

doi: 10.13241/j.cnki.pmb.2020.10.021

超微血流成像术用于肾移植患者术后评估的临床价值分析*

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摘要 目的:探讨超微血流成像术用于肾移植患者术后评估的临床价值。**方法:**选取我院 2019 年 2 月-2019 年 8 月收治的 60 例肾移植患者的临床资料,根据术后恢复情况分为 A、B、C 三组,A 组(27 例,术后肾功能恢复良好)、B 组(20 例,术后发生过敏肾功能异常病变但治疗后肾功能恢复正常)、C 组(13 例,术后血肌酐水平持续增高肾功能异常者),三组均采用超微血管流成像术检测血管指数,比较不同组患者的血管指数并分析其与血肌酐水平的关系。**结果:**三组患者的肾移植长径、前后径、左右径、皮质厚度、叶间动脉阻力指数比较无显著差异($P>0.05$)。C 组患者的肾皮质血管指数($23.34\pm 6.03\%$)明显低于 A 组($33.23\pm 3.45\%$)、B 组($31.23\pm 4.23\%$)($P<0.05$)。肾功能异常患者肾皮质的血管指数较低,且随着血肌酐水平的升高而下降,两者呈显著负相关($r=-0.23, P<0.05$)。**结论:**超声微血流成像术用于肾移植患者术后评估可较好地反映肾皮质血供及术后肾功能的变化。

关键词:超微血管成像术;肾移植;肾功能;评估

中图分类号:R692;R617 文献标识码:A 文章编号:1673-6273(2020)10-1893-04

Analysis of the Clinical value of Ultramicro-flow Imaging for the Postoperative Evaluation of Renal Transplant Recipients*

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ABSTRACT Objective: To evaluate the feasibility of ultramicro-flow imaging for the postoperative evaluation of renal transplantation patients. **Methods:** The clinical data of 60 renal transplant patients admitted to our hospital from February 2019 to August 2019 were retrospectively analyzed. According to the recovery after operation, they were divided into three groups: A, B and C. Group A (27 cases had good recovery of renal function after operation) and Group B (20 cases with abnormal allergic renal function after operation, but recovery of renal function after treatment), group C (13 patients with postoperative serum creatinine levels continued to increase renal dysfunction). All three groups used ultra-microvascular flow imaging was used to detect vascular index, and the vascular index of different groups was compared and analyzed for its relationship with serum creatinine level. **Results:** There were no significant difference in the length, anterior and posterior diameters, left and right diameters, cortical thickness and resistance index of interlobar artery between the three groups ($P>0.05$). The renal cortical vascular index in the group C ($23.34\pm 6.03\%$) was significantly lower than that in the group A ($33.23\pm 3.45\%$) and the group B ($31.23\pm 4.23\%$) ($P<0.05$). The renal vascular index of renal dysfunction was lower, and it decreases with the increase of serum creatinine level, which was negatively correlated between them ($r=-0.23, P<0.05$). **Conclusion:** Ultrasound micro-blood flow imaging for postoperative evaluation of renal transplant patients can better reflect changes in renal cortical blood supply and postoperative renal function.

Key words: Ultrasound angiography; Renal transplantation; Renal function; Evaluation

Chinese Library Classification(CLC): R692; R617 **Document code:** A

Article ID: 1673-6273(2020)10-1893-04

前言

肾移植(kidney transplantation)是将健康者的肾脏移植给有肾脏病变且丧失肾脏功能的患者。通常情况下,一个肾脏可满足患者正常的代谢需求,通过肾移植方法可满足患者正常生活需求,提高生活质量^[1,2]。然而,肾移植术后容易发生早期肾功能不全、肾功能减退等并发症,影响临床疗效。近年来,随着影像学技术的发展,超微血流成像术广泛用于临床疾病的诊治中^[3]。

本研究主要分析了本院收治的 60 例肾移植患者的临床资料,探讨了超微血流成像术用于肾移植患者术后评估的临床价值,结果报道如下。

1 资料与方法

1.1 一般资料

选取我院 2019 年 2 月-2019 年 8 月收治的 60 例肾移植患者,纳入标准:符合肾移植条件;对本研究知情同意并自愿参

* 基金项目:云南省应用基础研究基金资助项目(2016ZC146M)

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(收稿日期:2019-09-08 接受日期:2019-09-30)

与此次研究,获得医学伦理会同意。排除标准:合并心、肝等可能性疾病;输尿管狭窄;药物性肾损伤者;肾小管坏死者;精神病患者。根据术后恢复情况将患者分为 A、B、C 三组,A 组(27 例)、B 组(20 例)、C 组(13 例)。A 组:16 例男性,11 例女性;年龄 36-79 岁,平均年龄(56.67± 7.23)岁。B 组:12 例男性,8 例女性;年龄 35-77 岁,平均年龄(55.23± 6.45)岁。C 组:7 例男性,6 例女性;年龄 32-76 岁,平均年龄(54.12± 5.45)岁。三组患者的性别、年龄经统计学分析差异无统计学意义($P>0.05$),具有可比性。

1.2 检测方法

采用东芝 Aplio 500 超声诊断仪,PVT-375 BT 凸阵探头,频率 1.9-6.0 MHz,PVT-1005BT 线阵探头,频率 5-14 MHz。所有患者取仰卧位,暴露右、左两侧髂窝肾移植位置,凸阵探头显示移植肾的二维图像,肾冠状切面测量肾长径、横断面测量肾左右径、前后径,同时测量叶间肾动脉各项参数^[4]。采用机器自动扫描,至少取 3 个心动周期平均值。线阵探头对深度进行调节,显示肾移植的皮髓质结构。启动超微血管成像术,设置量程

为 1.2-1.6 cm/s,其帧频设置为每秒 48-56 帧,进行血管指数的测量,取 10 次测量后的平均值。由 2 名有经验的临床影像科医师从中选择 10 例原始图像,进行重复性检验,取平均值。

1.3 观察指标

观察及比较三组患者的基本资料、移植肾皮质的血管指数,并分析血管指数与血肌酐的相关性。

1.4 统计学分析

数据采用 SPSS21.0 进行统计学分析,计量资料用($\bar{x} \pm s$)表示,组间比较行 t 检验,计数资料采用(%)表示,组间比较行卡方(χ^2)检验。以 $P<0.05$ 为差异具有统计学意义。

2 结果

2.1 三组患者的基本情况比较

三组患者的肾移植长径、前后径、左右径、皮质厚度比较差异无统计学意义($P>0.05$),详见表 1 所示。

表 1 三组患者的基本情况比较($\bar{x} \pm s$,mm)

Table 1 Comparison of the basic conditions among three groups($\bar{x} \pm s$, mm)

Groups	Long diameter	Front and rear diameters	Left and right diameters	Cortical thickness
Group A(n=27)	113.23± 6.23	53.23± 5.12	50.34± 5.23	8.12± 0.15
Group B(n=20)	112.56± 6.12	54.34± 5.89	51.23± 5.75	8.23± 0.12
Group C(n=13)	113.45± 6.02	52.34± 5.12	50.23± 5.23	8.24± 0.54

2.2 三组患者术后常规超声检查情况

A 组 27 例患者术后肾功能恢复良好,且血肌酐水平低于 104.23 $\mu\text{mol/L}$,未出现导致肾功能的病变。B 组 20 例患者中,14 例出现过可导致肾功能异常的病变,其中 10 例出现免疫抑制剂中毒,7 例发生过急性排异反应,2 例患者发生肾动脉狭窄,1 例发生感染,通过临床治疗后患者肾功能恢复正常。C 组有 10 例可致肾功能异常病变,其中 6 例免疫抑制剂中毒,2 例病毒相关性肾病,1 例发生移植肾主肾动脉狭窄合并狭窄后动

脉瘤及血栓,1 例患者出现输尿管狭窄肾积水,剩下 3 例出现其他原因的血肌酐水平升高。

2.3 三组患者肾皮质的血管指数比较

C 组患者的肾皮质血管指数明显低于 A 组、B 组($P<0.05$)。但 A 组、B 组的肾皮质血管指数比较无显著差异($P>0.05$),三组患者的叶间动脉阻力指数比较均无显著差异($P>0.05$),详见表 2 所示。

表 2 三组患者肾皮质的血管指数比较($\bar{x} \pm s$)

Table 2 Comparison of the vascular index of renal cortex among three groups($\bar{x} \pm s$)

Groups	Vascular index of renal cortex (%)	Resistance index of interlobar artery
GroupA(n=27)	33.23± 3.45	0.67± 0.02
GroupB(n=20)	31.23± 4.23	0.63± 0.03
GroupC(n=13)	23.34± 6.03**	0.60± 0.03

Note:Compared with group A, there was statistical significance (* $P<0.05$); showed statistical significance compared with group B (** $P<0.05$).

2.4 肾皮质的血管指数与血肌酐水平的相关性

肾功能正常时,肾皮质的血管指数较高;肾功能异常时,肾皮质的血管指数较低,且随着血肌酐水平的升高而下降,两者呈负相关($r=-0.23$, $P<0.05$)。如下图 1 所示。

3 讨论

肾移植术是治疗肾小球肾炎、慢性肾盂肾炎、间质性肾炎、肾硬化等疾病的常用方法,一般适用于 12-50 岁患者,临床无明确的年龄界限^[5-7]。但对于超过 70 岁的老年患者而言,采用肾

移植手术时应充分考虑患者心血管情况及其患者预期寿命,降低肾移植对患者自身带来的损害^[8]。肾脏血流大部分来源于肾皮质血流量,占 95 %左右^[9,10],肾皮质血流量出现异常直接影响肾小球滤过功能。肾移植术后出现排异反应、感染等并发症可影响肾皮质血流灌注情况^[11,12],主要是因为影响了微循环,使肾皮质血流灌注减少,肾小球滤过功能也下降,导致肾功能损伤^[13,14]。因此,对肾移植患者术后肾功能进行评估具有重要意义。

长期以来,临床采用常规超声对肾移植术后的肾功能进行评估,主要依赖移植肾二维声像图特征判断肾内血流量的多

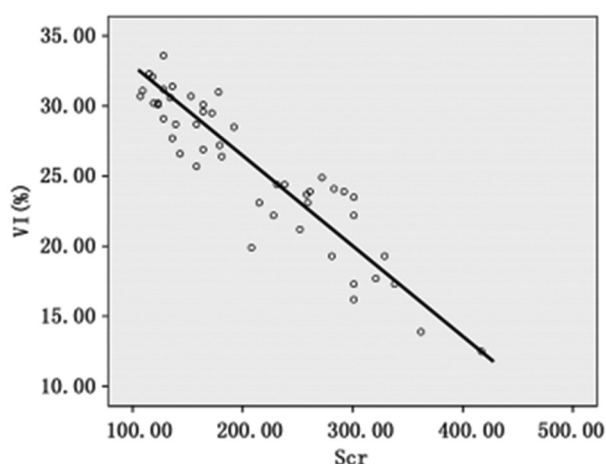


图1 肾皮质的血管指数与血肌酐水平的相关性

Fig.1 Correlation of renal cortex vascular index with serum creatinine level

少^[15,16]。常规二维超声能够反映肾脏大小、皮质厚度及抑制肾大小等情况,但当肾脏大体结构发生改变时,二维常规超声具有较低的敏感性及其特异性^[17,18]。而超微血管成像技术采用自适应计算方法,可准确的区分真正血流信息,抑制噪声,凸显低速血流信号^[19,20],无需注入造影剂,实现微小血管的造影^[21,22],尤其超微血管成像技术可精确反应肾皮质血供情况可间接反映肾功能变化^[23,24]。

本研究中,C组患者的肾皮质血管指数明显低于A组与B组,且肾皮质的血管指数与血肌酐水平呈负相关,表明肾移植术后,肾功能下降时,血肌酐越高。同时,肾皮质的血管指数先下降程度能准确的反映肾皮质血流灌注情况及肾功能异常情况^[25,26]。本研究中,B组患者的血管指数稍微低于A组患者,但差异无统计学意义。这可能是由于急性排斥反应、输尿管狭窄、免疫抑制剂中毒及感染等使微循环血流减少,治疗后肾血供和肾功能逐渐恢复正常,最终使得肾皮质的血管指数无明显变化^[27,28]。但采用超微血管成像技术时,应注意该技术有着较强的操作依赖性,对肾移植患者进行检测时,动作应轻柔且不重压,增益不宜过大,最大限度从不同方位来检测,避开干扰,提高检测准确性^[29,30]。

综上所述,超声微血流成像术用于肾移植患者术后评估可较好地反映肾皮质血供及术后肾功能的变化,为临床肾移植术后评价提供客观指标,同时也为临床进一步治疗提供参考依据。但本研究也存在不足之处,如未比较不同原因导致的移植肾功能异常血管指数差异,需进一步研究以明确。

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