王芳,高剑波,刘杰,侯平,胡丽丽.正弦图确定迭代重建技术在降低胸部扫描剂量中的应用[J].中国医学影像技术,2012,28(11):2087~2089

正弦图确定迭代重建技术在降低胸部扫描剂量中的应用

Application of sinogram-affirmed iterative reconstruction technique in reducing radiation dose of chest CT examination

投稿时间： 2012-06-18 最后修改时间： 2012-08-22

DOI:

中文关键词：正弦图确定迭代重建 胸部 体层摄影术,X线计算机 图像处理,计算机辅助 辐射剂量

英文关键词:Sinogram-affirmed iterative reconstruction Chest Tomography, X-ray computed Image processing, computer-assisted Radiation dosage

基金项目:

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中文摘要:

目的 探讨正弦图确定迭代重建(SAFIRE)技术在降低胸部扫描剂量中的价值。方法 收集64例胸部疾病患者,采用第二代双源CT(Somatom Definition Flash CT)Flash Spiral模式进行平扫。将患者随机均分为2组。低剂量组:采用100 kV,并采用SAFIRE(值为3)技术进行重建。对照组:采用常规120 kV、滤波反投影(FBP)重建技术。测量比较2组患者气管分权层面降主动脉的CT值与标准差(SD)、同层背部肌肉的CT值与SD值;比较两组胸部CT剂量指数(CTDI)及剂量长度乘积(DLP)。由2名医师采用5分制对图像质量进行评价,并用*Kappa*检验评价观察者间的一致性。结果 两组图像质量均能完全满足临床诊断需求,观察者间具有较好一致性(*Kappa*=0.795)。低剂量组CTDI为(3.23±0.53)mGy,DLP为(114.96±18.90)mGy·cm,有效剂量为(1.60±0.26)mSv,对照组CTDI为(5.27±1.07)mGy,DLP为(184.40±36.85)mGy·cm,有效剂量为(2.58±0.51)mSv;两组差异均有统计学意义(*P*均<0.001)。低剂量组和对照组气管分权层面降主动脉CT值分别为(39.90±8.31)HU和(43.12±7.43)HU,图像噪声值分别为13.61±2.00和13.00±3.39;同层背部肌肉的CT值分别为(45.50±11.85)HU和(48.23±10.99)HU,图像噪声值分别为10.34±1.55和8.53±1.99,差异均无统计学意义(*P*均>0.05)。结论 在成人胸部扫描中,利用SAFIRE技术可在不影响图像质量的同时降低辐射剂量。

英文摘要:

Objective To discuss the value of sinogram-affirmed iterative reconstruction (SAFIRE) technique in reducing radiation dose in chest CT examination. **Methods** Sixty-four patients underwent chest scan in Somatom Definition Flash CT with flash spiral model. Thirty-two patients underwent chest scan with 100 kV and SAFIRE (value=3) reconstruction (low-dose group), while other 32 patients underwent chest scan with 120 kV and filter back projection (FBP) reconstruction (control group). CT values and standard deviation (SD) of descending aorta and muscle at the level of epibronchial were measured. CT dose index (CTDI) and dose length product (DLP) were compared. Two radiologists assessed the image quality with 5-point scale. The degree of interobserver concordance was evaluated using *Kappa* test. **Results** All images of both groups could satisfy diagnosis requirement, and the interobserver agreement for diagnosis acceptability was good(*Kappa* value was 0.795). CTDI was (3.23±0.53)mGy in low-dose group, while (5.27±1.07)mGy in control group. DLP was (114.96±18.90)mGy·cm in low-dose group, while (184.40±36.85)mGy·cm in control group. The radiation dose was (1.60±0.26) mSv in low-dose group, while (2.58±0.51)mSv in control group (all *P*<0.001). CT value of descending aorta was (39.90±8.31)HU in low-dose group and (43.12±7.43)HU in control group, SD was 13.61±2.00 in low-dose group and 13.00±3.39 in control group (all *P*>0.05). CT value of muscle at the level of epibronchial was (45.50±11.85)HU in low-dose group and (48.23±10.99)HU in control group, SD was 10.34±1.55 in low-dose group and 8.53±1.99 in control group (all *P*>0.05). **Conclsion** SAFIRE can reduce radiation dose in adult chest CT scan on the condition that the image quality was not affected.

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