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体部血管双源CT能量减影成像与传统3D血管成像比较

Comparison of body artery imaging between dual-energy CT angiography and traditional 3D CT angiography

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中文摘要:

目的 评估双源CT(DSCT)能量减影成像所需时间、图像质量及其对血管狭窄闭塞诊断的效能。方法 23例临床疑似体部血管疾病患者接受DSCT血管造影(DE-CTA)检查,对所获数据在双能软件中进行自动去骨(ABS)去除斑块后行手动去除残余骨质(ABPS),对融合数据在常规3D软件中行自动去骨(ABR),去骨后手动去除残余骨质(ABR-M)。行最大密度投影(MIP)及多平面重组(MPR)重建,比较ABR与ABS的图像残余骨情况、ABPS和ABR-M后处理操作时间及动脉血管可见度情况;并以MPR及原始图像综合诊断结果为标准,比较两种血管成像方法对血管狭窄程度 $\geq 50\%$ 节段诊断的敏感度、特异度。结果 ABR图像总体去骨效果好于ABS($P<0.05$);ABPS所需后处理时间 少于ABR-M所需时间,差异有统计学意义($P<0.05$)。共325个节段用于评价血管狭窄程度,ABPS与ABR-B对狭窄程度 $\geq 50\%$ 节段的诊断敏感度、特异度分别为95.74%、96.19%和92.93%、97.87%。结论 双源CT能量减影成像去骨、去斑块后图像质量较好,对血管狭窄的诊断较为准确,后处理所耗时间少于传统3D方法。

英文摘要:

Objective To evaluate the effect of automatic bone and plaque removal on image quality and grading of steno-occlusive lesions in patients undergoing dual energy CT angiography (DE-CTA) of body artery. **Methods** DE-CTA was performed in 23 patients with suspected body vascular disease. Separate datasets were calculated for each of the two tubes and used to generate automatically bone-subtracted images (ABS) as well as additional manual bone removes after plaque subtracted images (ABPS). In addition, a weighted average dataset from both dual energy acquisitions resembling routine 3D CT acquisition was used for automatic bone remove (ABR). Residual bone in the ABR dataset was removed manually (ABR-M). Operator time for bone removal was measured, while effectiveness of bone subtraction and the time needed of ABPS and ABR-M was assessed. Compared with MPR, ABR images and stenosis grading in plaque subtracted were assessed with two radiologists. **Results** The imaging quality of ABR was superior to that of ABS ($P<0.05$). The time needed of ABPS was (7.8 ± 4.3) min, significantly lower than that of ABR-M $(11.4 \text{ min} \pm 2.5 \text{ min}, P<0.05)$. A total of 325 steno-occlusive lesions were assessed. The sensitivity, specificity of DE-CTA and traditional 3D CTA was 95.74%, 96.19% and 92.93%, 97.87%, respectively. **Conclusion** The imaging quality is good after automatic bone and plaque subtraction of DE-CTA. Automatic plaque subtraction for the first time provides a true CTA imaging which is easy to interpret and reduces the need for further post-processing. The diagnosis of vascular stenosis with DE-CTA is also accurate, and the time spent in post-processing is less than that of traditional 3D angiography.

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