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探讨成人颅脑CT检查的低剂量扫描条件

Discussion of parameters of low-dose multi-slice spiral CT scanning for adult brain

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中文关键词: [颅脑](#) [辐射剂量](#) [体层摄影术](#) [X线计算机](#)

英文关键词: [Brain](#) [Radiation dosage](#) [Tomography](#), [X-ray computed](#)

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中文摘要:

目的 探讨适于成人颅脑CT检查的适当低剂量扫描条件。方法 将500名健康成人随机分成5组,运用16层螺旋CT机行颅脑非螺旋扫描,其中第1组采用常规剂量(120 kV,颅底部240 mAs、颅顶部200 mAs)扫描,第2~5组分别采用低剂量(120 kV,200、160、100、80 mAs)扫描。由2名放射科医师采用5分制独立对各组图像进行主观评分,应用Kappa一致性检验评价评定结果的一致性,Spearman线性相关分析评估扫描剂量与图像质量评分的关系;记录各单次加权CT剂量指数(CTDIvol)和平均剂量长度乘积(DLP)值,计算第2~5组的CTDIvol及DLP值相对第1组下降的比例。结果 两名医师评分的一致性好($K=0.860, P=0.017$)。扫描剂量与图像质量主观评分呈正相关($r=0.512, P<0.01$)。图像质量优良者(评分>3分)在各第2~4组中所占比例达95%~98%,与第1组比较差异无统计学意义($P>0.05$)。第2~5组CTDIvol、DLP较第1组分别降低15.79%、32.59%、57.89%、66.40%和20.68%、36.50%、60.40%、68.23%,各组DLP值与第1组比较差异均有统计学意义(P 均<0.01)。第5组图像质量明显下降,评分>3分的图像仅占69%,与第1组比较图像质量降低($P<0.01$)。结论 管电流采用100 mAs时,低剂量CT扫描可显著降低辐射剂量,而对观察成人颅脑解剖结构和诊断无明显影响。

英文摘要:

Objective To explore suitable parameters of low-dose CT scanning for adult brain. **Methods** Totally 500 male adults who underwent cranial non-helical CT scanning were enrolled and randomly divided into 5 groups. Group 1 underwent conventional dose scanning (120 kV, basicranial with 240 mAs and calvarium with 200 mAs), and group 2-5 underwent low-dose scanning with the same parameters except for the tube current (200, 160, 100 and 80 mAs, respectively). Image quality was assessed by two independent experienced radiologists using a 5-point scale. The degree of inter-observer concordance was determined by Kappa conformance testing. The Spearman linear correlation analysis between the scanning dose and the image score was performed. The weighted CT dose index (CTDIvol) and dose length produce (DLP) were recorded, the decline proportion of CTDIvol and DLP in group 2-5 compared to group 1 were calculated, respectively. **Results** The two radiologists had almost perfect agreement for diagnostic score ($K=0.860, P=0.017$). Scan dosage were positive interrelated with image quality ($r=0.512, P<0.01$). The high quality image (score>3) in group 2-4 accounted for 95%-98%, not significantly different with that of group 1 ($P>0.05$). CTDIvol and DLP of group 2-5 reduced by 15.79%, 32.59%, 57.89%, 66.40% and 20.68%, 36.50%, 60.40%, 68.23%, respectively, while DLP values of group 2-5 were statistically lower than that of group 1 ($P<0.01$). However, the image quality of group 5 degraded obviously, and the high quality image (score>3) in group 5 was only 69%, statistically lower than that of group 1 ($P<0.01$). **Conclusion** Choosing 100 mAs tube current in adult cranial CT scan can ensure image quality and decrease radiation dosage, while image definition and clinical diagnosis were not affected.

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