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双源CT非心率控制自适应前瞻性心电图门控序列扫描冠状动脉成像

CT coronary angiography without heart rate control with adaptive cardio sequence prospective ECG-gated using the second generation dual-source CT

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中文关键词: 体层摄影术, X线计算机 冠状血管 血管造影术 心率

英文关键词: Tomography, X-ray computed Coronary vessels Angiography Heart rate

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中文摘要:

目的 探讨双源CT非心率控制低剂量自适应前瞻性心电图门控序列扫描冠状动脉成像的可行性。方法 前瞻性收集94例患者进行双源CT非心率控制自适应前瞻性心电图门控序列扫描技术冠状动脉成像。由2名放射科医师利用双盲法以5分法评定系统对冠状动脉15支分支血管的成像质量,图像质量 ≥ 3 分认为可满足影像学评价要求;分析平均心率、心率变化与图像质量的相关性,评估2名医师评价图像质量的一致性,并计算容积CT剂量指数(CTDIvol)和有效剂量(ED)。结果 扫描期间94例患者的平均心率为 (87.24 ± 13.76) 次/分。共1410段冠状动脉节段纳入分析,其中1334段(94.61%)可满足影像学评价要求,76段(5.39%)不能满足要求。94例患者平均冠状动脉得分为 (4.25 ± 0.93) 分,图像质量与心率($r = -0.17, P = 0.11$)及心率变化($r = 0.10, P = 0.32$)均无相关性;2名评价者间的一致性较好($Kappa$ 值 $= 0.90, P < 0.001$),CTDIvol均值为 (11.84 ± 1.76) mGy,平均ED为 (2.19 ± 0.45) mSv。结论 双源CT自适应前瞻性心电图门控序列扫描冠状动脉成像技术可无需控制心率而得到能够满足临床诊断需要的冠状动脉图像,且能显著降低辐射剂量。

英文摘要:

Objective To explore the feasibility of improving image quality of low dose scanning using adaptive cardio sequence prospective ECG-gated without heart rate control by the second generation dual-source CT coronary angiography (CTCA). **Methods** Ninety-four consecutive patients were collected prospectively and underwent prospective ECG-gated adaptive cardio sequence dual-source CTCA without heart rate control. Two experienced radiologists double-blindly assessed image quality of 15 segments of coronary arteries with five-score scale. Images with no less than 3 scores were usable for diagnosis. Correlation between image quality and heart rate, as well as with heart rate variability were analyzed. The intra-observer agreement for image quality was assessed. CT dose index of volume (CTDIvol) and effective dose (ED) were measured. **Results** The mean heart rate during scanning was (87.24 ± 13.76) beats per minute in all 94 patients. Totally 1410 segments of coronary arteries were included, and images useful for diagnosis (≥ 3 scores) were obtained in 1334 segments (94.61%) of the coronary artery segments, while 76 segments (5.39%) had non-assessable image quality. The mean image quality score for the whole coronary tree was 4.25 ± 0.93 . No correlation was observed between the mean heart rate ($r = -0.17, P = 0.11$) or heart rate variability ($r = 0.10, P = 0.32$) and image quality. The $Kappa$ value between two radiologists was 0.90 on image quality ($P < 0.001$). CTDIvol and ED was (11.84 ± 1.76) mGy and (2.19 ± 0.45) mSv, respectively. **Conclusion** Using prospective ECG-gated adaptive cardio sequence, assessable image quality of coronary artery can be acquired with dual-source CT without heart rate control, and radiation dose can be obviously reduced.

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