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## 最大斜率法与去卷积算法在64层螺旋CT脑灌注后处理中的应用比较

### Comparison of maximal slope method and deconvolution method in the post-processing of cerebral CT perfusion with 64-slice spiral CT

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中文摘要:

目的 比较常用对比剂流速(6 ml/s)下最大斜率法和去卷积算法在64层螺旋CT后处理中的差异。方法 收集32例接受64层螺旋CT头部平扫及灌注成像的患者,分别利用基于最大斜率模型和去卷积模型的灌注软件包进行后处理,在双侧皮质区绘制感兴趣区(ROI),测量CT灌注绝对参数值:脑血流量(CBF)、脑血容量(CBV)、平均通过时间(MTT)和达峰时间(TTP),以患侧参数值与对侧正常参数值的比值为相对参数值。由2位有经验的神经放射医师分别根据各参数伪彩功能图结合双侧灌注参数值盲法做出诊断,以配对t检验进行统计学分析。结果 灌注正常组应用基于两种模型的灌注软件包所得各项参数绝对值差异均有统计学意义( $P < 0.01$ ),各相对值差异均无统计学意义( $P > 0.05$ )。单侧灌注异常组应用基于两种模型的灌注软件包所得灌注异常侧MTT、CBV绝对值差异有统计学意义( $P < 0.01$ ),TTP、CBF绝对值差异无统计学意义( $P > 0.05$ ),各参数相对值差异均无统计学意义( $P > 0.05$ )。结论 在临床常用注射速率(6 ml/s)下,最大斜率法会低估CBF,其所得MTT、CBV绝对值均明显大于相应去卷积算法所得值。计算相对值不仅能弥补在低注射速率下最大斜率法的不足,而且能消除由不同后处理算法本身所带来的结果差异,能更好地用于定性、定量分析。

英文摘要:

Objective To compare the difference of maximal slope method and deconvolution method in the post-processing of cerebral CT perfusion with 64-slice spiral CT at common injection rate of 6 ml/s. **Methods** Thirty-two patients who underwent cerebral plain CT and CT perfusion examination with 64-slice spiral CT were collected. The post-processing of images were performed respectively with perfusion software packages based on maximal slope method and deconvolution method. Regions of interest (ROI<sub>s</sub>) were drawn in bilateral cortical areas, and absolute parameter values of CT perfusion were measured, including cerebral blood flow (CBF), cerebral blood volume (CBV), mean transit time (MTT) and time to peak (TTP). The ratio of the parameter value of pathological side and normal side was defined as relative parameter value. The data was analyzed with paired t-test. **Results** In the group with normal perfusion, the difference of every absolute parameter value obtained respectively from perfusion software packages based on two algorithms had statistical significance, and the difference of every relative parameter value had no statistical significance. In the group with unilateral abnormal perfusion, with regard to the cerebral side of abnormal perfusion, the difference of absolute parameter values of MTT and CBV had statistical significance, the difference of absolute parameter values of TTP and CBF had no statistical significance, nor did the difference of every relative parameter value. **Conclusion** At the frequently used clinical injection rate of 6 ml/s, the slope method can lead to the underestimate of CBF. Absolute parameter values obtained from the slope method are obviously greater than that from the deconvolution method. The evaluation of relative parameter values can not only make up the deficiency of the slope method at low injection rate, but also eliminate the difference of results caused by different post-processing algorithm, and can be used preferably in qualitative and quantitative analysis.

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