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同轴常规切口与微切口超声乳化术对白内障患者视力、角膜散光以及泪液炎症因子的影响*

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摘要 目的:探讨同轴常规切口与微切口超声乳化术对白内障患者角膜散光、视力以及泪液炎症因子的影响。**方法:**选取 2018 年 1 月~2019 年 12 月期间我院收治的白内障患者 80 例,根据随机数字表法分为对照组(n=40)和研究组(n=40),对照组患者采用同轴常规切口超声乳化术,研究组采用同轴微切口超声乳化术,比较两组患者术中前房稳定性、最佳矫正视力、平均超声能量、角膜散光程度、有效超声乳化时间、泪液炎症因子以及术后恢复时间,记录两组术后并发症发生率。**结果:**两组术后 1d、术后 1 周、术后 1 个月、术后 3 个月最佳矫正视力呈升高趋势,且研究组高于对照组($P<0.05$)。研究组术后 1 周、术后 1 个月、术后 3 个月角膜散光程度低于对照组($P<0.05$)。两组患者有效超声乳化时间、平均超声能量、术中前房稳定人数占比比较差异无统计学意义($P>0.05$);研究组术后恢复时间短于对照组($P<0.05$)。两组术后 3 个月泪液白介素-6(IL-6)、肿瘤坏死因子- α (TNF- α)均下降,且研究组低于对照组($P<0.05$)。两组术后并发症发生率比较差异无统计学意义($P>0.05$)。**结论:**与同轴常规切口超声乳化术相比,同轴微切口超声乳化术治疗白内障患者,在改善患者角膜散光、视力以及泪液炎症因子水平方面效果显著,且不增加术后并发症发生率。

关键词:常规切口;微切口;超声乳化术;白内障;视力;角膜散光;炎症因子

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The Effect of Phacoemulsification with Coaxial Conventional Incision and Micro Incision on Vision, Corneal Astigmatism and Tear Inflammatory Factors in Cataract Patients*

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ABSTRACT Objective: To investigate the effect of phacoemulsification with coaxial conventional incision and micro incision on corneal astigmatism, vision and tear inflammatory factors in cataract patients. **Methods:** 80 cataract patients who were treated in our hospital from January 2018 to December 2019 were selected, they were randomly divided into two groups: control group (n = 40) and study group (n = 40). Patients in the control group were treated with coaxial conventional incision phacoemulsification, while patients in the study group were treated with coaxial micro incision phacoemulsification. Intraoperative anterior chamber stability, best corrected vision, average ultrasound energy, corneal astigmatism, effective phacoemulsification time, lacrimal inflammatory factors and postoperative recovery time in the two groups were compared, the incidence of postoperative complications was recorded. **Results:** The best corrected visual acuity of the two groups increased 1d after operation, 1 week after operation, 1 month after operation, 3 months after operation, and the study group was higher than the control group ($P<0.05$). The corneal astigmatism in the study group was lower than that in the control group at 1 week after operation, 1 month after operation, 3 months after operation ($P<0.05$). There was no significant difference in the effective phacoemulsification time, average ultrasound energy and the proportion of patients with stable anterior chamber during operation between the two groups ($P>0.05$). The recovery time of the study group was shorter than that of the control group ($P<0.05$). The levels of Interleukin-6 (IL-6), tumor necrosis factor- α (TNF- α) in lacrimal fluid of the two groups were lower than those of the control group ($P<0.05$). There was no significant difference in the incidence of postoperative complications between the two groups ($P>0.05$). **Conclusion:** Compared with the coaxial conventional incision phacoemulsification, the coaxial micro incision phacoemulsification can improve the corneal astigmatism, visual acuity and the level of tear inflammatory factors, without increasing the incidence of postoperative complications.

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前言

白内障是由各种原因如遗传、局部营养障碍、老化等引起的晶状体代谢紊乱导致晶状体发生混浊的疾病^[1]。光线被混浊晶状体阻挡无法投射在视网膜上,导致视物模糊,是临床常见的致盲性眼病^[2]。超声乳化术是治疗白内障的常用方案,因其损伤小、术后恢复快等优点在临床上获得了广泛应用^[3]。但近年来临床实践发现,常规切口的超声乳化术后部分患者可出现眼部烧灼感等干眼症状^[4]。随着超声乳化设备的不断更新以及医师手术技巧的不断提高,同轴微切口超声乳化白内障手术逐渐被应用于临床^[5]。但有关同轴常规切口与微切口超声乳化术治疗白内障患者的疗效孰优孰劣尚存在一定的争议,本研究就此展开分析,以期临床白内障超声乳化术时切口的选择提供数据参考,现整理报道如下。

1 资料与方法

1.1 一般资料

选取 2018 年 1 月~2019 年 12 月期间我院收治的 80 例白内障患者,纳入标准:(1)均确诊为白内障,均符合手术指征者;(2)患者及其家属知情本研究且签署同意书;(3)晶状体核硬度按照 Emery-Little 分级标准 II~III 级者^[6];(4)均为单眼患病者;(5)手术操作均由同一组医师完成。排除标准:(1)合并全身结缔组织疾病、免疫性疾病者;(2)既往接受过白内障相关手术治疗者;(3)入组前使用影响泪液分泌及泪膜稳定性药物者;(4)合并精神疾患,无法正常沟通交流者;(5)合并有高血压、糖尿病等慢性消耗性疾病者;(6)合并眼科其他疾病者。根据随机数字表法分为对照组(n=40)和研究组(n=40),其中对照组男 22 例,女 18 例,年龄 43~78 岁,平均(54.62±4.37)岁;患眼:左眼 21 例,右眼 19 例;Emery-Little 分级:II 级 24 例,III 级 16 例。研究组男 24 例,女 16 例,年龄 45~82 岁,平均(55.09±5.26)岁;患眼:左眼 24 例,右眼 16 例;Emery-Little 分级:II 级 26 例,III 级 14 例。两组一般资料对比无差异($P>0.05$),具有可比性。此次研究已获得我院医学伦理委员会批准进行。

1.2 方法

两组术前散大瞳孔,常规麻醉处理。使用美国爱尔康公司生产的 U-II 型超声乳化仪完成如下手术操作:两组均于 2:00 位作侧切口,对照组于透明角膜缘 11:00 处行 3.0 mm 隧道式透明角膜切口,研究组于透明角膜缘 11:00 处行 1.8 mm 隧道式透明角膜缘切口,前房注入黏弹剂,并行连续环形撕囊,直径为 6 mm,作水分离、水分层,采用超声乳化技术吸除晶状体核及残余皮质后,使用一次性推入器注入 SOTEC I 型折叠式后房人工晶状体于囊袋内。术毕,水密角膜切口和辅助切口。两组术后常规使用妥布霉素地塞米松眼药水、托吡卡胺眼水滴眼,4~6 次/d,持续 1 个月。术后采用门诊复查的形式随访 3 个月。

1.3 观察指标

(1)记录两组平均超声能量、有效超声乳化时间、术后恢复时间、术中前房稳定人数。(2)记录两组术前、术后 1d、术后 1 周、术后 1 个月、术后 3 个月的最佳矫正视力。(3)记录两组患者术前、术后 1d、术后 1 周、术后 1 个月、术后 3 个月的角膜散光程度。(4)于术前、术后 3 个月采用毛细吸管法收集患者的泪液约 15 μ L,置于冰箱中(-80℃)待测。参考试剂盒(上海基免生物科技有限公司)说明书,采用酶联免疫吸附试验检测白介素-6 (Interleukin-6, IL-6)、肿瘤坏死因子- α (Tumor necrosis factor- α , TNF- α)。(5)记录两组术后并发症发生情况。

1.4 统计学方法

采用 SPSS26.0 进行数据分析,计量资料以均值±标准差的形式表示,行 t 检验。计数资料以比或率的形式表示,行卡方检验。检验标准设置为 $\alpha=0.05$ 。

2 结果

2.1 两组最佳矫正视力比较

两组术前最佳矫正视力比较无差异($P>0.05$);两组术后 1d、术后 1 周、术后 1 个月、术后 3 个月最佳矫正视力呈升高趋势,且研究组高于对照组($P<0.05$);详见表 1。

2.2 两组不同时间点角膜散光程度比较

两组术前、术后 1d 角膜散光程度比较无差异($P>0.05$);两组术后 1d、术后 1 周、术后 1 个月、术后 3 个月角膜散光程度呈升高后降低趋势($P<0.05$);研究组术后 1 周、术后 1 个

表 1 两组不同时间点最佳矫正视力比较($\bar{x}\pm s$)

Table 1 Comparison of the best corrected visual acuity of the two groups at different time points($\bar{x}\pm s$)

Groups	Best corrected vision				
	Before operation	1d after operation	1 week after operation	1 month after operation	3 months after operation
Control group(n=40)	0.29±0.08	0.42±0.07 ^a	0.64±0.12 ^{ab}	0.84±0.17 ^{abc}	1.02±0.13 ^{abcd}
Study group(n=40)	0.31±0.09	0.66±0.13 ^a	0.87±0.17 ^{ab}	0.99±0.18 ^{abc}	1.19±0.18 ^{abcd}
t	1.050	10.280	6.991	3.832	4.842
P	0.297	0.000	0.000	0.000	0.000

Notes: compared with before operation, ^a $P<0.05$; compared with 1d after operation, ^b $P<0.05$; compared with 1 week after operation, ^c $P<0.05$; compared with 1 month after operation, ^d $P<0.05$.

月、术后3个月角膜散光程度低于对照组($P<0.05$);详见表2。 定人数占比比较差异无统计学意义($P>0.05$);研究组术后恢复

2.3 两组临床指标比较

时间短于对照组($P<0.05$);详见表3。

两组患者有效超声乳化时间、平均超声能量、术中前房稳

表2 两组不同时间点角膜散光程度比较($\bar{x}\pm s$)

Table 2 Comparison of corneal astigmatism in two groups at different time points($\bar{x}\pm s$)

Groups	Corneal astigmatism				
	Before operation	1d after operation	1 week after operation	1 month after operation	3 months after operation
Control group(n=40)	0.68±0.18	0.97±0.17 ^a	0.90±0.13 ^{ab}	0.75±0.11 ^{abc}	0.59±0.12 ^{abcd}
Study group(n=40)	0.68±0.12	0.99±0.19 ^a	0.81±0.18 ^{ab}	0.62±0.13 ^{abc}	0.44±0.09 ^{abcd}
t	0.000	0.496	2.564	4.828	6.325
P	1.000	0.621	0.012	0.000	0.000

Notes: compared with before operation, ^a $P<0.05$; compared with 1d after operation, ^b $P<0.05$; compared with 1 week after operation, ^c $P<0.05$; compared with 1 month after operation, ^d $P<0.05$.

表3 两组临床指标比较

Table 3 Comparison of clinical indexes between the two groups

Groups	Effective phacoemulsification time(s)	Average ultrasonic energy (%)	Proportion of patients with stable anterior chamber during operation[n(%)]	Postoperative recovery time (h)
Control group(n=40)	5.52±0.31	10.49±1.32	29(72.50)	15.79±0.52
Study group(n=40)	5.58±0.24	10.57±1.40	33(82.50)	13.21±0.69
t/ χ^2	0.968	0.263	1.147	18.886
P	0.336	0.793	0.281	0.000

2.4 两组泪液炎症因子水平比较

($P>0.05$);两组术后3个月泪液 IL-6、TNF- α 均下降,且研究组

两组患者术前泪液 IL-6、TNF- α 比较差异无统计学意义 低于对照组($P<0.05$);详见表4。

表4 两组泪液炎症因子水平比较($\bar{x}\pm s$)

Table 4 Comparison of tear inflammatory factors between the two groups($\bar{x}\pm s$)

Groups	IL-6(pg/mL)		TNF- α (ng/mL)	
	Before operation	3 months after operation	Before operation	3 months after operation
Control group(n=40)	11.20±1.35	8.33±1.27 ^a	5.31±0.68	4.09±0.36 ^a
Study group(n=40)	11.68±1.29	5.75±1.34 ^a	5.84±0.42	2.51±0.25 ^a
t	1.626	8.838	1.194	22.799
P	0.108	0.000	0.263	0.000

Note: compared with before operation, ^a $P<0.05$.

2.5 两组术后并发症发生率比较

对照组术后出现1例角膜内皮水肿、1例前房积血、2例前房纤维性渗出,不良反应发生率为10.00%(4/40);研究组术后出现1例滤过泡瘢痕化、1例前房积血,不良反应发生率为5.00%(2/40);两组术后并发症发生率比较差异无统计学意义($\chi^2=0.721$, $P=0.396$)。

3 讨论

白内障是世界范围内发病率排名首位的致盲性眼病,多发于中老年群体^[7]。据我国卫生部门统计^[8],我国每年新生白内障约有40万例,严重影响我国人民的生活健康。同轴超声乳化术

是治疗白内障的常用术式,可有效改善患者视力^[9]。但仍存在术后散光程度大、眼内炎发生率高等问题^[10]。角膜散光已成为影响视觉功能的主要因素之一,而手术切口的位置、切口的愈合、手术切口大小等多种因素均与角膜散光有关^[11,12]。以往临床多采用3.0 mm大小的同轴常规切口进行手术,但近年来临床实践表明^[13,14],不同的手术切口可引起不同程度的角膜散光。同轴微切口超声乳化白内障手术一般指手术切口 <2.0 mm的白内障手术,近年来也受到了较多临床工作者的选择^[15,16]。但有关其与同轴常规切口的疗效孰优孰劣尚需进一步的研究以证实,本研究就此展开探讨。

本次研究结果显示,两组有效超声乳化时间、平均超声能

量、术中前房稳定人数占比对比未见差异,可见同轴微切口超声乳化术治疗白内障可获得与同轴常规切口手术相当的治疗效果。这可能是因为两种切口方式除灌注/抽吸针头、灌注套管管径以及超声乳化针头缩小以外,其余操作方法和手术器械均无差别,故两者手术效果差异不大^[17-19]。另外同轴微切口手术者的术后恢复时间短于同轴常规切口,这主要是因为微切口术后创伤小,创口愈合更快,有助于患者术后早期恢复^[20-22]。本次研究结果还显示,与同轴常规切口相比,同轴微切口超声乳化术治疗白内障患者,在改善患者视力,维持角膜散光的方面效果更佳。这主要是因为手术切口缩小后,可有效减少在水分离和水分层、连续环形撕囊的过程中由切口溢出的黏弹剂,加之微切口术后切口较稳定,降低了角膜形状改变程度,屈光状态更早趋于稳定,减少了不规则散光,状态良好,可更好的维持患者视力及减轻角膜散光^[23-25]。白内障手术会对眼内组织造成热、机械以及化学刺激,可引起组织细胞损伤,导致炎症介质大量合成释放,严重而持久的炎症反应可引起机体多种并发症^[26,27]。与此同时,眼表炎症会加重睑板腺损伤,影响泪膜的稳定性。本研究中两组患者炎症反应均有所控制,且同轴微切口超声乳化术者的控制效果更佳。推测与微切口对人体的应激损伤小,可减少机体的炎症反应有关^[28-30]。另两组术后并发症发生率比较差异无统计学意义,可见两种切口方式安全性相当。值得注意的是,虽然微切口疗效显著,但距离临床的广泛应用,仍有较长一段距离。同时,微切口的液流渗漏调节操作困难,同时还存在切口被灼伤的风险,这对术者的手术操作熟练度具有一定的要求。

综上所述,与同轴常规切口超声乳化术相比,同轴微切口超声乳化术治疗白内障患者,在改善患者角膜散光、视力以及泪液炎症因子水平方面效果显著,且不增加术后并发症发生率。

参考文献(References)

- [1] Jones JH, Aldwinckle R. Perioperative Dexmedetomidine for outpatient cataract surgery: a systematic review[J]. BMC Anesthesiol, 2020, 20(1): 75
- [2] Avetisov KS, Yusef NY, Smirnova TV, et al. Morphological and functional condition of the macula after different types of phaco cataract surgeries[J]. Vestn Oftalmol, 2020, 136(1): 4-16
- [3] Yusef YN, Voronin GV, Yusef SN, et al. Energy load and state of corneal endothelium in hybrid (femtosecond laser-assisted) and torsional phacoemulsification[J]. Vestn Oftalmol, 2020, 136(1): 42-48
- [4] Haldipurkar SS, Shetty V, Haldipurkar T, et al. Incision size changes after cataract surgery with intraocular lens implantation: comparison of 2 preloaded IOL implantation injectors[J]. J Cataract Refract Surg, 2020, 46(2): 222-227
- [5] Wang Q, Jiang ZX, Liao RF. Outcomes of 1.8-3.0 mm incision phacoemulsification combined with trabeculectomy for primary angle-closure glaucoma with cataract [J]. Int J Ophthalmol, 2020, 13(2): 246-251
- [6] 张海涛,刘婷婷,张利民,等. 向上劈核技术在硬核性白内障手术中的应用[J]. 内蒙古医科大学学报, 2016, 38(6): 496-499, 504
- [7] 饶玉萍,徐玲娟,游云,等. 同轴微切口超声乳化白内障手术对角膜内皮细胞的影响[J]. 现代生物医学进展, 2018, 18(5): 939-942
- [8] 张开颜,钟琼蕾,钟烈红,等. 海南省≥ 50 岁人群白内障流行病学调查[J]. 中国公共卫生, 2019, 35(9): 1201-1204
- [9] 王芳,赵金,王敏,等. 白内障手术与玻璃体抗 VEGF 药物不同应用方案治疗白内障合并湿性黄斑变性比较 [J]. 贵州医药, 2019, 43(12): 1940-1942
- [10] Gogate P. Commentary: Corneal endothelial cell changes in diabetics versus age-group matched nondiabetics after manual small incision cataract surgery (SICS)[J]. Indian J Ophthalmol, 2020, 68(1): 77
- [11] Song W, Conti TF, Gans R, et al. Prevention of Macular Edema in Patients With Diabetic Retinopathy Undergoing Cataract Surgery: The PROMISE Trial [J]. Ophthalmic Surg Lasers Imaging Retina, 2020, 51(3): 170-178
- [12] Muraine M, Boutillier G, Toubeau D, et al. Face-to-face phacoemulsification using a slitlamp in patients who are unable to lie flat[J]. J Cataract Refract Surg, 2019, 45(11): 1535-1538
- [13] Li PP, Huang YM, Cai Q, et al. Effects of steep-axis incision on corneal curvature in one-handed phacoemulsification [J]. Int J Ophthalmol, 2019, 12(8): 1277-1282
- [14] Jin KH, Kim TG. Relationship between early structural changes at cornea incision sites and surgical outcomes after phacoemulsification [J]. Int J Ophthalmol, 2019, 12(7): 1139-1145
- [15] Kongsap P. Central corneal thickness changes following manual small incision cataract surgery versus phacoemulsification for white cataract[J]. Rom J Ophthalmol, 2019, 63(1): 61-67
- [16] Pniakowska Z, Jurowski P. Influence of preoperative astigmatism on corneal biomechanics and accurate intraocular pressure measurement after micro-incision phacoemulsification [J]. Int J Ophthalmol, 2019, 12(4): 587-591
- [17] Baek J, Tae KS, Lee A, et al. Effective Lens Position According to Incision Width in Cataract Surgery Using Phacoemulsification and Posterior Chamber Lens Implantation [J]. Semin Ophthalmol, 2018, 33(7-8): 846-851
- [18] Xu W, Cheng W, Zhuang H, et al. Safety and efficacy of transpupillary silicone oil removal in combination with micro-incision phacoemulsification cataract surgery: comparison with 23-gauge approach[J]. BMC Ophthalmol, 2018, 18(1): 200
- [19] Fan F, Jia Z, Li K, et al. Cataract surgery combined with micro-incision vitrectomy in patients with behcet's disease uveitis [J]. BMC Ophthalmol, 2018, 18(1): 158
- [20] Jarstad JS, Jarstad AR, Chung GW, et al. Immediate Postoperative Intraocular Pressure Adjustment Reduces Risk of Cystoid Macular Edema after Uncomplicated Micro Incision Coaxial Phacoemulsification Cataract Surgery[J]. Korean J Ophthalmol, 2017, 31(1): 39-43
- [21] Czajka MP, Frajdenberg A, Johansson B. Comparison of 1.8-mm incision versus 2.75-mm incision cataract surgery in combined phacoemulsification and 23-gauge vitrectomy [J]. Acta Ophthalmol, 2016, 94(5): 507-513
- [22] Pérez-Torregrosa VT, Olate-Pérez Á, Cerdá-Ibáñez M, et al. Combined phacoemulsification and XEN45 surgery from a temporal approach and 2 incisions[J]. Arch Soc Esp Oftalmol, 2016, 91(9): 415-421

- [14] Sepiso K Masenga, Fernando Elijevich, Benson M Hamooya, et al. Elevated Eosinophils as a Feature of Inflammation Associated With Hypertension in Virally Suppressed People Living With HIV[J]. *J Am Heart Assoc*, 2020, 9 (4): e011450
- [15] Tomoatsu Kaneko, Bin Gu, Phyo Pyai Sone, et al. Dental Pulp Tissue Engineering Using Mesenchymal Stem Cells: A Review With a Protocol[J]. *Stem Cell Rev Rep*, 2018, 14(5): 668-676
- [16] Wei Zhang, Yong-Bo Dai, Peng-Cheng Wan, et al. Relationship Between Post-Extraction Pain and Acute Pulpitis: A Randomised Trial Using Third Molars[J]. *Int Dent J*, 2016, 66(6): 325-329
- [17] 张超. 一次性根管治疗和传统多次根管治疗对急性牙髓炎疗效观察的临床分析[J]. *山西医药杂志*, 2018, 47(16): 1949-1950
- [18] 杨光, 尹雪莲, 马东杰, 等. 生物陶瓷 iroot bp PLUS 在局限性急性牙髓炎行活髓保存术患者中的应用效果 [J]. *河北医科大学学报*, 2019, 40(1): 78-81
- [19] Leila Abdelhamid, Hayam Hussein, Mostafa Ghanem, et al. Retinoic acid-mediated anti-inflammatory responses in equine immune cells stimulated by LPS and allogeneic mesenchymal stem cells [J]. *Research in Veterinary Science*, 2017, 114(12): 225-232
- [20] G. Papadopoulos, Y.B. Shaik Dasthagirisahab, N. Huang, et al. Immunologic environment influences macrophage response to *Porphyromonas gingivalis*[J]. *Molecular Oral Microbiology*, 2017, 32 (3): 128-132
- [21] Zhixia Chen, Zhenzhen Shao, Shuya Mei, et al. Sepsis Upregulates CD14 Expression in a MyD88-Dependent and Trif-Independent Pathway[J]. *Shock*, 2018, 49(1): 82-89
- [22] 黎晶. 热牙胶充填与侧压充填治疗对急性牙髓炎和根尖周炎患者 SBI、PD 及 GI 值的影响[J]. *国际医药卫生导报*, 2017, 27(12): 1883-1885
- [23] 叶志飞, 朱晓琴, 方丹. 牙周治疗慢性牙周炎伴冠心病的血清中 CRP IL-8 及 TNF- α 水平变化[J]. *浙江临床医学*, 2019, 21(2): 167-168
- [24] William F Martin, Aloysius G M Tielens, Marek Mentel, et al. The Physiology of Phagocytosis in the Context of Mitochondrial Origin[J]. *Microbiol Mol Biol Rev*, 2017, 81(3): pii: e00008-17
- [25] Mathilde Galais, Baptiste Pradel, Isabelle Vergne, et al. LAP (LC3-associated Phagocytosis): Phagocytosis or Autophagy? [J]. *Med Sci (Paris)*, 2019, 35(8-9): 635-642
- [26] Narazaki M, Kishimoto T. The Two-Faced Cytokine IL-6 in Host Defense and Diseases[J]. *Int J Mol Sci*, 2018, 19(11): pii: E3528
- [27] Janilyn Arsenio, Patrick J Metz, John T Chang, et al. Asymmetric Cell Division in T Lymphocyte Fate Diversification [J]. *Trends Immunol*, 2015, 36 (11): 670-683
- [28] Elissavet Kemanetzoglou, Elisabeth Andreadou, et al. CNS Demyelination With TNF- α Blockers [J]. *Curr Neurol Neurosci Rep*, 2017, 17(4): 36
- [29] Palpandi Pandi, Anjali Jain, Saka Raju, et al. Therapeutic Approaches for the Delivery of TNF- α siRNA[J]. *Ther Deliv*, 2017, 8 (5): 343-355
- [30] 崔亚杰, 宋春兰, 成怡冰, 等. CD14⁺ 单核细胞 HLA-DR 异常表达对手足口病免疫状态评估及临床预后的指导价值[J]. *中华微生物学和免疫学杂志*, 2019, 39(10): 743-751

(上接第 4588 页)

- [23] Ye Z, Li Z, He S, et al. Outcomes of Coaxial Micro-incision Phacoemulsification in Nanophthalmic Eyes: Report of Retrospective Case Series[J]. *Eye Sci*, 2015, 30(3): 94-100
- [24] Neuhaan TH. Trabecular micro-bypass stent implantation during small-incision cataract surgery for open-angle glaucoma or ocular hypertension: Long-term results [J]. *J Cataract Refract Surg*, 2015, 41 (12): 2664-2671
- [25] Hayashi K, Yoshida M, Yoshimura K. Immediate changes in intraocular pressure after clear corneal micro-incision versus small-incision cataract surgery[J]. *Jpn J Ophthalmol*, 2014, 58(5): 402-408
- [26] Kabanarou SA, Xirou T, Boutouri E, et al. Pre-operative intravitreal dexamethasone implant in patients with refractory diabetic macular edema undergoing cataract surgery[J]. *Sci Rep*, 2020, 10(1): 5534
- [27] Cung LX, Hang DTT, Hiep NX, et al. Evaluation of Phacoemulsification Cataract Surgery Outcomes After Penetrating Keratoplasty [J]. *Open Access Maced J Med Sci*, 2019, 7 (24): 4301-4305
- [28] Orczykowska M, Owidzkaz M, Synder A, et al. Comparative analysis of early distance visual acuity in patients after coaxial phacoemulsification through the micro-incision (1.8 mm) and after standard phacoemulsification through the small incision(2.75 mm)[J]. *Klin Oczna*, 2014, 116(1): 7-10
- [29] 许荣, 赵少贞. 飞秒激光辅助与微切口超声乳化白内障摘出术对眼表功能影响的比较[J]. *中华实验眼科杂志*, 2019, 37(11): 907-913
- [30] 刘卫华, 王军. 同轴微切口与传统小切口超声乳化术的临床疗效及术后并发症对比分析[J]. *眼科新进展*, 2019, 39(9): 874-876