NAVIGATOR-TRIGGERED PROSPECTIVE ACQUISITION CORRECTION (PACE) TECHNIQUE VS. CONVENTIONAL RESPIRATORY-TRIGGERED TECHNIQUE FOR FREE-BREATHING 3D MRCP: PROSPECTIVE COMPARATIVE STUDY USING HEALTHY VOLUNTEERS

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INTRODUCTION: Navigator-triggered prospective acquisition correction (PACE) technique is used for three-dimensional (3D) magnetic resonance cholangiopancreatography (MRCP), with the expectation of reducing motion artifacts (1-4). However, there is no prospective comparative report proving its superiority to the conventional respiratory-triggered (RESP) technique for this sequence. Therefore, we prospectively compared PACE and RESP techniques for free-breathing 3D MRCP using healthy volunteers.

MATERIALS AND METHODS: Free-breathing 3D turbo spin-echo MRCP using both PACE and RESP techniques were prospectively performed on 25 healthy volunteers. Image acquisition time and quantitative analyses of a signal-to-noise ratio, contrast-to-noise ratio, and the contour sharpness index of each segment of the pancreaticobiliary tree were compared using the paired t-test. Qualitative analyses on a five-point scale (1, excellent; 5, poor) scored by two independent radiologists were compared using the Wilcoxon signed-rank test.

RESULTS: The subjective image quality and contour sharpness index of each segment of the PACE technique were found to be significantly better than for RESP (Table 1 and 2). No significant difference was observed with regard to signal-to-noise and contrast-to-noise ratios except for the pancreatic duct (Table 1). No significant difference in acquisition times between PACE and RESP techniques was observed (Table 1).

Table 1
Quantitative analysis of free-breathing 3D turbo spin-echo MRCP using PACE and RESP techniques*

	PACE	RESP	*P*
Acquisition time (min)	4.2 ± 1.1	4.0 ± 1.1	0.33
Signal-to-noise ratio			
Extra hepatic duct	90.0 ± 44.3	82.0 ± 40.3	0.39
Gallbladder	82.5 ± 37.7	91.3 ± 46.4	0.12
Pancreatic duct	22.8 ± 10.1	19.5 ± 9.4	< 0.05
Contrast-to-noise ratio			
Extra hepatic duct	86.9 ± 44.0	78.6 ± 39.8	0.37
Gallbladder	79.4 ± 37.4	87.9 ± 46.0	0.13
Pancreatic duct	18.9 ± 10.0	15.4 ± 8.7	< 0.05
Contour sharpness index			
Left hepatic duct	88.6 ± 0.5	87.5 ± 1.3	< 0.05
Pancreatic duct	86.9 ± 1.1	84.4 ± 2.9	< 0.05

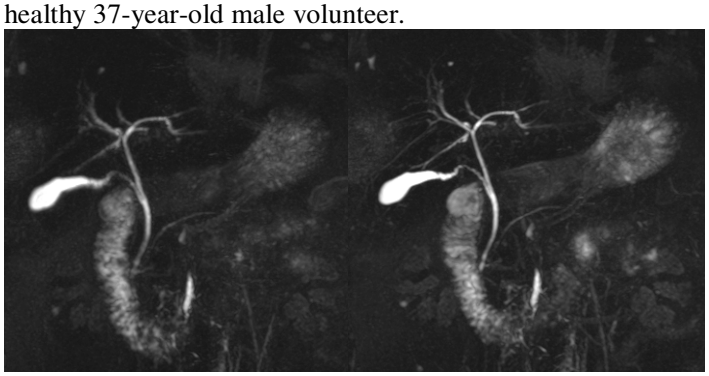
*Values are mean ± standard deviation. PACE = prospective acquisition correction, RESP = respiratory-triggered.

Table 2
Qualitative analysis of free-breathing 3D turbo spin-echo MRCP using PACE and RESP techniques*

	PACE	RESP	*P*
Overall image quality	1.8 ± 0.7 (0.39)	2.7 ± 1.0 (0.29)	< 0.05
Extra hepatic duct	1.8 ± 0.7 (0.39)	2.7 ± 1.0 (0.29)	< 0.05
Intra hepatic duct	1.8 ± 0.7 (0.39)	2.8 ± 1.1 (0.36)	< 0.05
Cystic duct	2.2 ± 1.0 (0.30)	3.1 ± 1.2 (0.19)	< 0.05
Pancreatic duct	2.1 ± 0.8 (0.34)	3.1 ± 1.1 (0.22)	< 0.05
Frequency of artifacts	1.1 ± 0.3 (0.63)	1.7 ± 0.9 (0.24)	< 0.05

*Values are mean ± standard deviation on a scale of 1-5 (1, excellent; 5, poor). In parentheses are the (kappa) values between two reviewers. PACE = prospective acquisition correction, RESP = respiratory-triggered.

Figure 1. Examples of MIP images of free-breathing 3D MRCP. The image quality of the RESP technique (a) is slightly worse than that of the PACE technique (b) for a healthy 37-year-old male volunteer.



CONCLUSION: We confirmed the superiority of the image quality of the PACE technique compared to conventional RESP technique for free-breathing 3D MRCP.

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