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3.0T MR半自动软件软骨体积定量测量的可重复性及准确性

Repeatability and accuracy of quantitative knee cartilage volume measurement using semi-automated software at 3.0T MR

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英文关键词: [Magnetic resonance imaging](#) [Knee joint](#) [Cartilage](#) [Volume](#) [OsiriX](#)

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中文摘要:

目的 评估在3.0T MR上使用半自动软件OsiriX测量膝关节软骨体积的可重复性及准确性。方法 在3.0T MR上使用MR轴位水激发3D-FLASH序列对30名健康受试者的右膝关节进行重复扫描。全部图像由3名观察者分别使用开放源软件OsiriX进行软骨的半自动分割及随机工作站进行人工分割,计算软骨体积,比较两种方法测量软骨体积所需时间、可重复性及测量结果。结果 ①OsiriX软件分割比人工分割节省50%以上时间;②OsiriX软件分割及人工分割的观察者间可重复性误差分别为4.88%和9.82%,高年资观察者内部可重复性误差分别为0.77%和1.29%,个体内部可重复性误差范围分别为0.14%~1.11%和0.52%~1.61%。前者各项可重复性误差均低于后者($P<0.05$);③OsiriX软件分割的系统误差为 $(-3.80\pm 3.93)\%$,随机配对误差为 $(4.68\pm 2.70)\%$,差异无统计学意义($t=0.92, P=0.36$)。结论 与人工分割相比,OsiriX半自动分割测量软骨体积具有省时、观察者间及观察者内可重复性高、有相对固定标准等明显优势,可用于临床及多中心大样本量研究。

英文摘要:

Objective To evaluate the repeatability and accuracy of semi-automated software OsiriX in the assessment of cartilage volume in normal knees on 3.0T MR. **Methods** Thirty right knees of healthy subjects were scanned twice with 3.0T MR using 3D-FLASH sequence with selective water excitation. Cartilage volume of the patellar compartment was determined with a validated open-source software OsiriX and manual segmentation separately by 3 observers using MRI data sets. After calculating the cartilage volumes, the segmentation processing times, the repeatability and volume results were compared between two segmentations. **Results** ①Compared with the manual segmentation, a time saving of at least 50% for cartilage volume measurement was achieved with OsiriX software segmentation. ②The interobserver repeatability error was 4.88% and 9.82% with OsiriX software segmentation and manual segmentation, respectively; the intraobserver repeatability error of high experienced observer was 0.77% and 1.29%, the interindividual repeatability range were 0.14%—1.11% and 0.52%—1.61%, respectively. The repeatability error of OsiriX software segmentation was proved to be significantly smaller than manual segmentation ($P<0.05$). ③System difference between results obtained with OsiriX software measurement and manual measurement was $(-3.80\pm 3.93)\%$ and absolute pairwise difference was $(4.68\pm 2.70)\%$. There was no statistical difference between the volume results measured using two techniques ($t=0.92, P=0.36$). **Conclusion** Compared to manual segmentation, cartilage volume measurement with OsiriX semi-automated segmentation is faster and has higher inter- and intraobserver repeatability with relatively fixed standard. This technique may therefore be used for clinical and multi-center trials of large sample.

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