

doi: 10.13241/j.cnki.pmb.2021.09.024

血府逐瘀汤对糖尿病视网膜病变患者视神经形态结构的影响*

张 唯¹ 刘 欢² 郝婷婷³ 王 黎⁴ 赵秋芳^{1Δ}

(1 陕西中医药大学附属医院眼科 陕西 咸阳 712000; 2 包头朝聚眼科医院中医眼科 内蒙古 包头 014040;

3 山东德州联合医院眼科 山东 德州 253000; 4 陕西中医药大学附属医院内分泌二科 陕西 咸阳 712000)

摘要 目的:探讨血府逐瘀汤对糖尿病视网膜病变患者视神经形态结构的影响。**方法:**2017年11月~2019年12月选择在本院就诊的糖尿病视网膜病变患者76例,根据随机信封抽签原则把患者分为观察组与对照组各38例。对照组给予康柏西普治疗,观察组在对照组治疗的基础上给予血府逐瘀汤治疗,两组都治疗观察2个月,记录视神经形态结构变化情况。**结果:**治疗后观察组的总有效率为97.37%,显著高于对照组的78.95%($P<0.05$)。两组治疗后行空腹血糖(fasting blood glucose, FBG)与餐后2h血糖(2 h postprandial blood glucose, 2hPG),值都低于治疗前,观察组低于对照组($P<0.05$)。两组治疗前的视盘周围视网膜神经纤维层(Retinal nerve fiber layer, RNFL)厚度在上象限、下象限、颞象限、鼻象限上对比无差异($P>0.05$),两组治疗后各个象限的RNFL厚度均显著下降($P<0.05$),且观察组各个象限的RNFL厚度均低于对照组($P<0.05$)。观察组治疗后的红细胞聚集指数与纤维蛋白原低于治疗前,也低于对照组($P<0.05$),对照组治疗前后对比无差异($P>0.05$)。**结论:**血府逐瘀汤在糖尿病视网膜病变患者中的应用能改善视神经形态结构,促进降低血糖,改善患者的血液流变学状况,从而提高治疗效果。

关键词:血府逐瘀汤;糖尿病视网膜病变;视神经形态结构;血液流变学;血糖

中图分类号:R587.2;R242 **文献标识码:**A **文章编号:**1673-6273(2021)09-1710-04

Effect of Xuefu Zhuyu Decoction on Optic Nerve Morphological Structure in Patients with Diabetic Retinopathy*

ZHANG Wei¹, LIU Huan², HAO Ting-ting³, WANG Li⁴, ZHAO Qiu-fang^{1Δ}

(1 Dept of Ophthalmology, Affiliated Hospital of Shaanxi University of Chinese Medicine, Xianyang, Shaanxi, 712000, China;

2 Department of Traditional Chinese Ophthalmology, Chaoyu Eye Hospital, Baotou, Baotou, Inner Mongolia, 014040, China;

3 Department of Ophthalmology, Shandong Dezhou United Hospital, Dezhou, Shandong, 253000, China;

4 Department of Endocrinology, Affiliated Hospital of Shaanxi University of Chinese Medicine, Xianyang, Shaanxi, 712000, China)

ABSTRACT Objective: To explore the effect of Xuefu Zhuyu Decoction on optic nerve morphology in patients with diabetic retinopathy. **Methods:** From November 2017 to December 2019, 76 cases of patients with diabetic retinopathy treated in our hospital were selected as the research object. All the cases were divided into the observation group and control group of 38 cases in each groups accorded to the principle of random envelope drawing. The control group were treated with Compcept, and the observation group were given Xuefu Zhuyu Decoction based on the treatment of the control group. Both groups were treated and observed for 2 months, and the changes of optic nerve morphology and structure were recorded. **Results:** The total effective rates of the observation group after treatment were 97.37%, which were significantly higher than 78.95% of the control group($P<0.05$). The fasting blood glucose (FBG) and 2 h postprandial blood glucose (2hPG) values of the two groups after treatment were lower than before treatment, and the observation group were lower than the control group, and compared the difference were statistically significant($P<0.05$). There was no difference in the thickness of the retinal nerve fiber layer (RNFL) around the optic disc between the upper quadrant, the lower quadrant, the temporal quadrant, and the nasal quadrant before treatment ($P>0.05$), and the thickness of the RNFL around the optic disc in each quadrant of the two groups after treatment decreased significantly ($P<0.05$), and the thickness of RNFL around the optic disc in each quadrant of the observation group was lower than that of the control group ($P<0.05$). The erythrocyte aggregation index and fibrinogen in the observation group after treatment were lower than before treatment and also lower than the control group, and the compared the difference were statistically significant ($P<0.05$), and there were no statistical difference compared between before and after treatment in the control group ($P>0.05$). **Conclusion:** The application of Xuefu Zhuyu Decoction in patients with diabetic retinopathy can improve the morphological structure of the optic nerve, promote the reduction of blood glucose, and improve the blood rheology of patients, thereby improving the therapeutic effect.

* 基金项目:陕西省重点研发计划项目(2017SF-227)

作者简介:张唯(1988-),女,硕士,主治医师,研究方向:眼科,电话:15029302577, E-mail:wwz20888@163.com

Δ 通讯作者:赵秋芳(1984-),女,硕士,主治医师,研究方向:眼科,电话:15029440076, E-mail:274970646@qq.com

(收稿日期:2020-09-03 接受日期:2020-09-27)

Key words: Xuefu Zhuyu Decoction; Diabetic retinopathy; Optic nerve morphology; Blood rheology; Blood glucose

Chinese Library Classification(CLC): R587.2; R242 **Document code:** A

Article ID: 1673-6273(2021)09-1710-04

前言

糖尿病视网膜病变(diabetic retinopathy, DR)是糖尿病重要并发症之一,在临床上表现为以视网膜微血管损害为特征的慢性、进行性视力丢失,严重时可致盲,可直接影响到患者的生活质量^[1,2]。该病的具体发病机制尚不明确,但病因主要涉及到机体胰岛素及细胞代谢异常,从而引起眼部血管、神经微循环改变,并伴随有视网膜新生血管形成,从而造成视功能损坏^[3]。目前,药物为糖尿病视网膜病变的主要治疗方法,其中玻璃体腔内给药克服了血-眼屏障,可使得药物长时间直接作用于病变处,从而提高治疗效果^[4]。中医治疗糖尿病视网膜病变具有悠久的历史,血府逐瘀汤是活血化瘀方中的代表方,由川芎、柴胡、当归、枳壳、桔梗、牛膝、桃仁、赤芍、红花、生地、甘草等组成,可用于气机郁滞、瘀血内结等病症的治疗,可改善微循环、扩张血管、促进眼内出血的吸收^[5,6]。视神经是由视网膜神经节细胞的轴突汇聚而成,也是糖尿病视网膜病变病理进程研究的重要部位^[7,8]。光学相干断层扫描技术(Optical Coherence Tomography, OCT)是一种可以实现实时、高分辨、大深度、非接触、无创伤的

图像诊断技术,能够精确的测量视网膜神经纤维层的厚度,其发展为视神经的三维重建提供了可能,其能清晰显示视神经各部分组织结构,并获得断层图像^[9,10]。本文具体探讨了血府逐瘀汤对糖尿病视网膜病变患者视神经形态结构的影响,希望为改善患者预后提供参考。

1 资料与方法

1.1 研究对象

2017年11月~2019年12月选择在本院就诊的糖尿病视网膜病变患者76例作为研究对象,纳入标准:符合单纯型糖尿病视网膜病变诊断;年龄30~80岁,双眼发病与治疗;均为增殖性糖尿病视网膜病变;医院伦理委员会批准了此次研究;患者均自愿接受研究本研究;患眼最佳矫正视力(best correct visual acuity, BCVA)在0.05~0.5,无全盲。排除标准:妊娠期或哺乳期妇女;对本研究药物过敏的患者;合并有心力衰竭、肝肾功能严重不全患者;合并青光眼、严重白内障等疾病患者。

根据随机信封抽签原则分为两组,各38例,两组一般资料对比无差异($P>0.05$),见表1。

表1 两组一般资料对比

Table 1 Comparison of two groups

Groups	n	Course of disease (years)	SBP(mmHg)	DBP(mmHg)	BMI(kg/m ²)	Gender (male/female)	Age (years)
Observation group	38	4.56± 0.15	132.98± 10.22	83.20± 5.15	22.76± 1.44	20/18	58.15± 1.48
Control group	38	4.61± 0.22	133.08± 8.73	83.77± 4.19	22.89± 1.24	21/17	58.19± 1.11

1.2 治疗方法

对照组:给予康柏西普治疗,用注射针头向玻璃体腔内注射康柏西普0.05 mL(0.5 mg,成都康弘,国药准字S20130012),每个月1次,治疗观察2个月。

观察组:在对照组治疗的基础上给予血府逐瘀汤治疗,组方:桃仁12 g,当归、生地、牛膝、红花各9 g,柴胡、枳壳、桔梗各6 g,甘草3 g,水煎400 mL,每日口服1剂,早晚分服,治疗观察2个月。

1.3 观察指标

(1)疗效标准:显效:临床症状明显减轻,视力增加2行以上;有效:临床症状有所减轻,视力增加1~2行;无效:无达到上述标准甚或恶化。总有效率=(显效+有效)/患者例数×100%。(2)在治疗前后进行FBG与2hPG的测定。(3)在治疗前

后进行RNFL检查,采用德国Zeiss光学相干断层扫描仪测量上象限、下象限、颞象限、鼻象限的RNFL厚度。(4)在治疗前后测定并记录患者的血液流变学指标,包括红细胞聚集指数与纤维蛋白原等。

1.4 统计方法

应用SPSS 20.00,经正态性检验和方差齐性检验,计量资料采用均数±标准差表示(对比为t检验),计数资料采用n(%)表示(对比为 χ^2 检验), $P<0.05$ (双侧)差异具有统计学意义。

2 结果

2.1 总有效率对比

治疗后观察组的总有效率为97.37%,显著高于对照组的78.95%($P<0.05$),见表2。

表2 两组总有效率对比(例,%)

Table 2 Comparison of total effective rates between the two groups (n, %)

Groups	n	Effect	Effective	Invalid	Total efficiency
Observation group	38	34	3	1	37(97.37)*
Control group	38	25	5	8	30(78.95)

Note: compared with the control group, * $P<0.05$.

2.2 血糖变化对比

对照组($P<0.05$),见表3。

两组治疗后的FBG、2hPG值都低于治疗前,观察组低于对

表3 两组治疗前后血糖变化对比(mmol/L, $\bar{x} \pm s$)

Table 3 Comparison of blood glucose changes between two groups before and after treatment (mmol/L, $\bar{x} \pm s$)

Groups	n	FBG		2hPG	
		Pre-treatment	After treatment	Pre-treatment	After treatment
Observation group	38	8.13 $\pm$ 0.66	5.14 $\pm$ 0.32**	15.20 $\pm$ 2.11	8.99 $\pm$ 1.10**
Control group	38	8.24 $\pm$ 0.34	5.99 $\pm$ 0.13 [#]	15.28 $\pm$ 1.48	10.77 $\pm$ 1.42 [#]

Note: compared with the control group, * $P<0.05$, compared with the pre-treatment, [#] $P<0.05$.

2.3 视神经形态结构变化对比

限上对比无差异($P>0.05$),两组治疗后各个象限的RNFL厚度

两组治疗前的RNFL厚度在上象限、下象限、颞象限、鼻象均显著下降($P<0.05$),且观察组低于对照组($P<0.05$),见表4。

表4 两组治疗前后视神经形态结构变化对比($\bar{x} \pm s$)

Table 4 Comparison of changes in optic nerve morphology before and after treatment between the two groups ($\bar{x} \pm s$)

Groups	n		RNFL thickness(um)			
			Upper quadrant	Lower quadrant	Temporal quadrant	Nasal quadrant
Observation group	38	Pre-treatment	139.08± 32.22	142.57± 34.25	90.27± 6.36	84.47± 7.21
		After treatment	127.42± 31.26 ^{#*}	132.46± 32.32 ^{#*}	82.46± 6.14 ^{#*}	78.36± 6.23 ^{#*}
Control group	38	Pre-treatment	139.31± 32.41	142.49± 34.16	90.35± 6.57	85.01± 7.15
		After treatment	135.27± 31.37 [#]	139.36± 33.15 [#]	87.53± 6.23 [#]	83.15± 7.16 [#]

2.4 血液流变学变化对比

前,也低于对照组($P<0.05$),对照组治疗前后对比无差异($P>0.05$),见表5。

观察组治疗后的红细胞聚集指数与纤维蛋白原低于治疗

表5 两组治疗前后血液流变学变化对比($\bar{x} \pm s$)

Table 5 Comparison of blood rheology changes between two groups before and after treatment ($\bar{x} \pm s$)

Groups	n	Red blood cell aggregation index		Fibrinogen (g/L)	
		Pre-treatment	After treatment	Pre-treatment	After treatment
Observation group	38	8.65 $\pm$ 0.13	4.58 $\pm$ 0.12**	4.59 $\pm$ 0.17	3.78 $\pm$ 0.10**
Control group	38	8.67 $\pm$ 0.22	8.44 $\pm$ 0.38	4.61 $\pm$ 0.22	4.56 $\pm$ 0.18

3 讨论

糖尿病视网膜病变是眼科较为常见疾病之一,随着生活水平的提高,糖尿病视网膜病变的发生率呈明显上升趋势^[11]。当前该病的发病机制尚不完全清楚,其病因主要涉及免疫系统、神经系统、内分泌系统、生理系统、遗传因素、环境因素等多方面。可反复引起发病区域出现出血、渗出、水肿等临床表现,甚至出现玻璃体积血、视网膜脱离等严重并发症,从而导致患者视力急剧下降^[12,13]。康柏西普是用生物工程技术生产的100%人源化重组融合蛋白,能特异性地结合VEGF,抑制新生血管、减轻黄斑水肿,从而达到治疗糖尿病视网膜病变的目的^[14]。糖尿病视网膜病变属祖国医学“消渴目病”、“视瞻昏渺”范畴,血瘀贯穿该病发生、发展的始终。在血府逐瘀汤中,柴胡能疏肝理气,升达清阳^[15];生地黄凉血清热,合当归滋养阴血;牛膝通血脉,引瘀血下行;桔梗开肺气载药上行于心,合枳壳开胸行气,与柴胡同用,使气行则血行;甘草调和诸药,使瘀痰得化^[16]。本研究治疗后观察组的总有效率高于对照组;两组治疗

后的FBG、2hPG值都低于治疗前,观察组低于对照组,与程艳春^[17]的研究类似,采用府逐瘀汤联合丹参饮治疗单纯型糖尿病视网膜病变,结果显示治疗后,治疗组总有效率明显高于对照组,2组FBG、2hPG均显著改善,且治疗组治疗后的变化情况显著优于对照组,表明血府逐瘀汤在糖尿病视网膜病变患者的应用能促进血糖降低,提高治疗效果。

视网膜居于眼球壁的内层,周围密布大量微小血管,糖尿病患者可引起血管内皮细胞功能异常,造成血-视网膜屏障受损,从而引起视力严重受损^[18,19]。视网膜神经纤维厚度能够反映视神经和视觉传导功能,主要由神经节细胞的轴突及传出纤维、Muller细胞、神经胶质细胞、以及丰富的血管系统组成^[20,21]。在糖尿病视网膜病变的早期改变以视网膜神经节细胞凋亡为主,至中晚期则出现视网膜血管明显病变、纤维增殖等导致视网膜水肿,使得视网膜神经纤维厚度可能增加^[22,23]。本研究两组治疗后各个象限的RNFL厚度均显著下降,且观察组各个象限的RNFL厚度均低于对照组,目前国内外对于血府逐瘀汤治疗糖尿病视网膜病变的研究很多,但是对RNFL厚度的研究目前缺

乏。从机制上分析,血府逐瘀汤能促进糖尿病患者缺血状态以及血液微循环的改善,能够促进内皮功能改善和缺血区血管新生,减轻病情对其视网膜神经纤维厚度的影响,同时也能抑制视网膜新生血管进一步病变增生、缓解视网膜水肿,使得视网膜神经纤维厚度降低^[24]。其也能将脂质过氧化物清除,具有良好的抗氧化作用和抗应激作用,能够调节患者的血脂水平,也能纠正患者的代谢紊乱状况,从而促进患者视神经形态结构的改善^[25,26]。

糖尿病视网膜病变的临床表现和病理改变多样,比如微血管瘤、出血、棉绒斑、硬性渗出、无灌注区形成、新生血管等^[27]。在中医的临床应用中需要积极进行行气活血治疗,才能减轻视网膜毛细血管渗漏和纤维增殖,有效促进视网膜出血、渗出物的吸收与改善^[28,29]。本研究显示观察组治疗后的红细胞聚集指数与纤维蛋白原低于对照组,表明血府逐瘀汤在糖尿病视网膜病变患者的应用能改善患者的血液流变学状况,与程艳春^[17]的研究类似,治疗后治疗组全血黏度,红细胞压积,红细胞聚集指数,纤维蛋白原水平显著改善,而对照组变化不明显,两组比较差异有统计学意义。当前也有研究显示,血府逐瘀汤提高了血液成分的代谢速度,能促进机体代谢废物的清理^[30,31]。但对血府逐瘀汤的有效性和安全性的评价尚需大样本和长期的观察,特别是该药在糖尿病视网膜病变中的作用机制还有待深入分析。

综上所述,血府逐瘀汤在糖尿病视网膜病变患者中的应用能改善视神经形态结构,促进血糖降低,改善患者的血液流变学状况,从而提高治疗效果。

参考文献(References)

- [1] Safi H, Safi S, Hafezi-Moghadam A, et al. Early Detection of Diabetic Retinopathy[J]. *Surv Ophthalmol*, 2018, 63(5): 601-608
- [2] 刘杰,张慧娟.糖尿病视网膜病变检查的应用进展[J]. *临床与病理杂志*, 2019, 39(7): 1560-1563
- [3] Azevedo B, Araujo RB, Ciongoli MR, et al. The effect of panretinal photocoagulation on confocal laser scanning ophthalmoscopy and stereo photographic parameters of optic disk topography in patients with diabetic retinopathy[J]. *Arq Bras Oftalmol*, 2019, 82(4): 295-301
- [4] Baltatescu A, Striglia E, Trento M, et al. Detection of perimacular red dots and blots when screening for diabetic retinopathy: Refer or not refer?[J]. *Diab Vasc Dis Res*, 2018, 15(4): 356-359
- [5] Zhang C, Xu Y, Tan HY, et al. Neuroprotective effect of He-Ying-Qing-Re formula on retinal ganglion cell in diabetic retinopathy[J]. *J Ethnopharmacol*, 2018, 214(11): 179-189
- [6] Luo D, Deng T, Yuan W, et al. Effects of Huangban Bianxing One decoction combined with ranibizumab on treating exudative age-related macular degeneration [J]. *Evid Based Complement Alternat Med*, 2019, 39(6): 892-901
- [7] Filek R, Hooper P, Sheidow T, et al. Structural and functional changes to the retina and optic nerve following panretinal photocoagulation over a 2-year time period[J]. *Acta Diabetol*, 2017, 31(8): 1237-1244
- [8] Garcia-Martin E, Cipres M, Melchor I, et al. Neurodegeneration in Patients with Type 2 Diabetes Mellitus without Diabetic Retinopathy[J]. *J Ophthalmol*, 2019, 20(19): 1825-1829
- [9] Huang J, Zheng B, Lu Y, et al. Quantification of Microvascular Density of the Optic Nerve Head in Diabetic Retinopathy Using Optical Coherence Tomographic Angiography [J]. *J Ophthalmol*, 2020, 9(20): 4035-4038
- [10] Iwase T, Mikoshiba Y, Ra E, et al. Evaluation of blood flow on optic nerve head after pattern scan and conventional laser panretinal photocoagulation[J]. *Medicine (Baltimore)*, 2019, 98(24): e16062
- [11] Jampol LM, Odia I, Glassman AR, et al. Panretinal Photocoagulation Versus Ranibizumab for Proliferative Diabetic Retinopathy: Comparison of Peripapillary Retinal Nerve Fiber Layer Thickness in a Randomized Clinical Trial[J]. *Retina*, 2019, 39(1): 69-78
- [12] Jeziorny K, Niwald A, Moll A, et al. Measurement of corneal thickness, optic nerve sheath diameter and retinal nerve fiber layer as potential new non-invasive methods in assessing a risk of cerebral edema in type 1 diabetes in children [J]. *Acta Diabetol*, 2018, 55(12): 1295-1301
- [13] Keel S, Wu J, Lee PY, et al. Visualizing Deep Learning Models for the Detection of Referable Diabetic Retinopathy and Glaucoma [J]. *JAMA Ophthalmol*, 2019, 137(3): 288-292
- [14] Khadamy J, Abri Aghdam K, Falavarjani KG. An Update on Optical Coherence Tomography Angiography in Diabetic Retinopathy [J]. *J Ophthalmic Vis Res*, 2018, 13(4): 487-497
- [15] Kołodziej M, Waszczykowska A, Korzeniewska-Dyl I, et al. The HD-OCT Study May Be Useful in Searching for Markers of Preclinical Stage of Diabetic Retinopathy in Patients with Type 1 Diabetes[J]. *Diagnostics (Basel)*, 2019, 9(3): 112-118
- [16] Li Y, Huang Y, Tu C. Systems-Pharmacology-Based Identification of Antitumor Necrosis Factor Effect in Mimeng Flower Decoction for the Treatment of Diabetic Retinopathy [J]. *Evid Based Complement Alternat Med*, 2019, 2019: 5107103
- [17] 程艳春. 血府逐瘀汤联合丹参饮治疗单纯型糖尿病视网膜病变疗效观察[J]. *现代中西医结合杂志*, 2016, 25(3): 281-283
- [18] Matuszewski W, Baranowska-Jurkun A, Stefanowicz-Rutkowska M, et al. Prevalence of Diabetic Retinopathy in Type 1 and Type 2 Diabetes Mellitus Patients in North-East Poland[J]. *Medicina (Kaunas)*, 2020, 56(4): 112-119
- [19] Mendonca HR, Carpi-Santos R, Da Costa Calaza K, et al. Neuroinflammation and oxidative stress act in concert to promote neurodegeneration in the diabetic retina and optic nerve: galectin-3 participation[J]. *Neural Regen Res*, 2020, 15(4): 625-635
- [20] Moutray T, Evans JR, Lois N, et al. Different lasers and techniques for proliferative diabetic retinopathy[J]. *Cochrane Database Syst Rev*, 2018, 3(3): Cd012314
- [21] Pekel E, Tufaner G, Kaya H, et al. Assessment of optic disc and ganglion cell layer in diabetes mellitus type 2 [J]. *Medicine (Baltimore)*, 2017, 96(29): e7556
- [22] Pincelli Netto M, Lima VC, Pacheco MA, et al. Macular Inner Retinal Layer Thinning in Diabetic Patients without Retinopathy Measured by Spectral Domain Optical Coherence Tomography [J]. *Med Hypothesis Discov Innov Ophthalmol*, 2018, 7(3): 133-139
- [23] Reinhard J, Roll L, Faissner A. Tenascins in Retinal and Optic Nerve Neurodegeneration[J]. *Front Integr Neurosci*, 2017, 11(12): e30
- [24] Renner M, Stute G, Alzureiqi M, et al. Optic Nerve Degeneration after Retinal Ischemia/Reperfusion in a Rodent Model [J]. *Front Cell Neurosci*, 2017, 11(8): e254

- Maced J Med Sci, 2019, 7(8): 1276-1281
- [19] Kendrick JB, Kaye AD, Tong Y, et al. Goal-directed fluid therapy in the perioperative setting [J]. J Anaesthesiol Clin Pharmacol, 2019, 35 (Suppl 1): S29-S34
- [20] Russo A, Aceto P, Grieco DL, et al. Goal-directed hemodynamic management in patients undergoing primary debulking gynaecological surgery: A matched-controlled precision medicine study[J]. Gynecol Oncol, 2018, 151(2): 299-305
- [21] 刘宇,赵建益,单晓山.目标导向液体治疗对老年单肺通气患者局部脑氧饱和度及血流动力学的影响[J].中国现代医学杂志, 2020, 30 (8): 114-118
- [22] 刘洋,田丹丹,张超凡,等.目标导向液体治疗对妇科腹腔镜手术术中血流动力学及脑氧饱和度的影响[J].临床麻醉学杂志, 2020, 36 (4): 349-353
- [23] Hasanin A, Mourad KH, Farouk I, et al. The Impact of Goal-Directed Fluid Therapy in Prolonged Major Abdominal Surgery on Extravascular Lung Water and Oxygenation: A Randomized Controlled Trial [J]. Open Access Maced J Med Sci, 2019, 7 (8): 1276-1281
- [24] 潘传亮,刘剑萍,胡星.基于 PiCCO 变量的目标导向集束化治疗对体外循环心脏术后患者 AKI 的防治作用:一项前瞻性观察性研究[J].中华危重病急救医学, 2019, 31(6): 731-736
- [25] 陈欲晓,纪璘.糖皮质激素联合目标液体复苏法对脓毒症休克患儿组织灌注指标、免疫功能及乳酸清除率的影响[J].湖南师范大学学报(医学版), 2017, 14(4): 88-91
- [26] Herner A, Haller B, Mayr U, et al. Accuracy and precision of ScvO₂ measured with the CeVOX-device: A prospective study in patients with a wide variation of ScvO₂-values [J]. PLoS One, 2018, 13 (4): e0192073
- [27] 刘素霞,石远峰,陈晓兵,等.全心舒张末期容积指数在脓毒性休克早期液体复苏中的应用 [J]. 中华灾害救援医学, 2016, 4(12): 692-695
- [28] 陈惠群,田丽平,张鸿飞,等.目标导向液体治疗对老年患者腹腔镜膀胱根治性全切并肠代膀胱术中组织灌注的影响[J].临床麻醉学杂志, 2017, 33(4): 329-333
- [29] Toker H, Görgün EP, Korkmaz EM. Analysis of IL-6, IL-10 and NF-κB Gene Polymorphisms in Aggressive and Chronic Periodontitis [J]. Cent Eur J Public Health, 2017, 25(2): 157-162
- [30] 黄林枫,熊岚,吴奎,等.脓毒症患儿血浆 miR-146a, miR-223 表达与 IL-6、IL-10、TNF-α 水平变化的临床意义分析[J].现代生物医学进展, 2017, 17(32): 6324-6327+6344
- [31] 赵静,刘宁,佟雪光.乌司他丁对肝脏肿瘤切除术患者肝脏缺血-再灌注损伤时 IL-1β、IL-6、TNF-α 及肝功能的影响[J].川北医学院学报, 2020, 35(3): 478-481
- [32] Hirano S, Zhou Q, Furuyama A, et al. Differential Regulation of IL-1β and IL-6 Release in Murine Macrophages [J]. Inflammation, 2017, 40(6): 1933-1943
- [33] 孙燕,万忠均,毛亮,等.中枢神经系统来源的 HMGB1 表达模式和释放特征[J].中南民族大学学报(自然科学版), 2020, 39(1): 29-34
- [34] Xue P, Zhao J, Zheng A, et al. Chrysophanol alleviates myocardial injury in diabetic db/db mice by regulating the SIRT1/HMGB1/NF-κB signaling pathway[J]. Exp Ther Med, 2019, 18(6): 4406-4412

(上接第 1713 页)

- [25] Sabel B A, Flammer J, Merabet L B. Residual vision activation and the brain-eye-vascular triad: Dysregulation, plasticity and restoration in low vision and blindness - a review [J]. Restor Neurol Neurosci, 2018, 36(6): 767-791
- [26] Kim J, Moon E, Kim TH. Successful Midterm Management With an Herbal Decoction, Modified-Goshajinkigan (mGJG) for Non-Proliferative Diabetic Retinopathy: A Case Study[J]. Explore (NY), 2018, 14 (4): 295-299
- [27] Shin JS, Lee YH. Changes in Macular Retinal Layers and Peripapillary Nerve Fiber Layer Thickness after 577-nm Pattern Scanning Laser in Patients with Diabetic Retinopathy [J]. J Ophthalmol, 2017, 31(6): 497-507
- [28] Spaide RF, Fujimoto JG, Waheed NK, et al. Optical coherence tomography angiography[J]. Prog Retin Eye Res, 2018, 64(6): 1-55
- [29] Vujosevic S, Muraca A, Gatti V, et al. Peripapillary Microvascular and Neural Changes in Diabetes Mellitus: An OCT-Angiography Study[J]. Invest Ophthalmol Vis Sci, 2018, 59(12): 5074-5081
- [30] Yang HS, Kim JG, Cha JB, et al. Quantitative analysis of neural tissues around the optic disc after panretinal photocoagulation in patients with diabetic retinopathy [J]. PLoS One, 2017, 12 (10): e0186229
- [31] Zeiner J, Loukovaara S, Losenkova K, et al. Soluble and membrane-bound adenylate kinase and nucleotidases augment ATP-mediated inflammation in diabetic retinopathy eyes with vitreous hemorrhage[J]. Diab Vasc Dis Res, 2019, 97(3): 341-354