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3.0TMR相位对比法测量正常人肺、体循环血流

Quantitative measurement of hemodynamics of pulmonary and systemic circulation in healthy volunteers with phase-contrast MR imaging on 3.0T system

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作者 单位

E-mail

[王荣品](#) [贵州省人民医院放射科,贵州 贵阳 550002](#)

[梁长虹](#) [广东省医学科学院 广东省人民医院放射科,广东 广州 510080](#)

[dr_liang62@hotmail.com](#)

[黄美萍](#) [广东省医学科学院 广东省人民医院放射科,广东 广州 510080](#)

[刘辉](#) [广东省医学科学院 广东省人民医院放射科,广东 广州 510080](#)

[徐莉](#) [广东省医学科学院 广东省人民医院放射科,广东 广州 510080](#)

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中文摘要:

目的 观察3.0T MR相位对比法成像(PC-MRI)在体测量血流的准确性。方法 采用PC-MRI对15名健康志愿者的肺动脉主干、左、右肺动脉、主动脉、上、下腔静脉进行血流测量,计算各血管一个心动周期的平均血流量(AF)和反流分数(RF)。采用配对样本t检验分析肺、体循环血流差异。结果 肺动脉主干与主动脉的AF和RF差异无统计学意义,右肺动脉AF显著大于左肺动脉($t=3.092, P=0.004$),左肺动脉RF明显大于右肺动脉($t=-5.502, P=0.001$)。上腔静脉AF明显低于下腔静脉($t=-6.866, P<0.001$),下腔静脉RF明显大于上腔静脉($t=4.250, P<0.001$)。肺动脉主干、主动脉及腔静脉AF比为1:1.009:0.974($r=0.939-0.991, P<0.05$)。结论 PC-MRI能够准确测量肺、体循环大血管血流量。

英文摘要:

Objective To investigate the hemodynamic information of great vessels of pulmonary and systemic circulation by using phase-contrast sequence on 3.0 T MR system (3.0T PC-MRI) in vivo. **Methods** PC-MRI were performed in 15 healthy volunteers, and the blood flow status in main pulmonary artery (MPA), right pulmonary artery (RPA), left pulmonary artery (LPA), ascending aorta (AA), superior vena cava (SVC) and inferior vena cava (IVC) were evaluated. The average flow (AF) and regurgitation fraction (RF) of each vessel were calculated during one cardiac cycle. Paired-samples *t*-test was employed for statistical assessment. **Results** No significant difference was found in AF and RF between MPA and AA. AF of RPA was significantly higher than that of LPA ($t=3.092, P=0.004$), while RF of RPA was significantly lower than that of LPA ($t=-5.502, P=0.001$). AF of SVC was significantly lower than that of IVC ($t=-6.866, P<0.001$), while RF of IVC was significantly higher than that of SVC ($t=4.250, P<0.001$). High correlation ($r=0.939-0.991$) among AF of MPA, AA and vena cava were found and the ratio of the three was 1 : 1.009 : 0.974. **Conclusion** The average flow of great vessels of pulmonary circulation and systemic circulation can be accurately measured with PC-MRI.

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地址:北京市海淀区北四环西路21号大猷楼502室 邮政编码:100190 电话:010-82547901/2/3 传真:010-82547903

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