论著

血浆代谢组学研究用于肝移植物功能变化的评估

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摘要　　摘要：目的
探讨基于核磁共振波谱技术的代谢组学方法在肝移植患者围手术期肝功能评价中的应用。方法 肝移植患者15例,
分别于术前1d、术后1d及1周, 空腹收集其血液, 对丙氨酸氨基转移酶、天冬氨酸氨基转移酶、碱性磷酸酶、
白蛋白、总胆红素、葡萄糖、甘油三酯、胆固醇以及乳酸等血浆生化指标进行检查, 同时测定其核磁共振氢谱,
进行代谢组学分析。结果 代谢组学分析显示, 与术前相比, 术后1d患者血浆中的血糖和乳酸水平显著升高,
缬氨酸、丙氨酸、丙酮、琥珀酸、谷氨酰胺、胆碱含量亦显著升高; 至术后1周, 血脂和胆碱水平显著升高,
血糖和氨基酸类代谢物含量显著降低。主成分分析显示, 肝移植围手术期各时段血样的代谢谱图之间差异显著,
并能够互相区分开来。造成组间差异的主要影响因素是血糖、血脂、胆碱、乳酸等物质含量的变化。其中血糖、
血脂（包括甘油三酯和胆固醇）以及乳酸的变化规律与临床检测血浆生化的改变一致,
但血液中胆碱的含量随着治疗进程出现显著的变化。结论
代谢组学分析方法能较清晰地反映肝移植患者围手术期各时间段血浆样本间的代谢差异和变化,
作为一种辅助手段, 其在肝移植患者术后诊断中可能有良好的研究和应用前景。

关键词　　肝脏移植　代谢组学　核磁共振　模式识别

分类号

Metabonomic Study of Blood Plasma in the Assessment of Liver Graft Function

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Abstract　ABSTRACT:Objective To access the capability of 1H nuclear magnetic resonance (NMR)-based metabonomics in the evaluation of graft function in the perioperation period of liver transplantation. Methods Plasma samples of 15 male primary hepatic carcinoma patients were collected for clinical biochemical analysis and 1H NMR spectroscopy 1 day before operation, 1 day and 1 week after the operation. The NMR data were analyzed using principal component analysis. Results Metabonomic analysis indicated that, compared with those before operation, blood concentrations of valine, alanine, acetone, succinic acid, glutamine, choline, lactate, and glucose increased significantly 1 day after transplantation. One week later, the levels of lipids and choline increased notably, while those of glucose and amino acids decreased. Principal component analysis showed significant difference between metabolic profiles of plasma samples of variant periods of liver transplantation, due to the variation of the levels of glucose, lipids, lactate, and choline. A good agreement was observed between clinical chemistry and metabonomic data. Conclusions Metabonomic analysis can clearly identify the difference between the plasma samples of primary hepatic carcinoma patients at different time during the perioperation period of liver transplantation. It therefore may be a promising new technology in predicting the outcomes of liver transplantation.

Key words　liver transplantation　metabonomic　nuclear magnetic resonance　pattern recognition

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