doi:10.11659/jjssx.07E019162

·临床研究·

静态和动态自旋跟踪矫正经角膜上皮的激光角膜切削术的临床疗效

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[摘 要] **目的** 评估经角膜上皮的激光角膜切削术(TransPRK)中联合使用静态和动态自旋跟踪补偿软件对散光和角膜源性波前像差的矫正效果。**方法** 回顾性分析陆军军医大学第一附属医院2017年1月至2018年7月收治的行TransPRK的56例患者(112眼)的临床资料。根据患者术前显然验光柱镜度数值将其分为联合组(术前显然验光柱镜度数值≥ -0.75 D)和DCC组(术前显然验光柱镜度数值< -0.75 D)。联合组患者术前行静态眼球自旋跟踪(SCC)检查,并在术中成功实施;DCC组患者术中未实施SCC。使用CAM软件指导激光治疗,同时联合静态和动态自旋控制技术跟踪眼球自旋。对SCC以及实时眼球动态自旋跟踪(DCC)的幅度值及分布频率进行分析评估。术后随访6个月,同时评估患者术前、术后裸眼视力(UCVA)、最佳矫正视力(BCVA)、显然验光度数、角膜源性波前像差,并评估手术安全性及预测意义。**结果** 联合组100%的患者SCC测量值在±10.0°以内,78.72%浮动在±5.0°以内,4.25%在±0.5°以内;97.87%的患者DCC测量值在±5.0°以内,27.66%在±1.0°以内,6.38%在±0.5°以内,部分补偿了SCC。DCC组100%的患者DCC测量值在±5.0°以内,44.62%在±1.0°以内,4.62%在±0.5°以内。联合组患者术前柱镜值平均(-1.44±0.109)D,DCC组平均(-0.71±0.05)D,2组比较差异有统计学意义(t = -6.635 9,P<0.001)。联合组患者术后柱镜值平均(-0.33±0.04)D,100%眼散光值在1.0 D以内,82.97%眼散光值在0.50 D以内,65%眼散光值在0.25 D以内;DCC组患者术后柱镜值平均(-0.39±0.03)D,99%眼散光值在1.0 D以内,78.56%眼散光值在0.50 D以内,55.40%眼散光值在0.25 D以内,2组比较差异无统计学意义(t=1.063,P=0.290 1)。在角膜源性像差的分析中(以6 mm瞳孔直径分析),2组术前、术后角膜源性总像差、总高阶像差、彗差、三叶草、球差比较,差异均无统计学意义(P>0.05)。联合组手术前后总高阶像差、球差平均值比较,差异有统计学意义(P<0.05)。DCC组手术前后总高阶像差、三叶草和球差比较差异有统计学意义(P<0.05)。**结论** 在经角膜上皮的激光角膜切削术中采用静态及动态自旋跟踪补偿功能是安全且可预测的,较单纯使用动态跟踪补偿功能对矫正患者散光效果优异。

[关键词] 静态自旋;动态自旋;散光;波前像差;眼球运动

[中图分类号] R772.2 [文献标识码] A [收稿日期] 2019-07-28

Effect of static cyclotorsion compensation and dynamic cyclotorsion compensation on refractive and visual outcomes of transepithelial photorefractive keratectomy

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Abstract: Objective To evaluate the corrective effect of transepithelial photorefractive keratectomy (TransPRK) combined with static and dynamic cyclotorsions compensation on astigmatism and corneal aberrations of ametropic patients. **Methods** The clinical data of 56 ametropic patients (112 eyes) who were treated by TransPRK in first hospital affiliated to army medical university from Janunary 2017 to July 2018 were analyzed retrospectively. According to the preoperative astigmatic diopters, the patients were divided into combination group (preoperative astigmatic severity was or more than -0.75 diopters) and DCC group (preoperative astigmatic severity was less than -0.75 diopters). Patients in combination group were examined by static cyclotorsion compensation (SCC) before surgery and successfully performed surgery, while patients in DCC group received surgery without SCC. Treatments planned with Custom Ablation Manager and ablations were performed by using the SCHWIND AMARIS. Cyclotorsional movements were evaluated for SCC and dynamic cyclotorsion component (DCC) for mean and amplitude distribution frequency. The patients were followed up for 6 months. Clinical outcomes were evaluated for uncorrected visual acuity (UCVA), best corrected visual acuity (BCVA), manifest refraction, corneal aberrations, safety and predictability. **Results** In combination group, SCC measurements were within ±10.0 degrees in 100% of cases, within ±5.0 degrees in 78.72% of cases, within ±0.5 degrees in 4.25% of cases; DCC measurements were within ±5.0 degrees in 97.87% of cases, within ±1.0 degrees in 27.66% of cases,

[基金项目] 国家重点研发计划重点专项项目(2018YFA0107302);重庆市基础与前沿研究计划一般项目(cstc2016jcyjA0297);军事医学科技创新计划基础研究军民融合项目(SWH2017YBXM-08)

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within ±0.5 degrees in 6.38% of cases, partly compensating for SCC. In DCC group, DCC measurements were within ±5.0 degrees in 100% of cases, within ±1.0 degrees in 44.62% of cases, within ±0.5 degrees in 4.62% of cases. Preoperative mean astigmatism was (−1.44 ±0.109) diopters in combination group, which was (−0.71 ±0.05) diopters in DCC group, the difference was statistical significant (t = −6.635 9, P <0.001). Postoperative astigmatism was (−0.33 ±0.04) diopters in combination group, astigmatic measurements were within 1.0 degrees in 100% of cases, within 0.5 degrees in 82.97% of cases, within 0.25 degrees in 65% of cases. Postoperative astigmatism was (−0.39 ±0.03) diopters in DCC group, astigmatic measurements were within 1.0 degrees in 99% of cases, within 0.5 degrees in 78.56% of cases, within 0.25 degrees in 55.40% of cases, there was no statistical significance between two groups (t = 1.063, P = 0.290 1). Compared preoperative and postoperative root mean square of corneal aberrations at 6-mm analysis diameter, there was no statistically significant difference in total aberration, high-order magnitudes, coma, trefoil, spherical aberration. There were significant differences in preoperative and postoperative total aberration, spherical aberration of combination group. The differences in preoperative and postoperative total aberration, trefoil, spherical aberration of DCC group were statistically significant. **Conclusion** Transepithelial photorefractive keratectomy with advanced cyclotorsion compensation is safe and predictable for patients, which has an excellent effect in correcting astigmatism compared with that only assisted with dynamic cyclotorsion compensation.

Keywords: static cyclotorsion compensation; dynamic cyclotorsion compensation; astigmatism; wavefront aberration; eye movements

激光技术通过改变角膜形状能更准确地矫正屈光不正[1]。消融轮廓基于以连续激光脉冲的形式去除组织微透镜,通过消融少量角膜组织补偿屈光不正。然而,视觉质量会随之恶化,尤其是在低对比度条件下容易诱发球面像差、彗差,与术后视觉质量密切相关[2]。人眼存在 6 个维度的运动:X、Y、Z 轴线性运动,水平和垂直旋转运动及以光轴为旋转中心发生的眼球自旋运动。常规的眼球跟踪系统仅能在眼球的 X、Y 轴上跟踪并补偿眼球的线性运动,但眼球的运动或头部的倾斜将产生眼球的旋转运动,导致实际激光切削轮廓与预期轮廓不匹配[3-5]。AMARIS 500E 准分子激光治疗仪的眼球跟踪系统配备了对眼球旋转运动的捕获和分析功能,基于对角巩膜缘和眼球结构的识别,该系统可以对眼球以视轴为旋转中心发生的眼球自旋运动,即眼球在第五维度上的运动进行静态跟踪和实时动态跟踪。静态眼球自旋跟踪功能(static cyclotorsioncomponent,SCC)补偿的是患者处于直立位和躺卧位时眼球位置的差别,并在术中予以相应的补偿[6-7]。实时动态眼球自旋跟踪功能(dynamic cyclotorsion component,DCC)则是指准分子激光治疗跟踪系统能捕获到激光治疗过程中眼球发生的自旋运动,随时调整激光切削位置[8-10]。本研究评估了术中静态及动态自旋跟踪补偿功能对术后视觉质量的影响,现报告如下。

1 资料与方法

1.1 临床资料

选择陆军军医大学第一附属医院 2017 年 1 月至 2018 年 7 月收治的行 TransPRK 治疗的近视患者共 56 例(112 眼)作为研究对象,所有患者均双眼发病。其中男 36 例,女 20 例;年龄 18 ~ 31 岁,平均(23.6 ± 5.82)岁。根据患者术前显然验光柱镜度数值将患者分为联合组和 DCC 组。25 例患者术前显然验光柱镜度数值≥ −0.75 D 设为联合组(50 眼),联合组患者术前行 SCC 检查,并在术中成功实施。31 例患者术前显然验光柱镜度数值 < −0.75 D 设为 DCC 组(62 眼),DCC 组患者(包含部分虽建议行 SCC 治疗,但最终拒绝行 SCC 的患者)术中未实施 SCC。2 组术中均成功实施 DCC。

2 组患者术前裸眼视力(under corrected visual acuity, UCVA)、最佳矫正视力(best corrected visual acuity, BCVA)、球镜平均值、柱镜平均值、角膜源性的总像差均值、角膜源性的高阶像差均值、角膜源性彗差均值、角膜源性的三叶草均值、角膜源性的球差均值比较,差异无统计学意义(P >0.05),见表 1。2 组患者柱镜度数值比较,差异有统计学意义(t = −6.635 9, P <0.05)。

表 1 2 组患者术前各项参数($\bar{x} \pm s$)

组别	n	UCVA	BCVA	球镜度数(D)	柱镜度数(D)	角膜源性总像差(μm)	角膜源性高阶像差(μm)	角膜源性彗差(μm)	角膜源性三叶草(μm)	角膜源性球差(μm)
联合组	25	0.08 ±0.007	1.0 ±0.008	−4.16 ±0.19	−1.44 ±0.109	2.29 ±0.16	0.49 ±0.07	0.28 ±0.03	0.21 ±0.03	0.25 ±0.02
DCC 组	31	0.08 ±0.01	1.12 ±0.02	−3.97 ±0.14	−0.71 ±0.05	2.84 ±0.9	0.58 ±0.09	0.32 ±0.04	0.19 ±0.03	0.35 ±0.07
t		0.21	1.19	−0.82	−6.63	−0.52	−0.77	−0.76	0.18	−1.26
P		0.83	0.23	0.41	<0.001	0.61	0.44	0.45	0.86	0.21

1.2 方法

1.2.1 手术方式 所有患者给予屈光手术常规检查,术前3 d开始使用非甾体抗炎眼液和抗生素眼液滴眼。TransPRK手术方法:采用AMARIS 500E准分子激光治疗仪的Custom Ablation Manager(CAM)软件指导进行激光治疗,同时联合静态和动态自旋控制技术跟踪眼球自旋。术前使用角膜地形图检查仪采集SCC数据。术前常规洗眼,滴用0.4%倍诺喜表面麻醉3次,用0.05%碘伏消毒手术眼,铺孔巾,开睑器开睑,导入角膜地形图检查仪中筛选的质量最佳的SCC图形,启动SCC后,手术区域照明强度会发生变化,目的在于通过调节手术区域的照明,使此时仰卧位眼位的瞳孔大小与术前基准图的瞳孔大小一致,两张图所暴露的虹膜面积也大致相等,这样才有利于比对的成功。SCC软件会自动比对并补偿患者术前检查坐立位所拍摄的眼位图(即SCC对比的基准图)与术中仰卧位时跟踪系统所拍摄的眼位图的差异来计算出眼球自旋的度数,如果测量的SCC<5°,直接采用此SCC值指导手术;如测量的SCC≥5°,则需重复测量SCC值,测量次数不超过3次,以观察SCC测量值的重复性是否良好[6]。术中应用DCC软件能捕获到激光治疗过程中眼球发生的自旋运动,随时调整激光切削位置,同时记录DCC(min)及DCC(max)。将激光瞄准光对准患者角膜中心位,启动治疗程序,激光切削预设的角膜组织(图1)。用平衡液大量冲洗角膜基质床碎屑后眼表滴妥布霉素地塞米松滴眼液,术毕配戴软性角膜绷带镜。

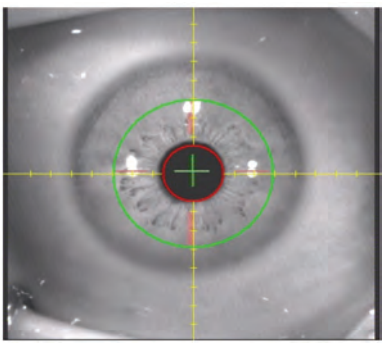


图1 静态和动态自旋跟踪下的激光角膜切削术

1.2.2 术后用药 妥布霉素地塞米松滴眼液每日4次,术后2周改为氯替泼诺混悬滴眼液,每日4次,逐渐减量,直至术后3个月停药。重组人表皮生长因子衍生物滴眼剂每日4次,术后1周停药;玻璃酸钠滴眼液每日4次,术后3个月停药。

1.3 术后随访观察指标

术后5 d、14 d、1个月、3个月、6个月随访复查裂隙灯显微镜、UCVA、BCVA、散瞳验光、眼压、角膜地形图、波前像差。

1.4 统计学方法

采用SPSS 23.0统计学软件对观察指标进行分析处理。应用D′Agostino-Pearson检验检测数据均符合正态分布,计量资料以均数±标准差($\bar{x} \pm s$)表示,采用t检验,$P<0.05$表示差异具有统计学意义。

2 结果

2.1 SCC和DCC

联合组所有术眼均捕获SCC至少一次(眼睛注册率,100%),DCC注册成功率为100%。从直立位到仰卧位的SCC值为-7.4°~10°,平均(1.19±0.56)°,术眼SCC测量值分布比见图2。术眼DCC测量值分布比见图3。联合组患者DCC(min)值为-5.75°~2.12°,平均(-1.15±0.24)°,DCC(max)值为-3.36°~7.32°,平均(1.80±0.29)°。DCC组患者术眼DCC测量值分布比见图3。DCC组患者DCC(min)值为-7.11°~1.19°,平均(-1.25±0.21)°,DCC(max)值为-1.55°~8.48°,平均(1.15±0.21)°。2组DCC(min)平均值比较,差异无统计学意义($t=0.29$,$P=0.77$);2组DCC(max)平均值比较,差异无统计学意义($t=1.85$,$P=0.06$)。治疗期间的DCC平均值与相应的SCC值呈负相关($P<0.05$),部分补偿了SCC,但相关性较弱($R^2=0.015$),回归的斜率可能受2个极值的影响(图4)。

2.2 显然验光

联合组及DCC组术后患眼柱镜测量值分布见图5。2组UCVA、球镜度数平均值及柱镜度数平均值比较,差异无统计学意义($P>0.05$),见表2。

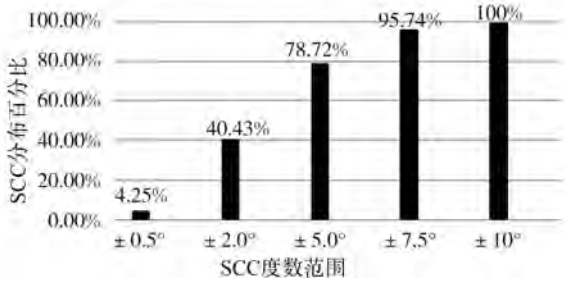


图2 联合组静态眼球自旋跟踪(SCC)平均值

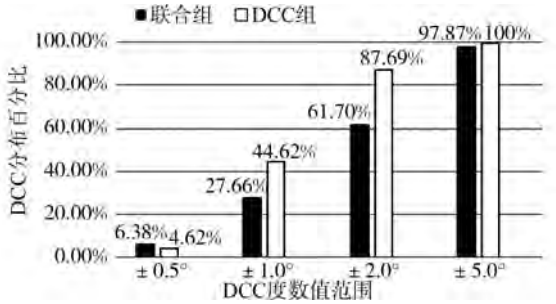


图3 2组实时眼球动态自旋跟踪(DCC)平均值

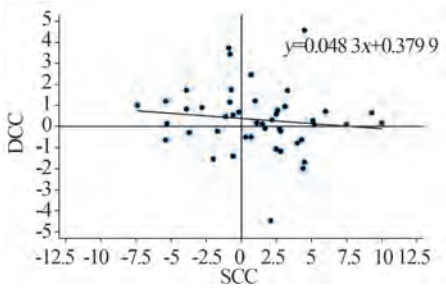


图4 联合组 SCC 与 DCC 平均值的回归关系

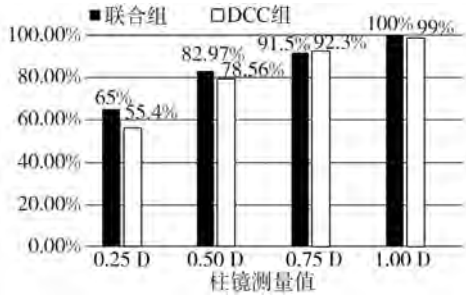


图5 2组术后散光度数分布图

表2 2组术后显然验光值($\bar{x}\pm s$)

组别	n	UCVA	球镜度数(D)	柱镜度数(D)
联合组	25	1.17±0.028	0.15±0.07	−0.33±0.04
DCC 组	31	1.12±0.023	0.02±0.06	−0.39±0.03
t		1.19	1.27	1.06
P		0.235	0.207	0.29

2.3 角膜源性波前像差

联合组手术前后角膜源性高阶像差及角膜源性球差平均值比较,差异有统计学意义($P<0.05$),见表3。DCC 组手术前后角膜源性高阶像差、三叶草及球差平均值比较,差异有统计学意义($P<0.05$),说明联合使用静态及动态跟踪补偿功能较单纯使用动态跟踪补偿功能对角膜源性波前像差的矫正优势不明显,见图6、表3。

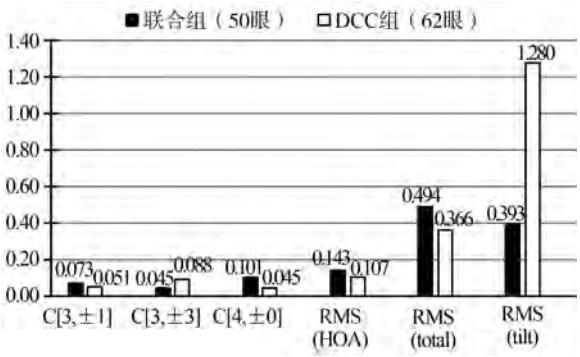


图6 2组手术前后角膜源性波前像差值变换

3 讨论

经角膜上皮的激光角膜切削术(transepithelial photorefractive keratectomy,TransPRK)是一种新型的表层激光手术,极大程度地提升了手术安全性,其优势包括:无需制作角膜瓣,可避免在术中、术后出现瓣相关并发症,治疗无需负压吸引,可预防视网膜脱离、眼球暂时性缺血等风险,是薄角膜、小睑裂、手术配合度差的患者首选的屈光矫正手术方式。准分子激光治疗跟踪系统包括虹膜识别及眼球自旋识别、补偿系统(SCC 及 DCC),眼球自旋识别及补偿系统主要选取眼球的三个解剖结构:瞳孔轮廓、虹膜纹理、角巩膜缘血管。患者术前检测的散光轴向与激光实际矫正的散光轴向的误差来源于两个阶段的眼球自旋,第一阶段为个体由术前检查时的直立位变为手术时的仰卧位时的静态旋转,此阶段的眼球自旋采用 SCC 监测并补偿;第二阶段为患者在激光治疗期间眼球的动态旋转,此阶段的眼球自旋采用 DCC 监测并补偿,准分子激光治疗平台对术中所有患者均自动实施 DCC 补偿治疗[6-10]。有文献报道眼球旋转超过2°而未补偿时,可影响散光的矫正并导致术后像差增加;眼球旋转达到4°而不对其进行补偿时,会导致14%的残余散光。眼球自旋对患者术后视觉质量的影响与患者术前的散光度数呈正相关,因此对静态眼球自旋和动态眼球旋转进行实时监测并进行补偿与患者术后的视觉质量密切相关[6,11]。

表3 2组手术前后各项波前相差值(μm)

组别	角膜源性总像差	角膜源性高阶像差	角膜源性彗差	角膜源性三叶草	角膜源性球差
联合组 术前	2.29±0.16	0.49±0.07	0.28±0.03	0.21±0.03	0.25±0.02
(n=25) 术后	2.78±0.56	0.63±0.03	0.36±0.02	0.25±0.29	0.35±0.39
t	−0.911	−2.63	−2.02	−1.63	−3.92
P	0.37	0.01	0.05	0.10	0.00
DCC 组 术前	2.84±0.9	0.58±0.09	0.32±0.04	0.19±0.03	0.35±0.07
(n=31) 术后	3.21±1.12	0.69±0.12	0.37±0.03	0.29±0.06	0.39±0.08
t	−1.014	−2.27	−1.396	−2.23	−2.48
P	0.31	0.03	0.17	0.03	0.02

为了证实 SCC 联合 DCC 补偿对患者的散光矫正可以起到精准控制的效果,本研究采用 AMARIS 500E 准分子治疗平台对近视散光患者行 TransPRK 激光治疗,根据患者术前散光测量值(以 −0.75 D 为界)将患者分为 DCC 联合 SCC 组及单纯 DCC 组,DCC 联合 SCC 组术后 82.97% 患眼散光度数值在 ±0.50 D 以内,单纯 DCC 组术后 78.56% 患眼散光度数值在 ±0.50 D以内,2 组患者术后散光度数均值比较差异无统计学意义,提示 SCC 联合 DCC 对患者在不同阶段眼球自旋的补偿,能更加精准地矫正患者散光,使其术后散光度数值更接近正视范围。这一研究结果与我们术前的假设一致,同时与相关研究报道一致[11-13]。Tomita等[11]将术前散光大于 2.00 D 的患者随机分为2组行激光治疗,治疗组采用 SCC 联合 DCC 治疗,对照组仅采用 DCC 治疗。术后 SCC 联合 DCC 治疗组散光度数为(−0.11±0.29)D,对照组为(−0.19±0.36)D,2 组比较差异有统计学意义。Aslanides 等[12]对术前散光大于 1.00 D 的患者采用 AMARIS 激光平台行

TransPRK 治疗,35 眼采用 SCC 联合 DCC 治疗,35 眼仅采用 DCC 治疗,结果发现 SCC 联合 DCC 治疗组术后散光度数为(0.24 ±0.28)D,对照组为(0.46 ±0.42)D,2 组差异有统计学意义。Fahd 等[13]研究 AMARIS 激光平台联合 SCC 对散光的矫正情况,结果发现联合治疗组术后残余散光大于 1.0 D 的比例为 10%,未联合组为 20%,2 组比较差异有统计学意义。以上研究均说明对于术前散光值较高的患者,采用 SCC 联合 DCC 补偿治疗对矫正散光能起到精准治疗的效果。

由于 SCC 及 DCC 分别从 X、Y、Z 轴监控及补偿了眼球自旋,为了进一步观察 SCC 联合 DCC 补偿对患者高阶像差的矫正效果,本研究分别比较了 DCC 联合 SCC 组及单纯 DCC 组患者手术前后各种角膜源性高阶像差值的变化情况,结果提示 DCC 联合 SCC 组术前、术后角膜源性总高阶像差及球差平均值比较差异有统计学意义,单纯 DCC 组术前、术后角膜源性总高阶像差、三叶草及球差平均值比较差异有统计学意义,说明 SCC 联合 DCC 治疗相较于单纯 DCC 治疗而言,对高阶像差的矫正效果优势不明显。Tomita 等[11]比较了 SCC 联合 DCC 治疗组及单纯 DCC 治疗组对高阶像差的矫正效果,结果显示差异无统计学意义。Xu 等[14]采用全飞秒激光治疗近视散光患者,随机将患者分为 SCC 联合 DCC 治疗组及对照组,结果发现 2 组患者全眼像差无统计学差异。不同的像差测量设备,瞳孔大小等多种因素均可能影响患者高阶像差,分析 SCC 联合 DCC 治疗对患者角膜源性高阶像差及全眼高阶像差矫正效果优势不明显的原因,可能是由于影响患者高阶像差的因素过多,即便对同一患者进行前后多次测量,其高阶像差测量值仍可能存在误差,因此难以进行比较分析。

本研究中 DCC 联合 SCC 组患者 SCC 测量均值为(1.19 ±0.56)°,78.72% 在 ±5.0° 以内。DCC(min)平均值为(−1.15 ±0.24)°,DCC(max)均值为(1.80 ±0.29)°。97.87% 的术眼 DCC 测量值在 ±5.0° 以内,单纯 DCC 组患者 100% 的术眼 DCC 测量值在 ±5.0° 以内。研究中测量的平均 DCC 值相对于 SCC 值而言较小,分析两者的线性回归关系发现 DCC 与 SCC 呈负相关,因此认为动态旋转运动是对静态自旋运动的补偿。这一结果与以往研究结果类似[11,14]。Piao 等[15]采用 Amaris 激光平台 SCC 联合 DCC 分别采用消像差模式(aberration-free,AF)及角膜波前像差模式(corneal wavefront,CW)治疗近视散光患者,结果发现 AF 组 57% 的眼 SCC 值在 ±5° 以内,CW 组 68% 的眼 SCC 值在 ±5° 以内。AF 组 96% 的眼及 CW 组 95% 的眼 DCC 均值在 ±1° 以内[15]。Ciccio 等[16]监测了 732 例(1 019 眼)近视激光矫正患者,结果发现 SCC 平均值为(4.05 ±2.9)°。我们观察到这种 DCC 倾向于部分抵消 SCC 的影响,两者呈负向相关,即使只是部分补偿,但仅考虑治疗的 SCC 会高估消融过程中的实际旋转[17]。

此外,本研究中 4.26% 的眼球静态自旋接近 10°,如果静态自旋没有得到补偿,那么预计患者将有至少 35% 残余散光,52% 残留三叶草,以及四叶、五叶和六叶的残余误差,明显影响患者术后视觉质量[6]。

综上所述,传统的虹膜定位技术只是一种静态定位且不能对眼球的自旋进行精准的测量和补偿,AMARIS 500E 准分子治疗仪配置最先进的跟踪系统,在激光角膜消融期间,可以在静态和动态条件下有效地测量和补偿眼睛的旋转运动,确保手术的安全性和精准性,从而大大提高患者术后的视觉质量。

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·临床研究·

经尿道前列腺剜除术治疗良性前列腺增生疗效观察

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[摘 要] **目的** 观察经尿道前列腺剜除术治疗良性前列腺增生(BPH)的临床效果。**方法** 回顾性分析内蒙古医科大学附属医院泌尿外科2017年7月至2018年7月收治的128例BPH患者的临床资料,按手术方法不同分为2组,每组64例。对照组行经尿道前列腺电切术,观察组行经尿道前列腺剜除术,比较2组患者手术指标、尿道功能、并发症及血清检测指标。**结果** 观察组手术时间、膀胱冲洗时间、尿管留置时间、住院时间、术中出血量均少于对照组,前列腺切除量大于对照组,差异均有统计学意义($P<0.05$);观察组术后3个月的IPSS评分较对照组低,RUV值较对照组小,Qmax值较对照组大,术后并发症发生率及术后24 h的Scr水平较对照组低,差异均具有统计学意义($P<0.05$);而2组术后24 h的BUN、NSE、S100β蛋白水平比较学差异无统计意义($P>0.05$)。**结论** 经尿道前列腺剜除术能有效清除良性前列腺增生组织,改善前列腺增生症状,恢复尿道功能,术后并发症少,对肾功能影响较小,不会造成患者脑组织损害。

[关键词] 良性前列腺增生;经尿道前列腺剜除术;并发症;血尿素氮;S100β蛋白

[中图分类号] R697+.32 [文献标识码] A [收稿日期] 2019-05-16

Transurethral prostatectomy in treatment of patients with benign prostatic hyperplasia

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Abstract: Objective To observe the clinical effect of transurethral enucleation of the prostate for benign prostatic hyperplasia(BPH). **Methods** The clinical data of 128 patients with BPH, who had been admitted to urology surgery department of affiliated hospital of Inner Mongolia medical university from July 2017 to July 2018, were analyzed retrospectively. They were divided into two groups according to the surgical method, with 64 cases in each group. The control group underwent transurethral resection of the prostate, whereas the observation group underwent transurethral enucleation of the prostate. The surgical indicators, urinary tract function, complications and serum indicators were compared between the two groups. **Results** The operation duration, bladder irrigation time, catheter indwelling time and length of hospital stay of the observation group were shorter than those of the control group, the amount of intraoperative bleeding of the observation group was less than that of the control group, and the mass of excised prostate in the observation group was larger than that in the control group, the differences were significant($P<0.05$). After 3 months, the IPSS score and the RUV in the observation group were less than those in the control group, the Qmax in the observation group was more than that in the control group. The incidence of postoperative complications in the observation group was lower than that in the control group. The level of Scr was in the observation group at 24 hours after operation was lower than that in the control group, the differences were significant($P<0.05$). There was no statistical difference in the levels of BUN, NSE and

[基金项目] 内蒙古自治区科技计划项目(1505015)

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(编辑:贺绍梅)