scores of the images taken before and after contrast injection of gadoxetic acid. As the length of time between contrast injection and imaging increased, there was an increased percentage of low score MRCP images. SNR and CNR of the common bile ducts did not show a significant difference between groups. Although reader confidence was improved with the additional viewing of hepatobiliary phase images especially when MRCP image quality was poor, only one patient showed potentially significant additional findings on hepatobiliary phase images.

CONCLUSION: As the length of time between T2-weighted MRCP imaging and gadoxetic acid injection increases, the image quality of MRCP images decreases in normal liver patients. Therefore, MRCP images should be acquired before gadoxetic acid contrast injection. SNR and CNR of the common bile duct is a poor metric for the quality evaluation of MRCP images.