# Non-contrast MRA using ECG-triggered 3D valuable flip angle fast spin echo for the vessels of the pelvis and legs with Total imaging matrix coil.

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**PURPOSE**: The purpose of this study is to clearly non-contrast enhanced MRA using ECG-triggered 3D fast spin echo with Total imaging matrix coil can be applied to peripheral artery occlusive disease.

**MATERIALS and METHODS**: Six consecutive patients (5 men and 1 women; Age range 60 – 85 years) with peripheral artery occlusive disease underwent non-contrast enhanced MRA in a two or three step table feed technique. Three of five patients were underwent CE whole body MRA in a four step automatic table feed technique. The MRI unit used was MAGNETOM avanto 1.5T (SIEMENS, Erlangen, Germany) with Tim coil system. Non-contrast enhanced MRA was obtained by ECG-triggered 3D valuable flip angle FSE (SPACE) using parallel acquisition technique. 2 sets of pelvic, femoral and popliteal MRA were obtained at both systolic and diastolic phase. Imaging parameter were TR 500 msec, TE 50 msec, matrix 256 x 256, FOV 400 mm, iPAT: GRAPPA, factor=2, with fat saturation. Non contrasted MRA were reconstructed from the images obtained by subtracting the systolic images from the diastolic images using the maximum intensity projection algorithm. Whole body MRA was obtained by turbo MRA using parallel acquisition technique; Upper part of MRA was obtained using 3D time resolved MRA. Imaging parameter were TR 2.1 msec, TE 0.7 msec, matrix 358 x 512, partition 52, FOV 450 mm, PAT factor 2, acquisition time 3.6 sec. Oblique sagital, 4 independent data sets were obtained consecutively. Abdominal, femoral and popliteal MRA were obtained 3D high resolution MRA. Imaging parameter (abdomen / femoral / popliteal) were TR (2.8/ 2.9/ 3.0) msec, TE (0.9/ 0.9/ 0.9) msec, partition (80/ 80/ 72), FOV 450 mm, PAT factor 2. Three-dimensional MRA were reconstructed from the images obtained by subtracting the pre-contrast images from the post contrast images using the maximum intensity projection algorithm. Image analysis was conducted on the three items. 1) Whether arterial system was visualized or not, according to a 3-grade scale on each station (excellent: clearly visualized, good: visualized, poor: not visualized or partially visualized). 2) Whether arterial diseases was detected or not.

**RESULTS**: 1) On pelvic station, 2 of 6 (33%) was excellent and 2 (33%) was good, 2 (33%) was poor. On femoral station, 3 of 6 (50%) was excellent and 2 (33%) was good, remained 1 (17%) was poor. On popliteal station, 1 of 5 (20%) was excellent and 2 (40%) was good, 2 (40%) was poor. 2) All stenosis and occlusion were overestimated.

**CONCLUSION**: ECG-triggered 3D valuable flip angle FSE MRA with Tim coil system is a promising technique in the diagnosis of the peripheral arterial vascular system.


Fig 1. ECG-triggered 3D valuable flip angle FSE