

doi: 10.13241/j.cnki.pmb.2018.13.016

血液透析和腹膜透析对慢性肾衰竭患者微炎症状态和生活质量影响的临床研究 *

邵秋媛 张 苗[△] 张庆燕 赵 敏 万 骋 孙 琤 王恒进

(南京大学医学院附属鼓楼医院肾内科 江苏 南京 210008)

摘要 目的:比较腹膜透析和血液透析对慢性肾衰竭患者微炎症状态和生活质量的影响。**方法:**选取我院 2014 年 11 月~2016 年 9 月因慢性肾衰竭需住院治疗患者 96 例,按入院先后顺序分为观察组和对照组,每组 48 例。观察组予以腹膜透析,对照组予以血液透析,比较两组治疗前后血清超敏 C 反应蛋白(hs-C-reactive protein,hs-CRP)、白细胞介素-6(interleukin-6,IL-6)、肿瘤坏死因子- α (Tumor necrosis factor- α ,TNF- α)、血尿素氮(blood urea nitrogen,BUN)、血肌酐(Serum creatinine,Scr)和白蛋白(albumin,ALB)水平、血红蛋白(hemoglobin,HB)和红细胞(red blood cell,RBC)值、SF-36 量表生活质量评分(the MOS item short form health survey)的变化及并发症的发生情况。**结果:**治疗后,观察组血清 hs-CRP、IL-6、TNF- α 、BUN、Scr 和 ALB 水平均显著低于对照组,HB 和 RBC 值明显高于对照组,差异均具有统计学意义($P<0.05$)。观察组治疗后并发心脑血管疾病的发生率显著低于对照组,并发低蛋白血症和感染得发生率显著高于对照组,差异具有统计学意义($P<0.05$),但两组总并发症发生率比较差异无统计学意义($P>0.05$)。观察组治疗 6 个月后体力功能、总体健康、心理健康评分与对照组比较差异无统计学意义($P>0.05$),躯体疼痛、生命活力、社会职能、生理职能和情感职能评分均显著高于对照组,差异具有统计学意义($P<0.05$)。**结论:**腹膜透析对慢性肾衰竭患者的临床效果较好,较血液透析可更有效抑制患者的微炎症状态,提高小分子物质清除率,改善生活质量,降低心脑血管疾病发生率,但治疗中易发生低蛋白血症和感染等并发症,需及时补充白蛋白和加强预防感染措施等对症处理。

关键词:腹膜透析;血液透析;慢性肾衰竭;炎症因子;生活质量

中图分类号:R692.5; R459.5 文献标识码:A 文章编号:1673-6273(2018)13-2478-05

A Clinical study on the Effect of Peritoneal Dialysis and Hemodialysis on the Microinflammatory State and Quality of Life in Patients with Chronic Renal Failure*

SHAO Qiu-yuan, ZHANG Miao[△], ZHANG Qing-yan, ZHAO Min, WAN Cheng, SUN Zheng, WANG Heng-jin

(Department of Nephrology, Drum Tower Hospital, Medical College of Nanjing University, Nanjing, Jiangsu, 210008, China)

ABSTRACT Objective: To compare the effects of peritoneal dialysis and hemodialysis on the microinflammatory state and quality of life of patients with chronic renal failure. **Methods:** From November 2014 to September 2016, 96 cases of patients with chronic renal failure were selected and divided into the observation group and the control group according to the order of admission, with 48 cases in each group, the observation group was treated with peritoneal dialysis, the control group was treated with hemodialysis, the levels of serum hs-CRP (hs-C-reactive protein), interleukin-6 (IL-6) and Tumor necrosis factor- α (TNF- α), blood urea nitrogen (BUN), serum creatinine (Scr) and albumin (ALB) levels, hemoglobin (HB) and red blood cell (RBC), SF-36 scale and the incidence of complications were compared between two groups before and after treatment. **Results:** After treatment, the levels of serum hs-CRP, IL-6, TNF- α , BUN, Scr and ALB were significantly lower in the observation group than those in the control group, the HB and RBC levels were significantly higher than those in the control group ($P<0.05$). The incidence of cardiovascular and cerebrovascular disease in the observation group was significantly lower than that in the control group, and the incidence of hypoalbuminemia and infection was significantly higher than that of the control group ($P<0.05$); but there was no significant difference in the incidence of total complications between the two groups ($P>0.05$). there was no significant difference in the physical function, overall health and mental health score between two groups ($P>0.05$), the body pain, vitality, social function, physiological function and emotional function score were significantly higher than those of the control group ($P<0.05$). **Conclusion:** Peritoneal dialysis was more effective in the treatment of patients with chronic renal failure than hemodialysis, which could effectively inhibit the microinflammatory state of patients, improve the clearance rate of small molecules, quality of life and reduce the incidence of cardiovascular and cerebrovascular diseases, but the treatment is easy to induce hypoproteinemia and infection and other complications, prompt addition of albumin and prevention of infection and other symptomatic treatment were needed during the treatment.

作者简介:邵秋媛(1984-),硕士,住院医师,主要从事肾内科方面的疾病研究,电话:13913021936, E-mail: shaoqiuyuan362@163.com

[△] 通讯作者:张苗(1958-),本科,主任医师、教授,主要从事肾内科方面的疾病研究

(收稿日期:2017-09-30 接受日期:2017-10-24)

Key words: Peritoneal dialysis; Hemodialysis; Chronic renal failure; Inflammatory factors; Quality of life**Chinese Library Classification(CLC):** R692.5; R459.5 **Document code:** A**Article ID:** 1673-6273(2018)13-2478-05

前言

慢性肾衰竭是临床较常见的肾脏不可逆性、严重疾病之一,由慢性肾脏疾病迁延导致肾小球滤过率降低和相关代谢紊乱的慢性、进行性肾实质功能损害,其核心表现为肾脏萎缩或肾实质损伤,随病情发展而导致多器官受累^[1]。据资料显示,我国目前每一百万人口中就有近 200 例新增患者,且比例呈逐年上升趋势^[2]。临床上当肾小球滤过率 $<10\text{ mL/min}$ 且伴随明显尿毒症表现时,需行肾脏替代治疗,除药物治疗外,还包括透析治疗和肾脏移植。其中,肾脏移植为最佳选择,可成功恢复肾功能,但肾源有限、价格昂贵,且匹配困难,严重限制其开展和患者的接受度。因此,透析治疗是目前临床肾脏替代治疗的首选,包括腹膜透析和血液透析。两种治疗方法均应用较多,但何种更具优势一直是临床研究的重点。本研究主要探讨了两种透析方法对微炎症状态和生活质量影响,现将结果报道如下。

1 资料与方法

1.1 临床资料

选取我院 2014 年 11 月~2016 年 9 月收治的 96 例慢性肾衰竭患者,按入院先后顺序分为 2 组,每组 48 例,分别为观察组和对照组。观察组予以腹膜透析,对照组予以血液透析。观察组患者男 26 例,女 22 例,年龄 29-70 岁,平均年龄 (50 ± 20) 岁,病程 1 年-6 年,平均病程 (4 ± 2) 年,原发病为慢性肾小球肾炎 30 例,高血压 10 例,糖尿病 4 例,自身免疫系统疾病 4 例;对照组患者男 29 例,女 19 例,年龄 31-72 岁,平均年龄 (52 ± 18) 岁,病程 1 年-5 年,平均病程 (3 ± 1) 年,原发病为慢性肾小球肾炎 25 例,高血压 12 例,糖尿病 6 例,自身免疫系统疾病 4 例,间质性肾炎 1 例。两组患者的一般临床特征比较差异均无统计学意义($P>0.05$),具有可比性。纳入标准:a.所有患者均符合 2012 年的 K/DIGO 指南慢性肾脏病 5 期诊断标准^[3],且已符合尿毒症表现;b.均经本人及家属同意自愿参与本次研究,且签署知情同意书。排除标准:a.1 个月内有感染、手术史者,或应用糖皮质激素抑制剂治疗史者;b.存活期不足 6 个月的临终患者;c.合并脑卒中、心肌梗死、冠心病、活动性肝脏疾病、出血性

疾病、恶性肿瘤等急慢性病变者;d.腹膜缺损者;e.精神、神经异常,不能配合治疗,或依从性差者。

1.2 治疗方法

观察组予以腹膜透析,取双联系统腹膜透析装置和浓度 1.5%、2000 mL/袋腹透液(美国 Baxter 公司生产),于脐正中边 1 cm 处切开置管,置入腹膜透析管,于膀胱直肠窝后缝合,透析剂量为 6000-8000 mL/d,若患者有水肿,腹透液浓度改为 2.5%-4.5%,开始为间歇性腹膜透析,隔日一次,1 周后改为非卧床持续性腹膜透析,每次使用 2000 mL 透析液灌注入腹腔内,透析液于腹腔内保留 4 h 后排除体外,疗程为 6 个月。对照组予以血液透析,取 4008B 血透机(德国 Fresenius 公司生产),行碳酸氢盐透析,透析液流量为 500 mL/L,血流量为 250 mL/h,以外周动脉为血管通路,于锁骨下静脉插管并留置,KT/V >1.3 ,3 次/周,4 h/次,疗程为 6 个月。

1.3 疗效分析

比较两组微炎症状态、实验室指标、并发症和生活质量。微炎症因子[4]包括 hs-CRP、IL-6 和 TNF- α ;实验室指标包括尿素氮(BUN)、肌酐(Scr)、血清白蛋白(ALB)、血红蛋白(HB)和红细胞(RBC);生存质量调查采用 SF-36 健康调查简表^[5],包括体力功能、躯体疼痛、生命活力、社会职能、总体健康、心理健康、生理职能和情感职能 8 项,共 36 个分项,分值与生活质量成正比例关系。上述指标均分别于治疗前后各测定一次。并发症包括心脑血管疾病、低蛋白血症率和感染。

1.4 统计学方法

采用 SPSS17.0 对所有数据进行统计学处理,组间计量资料结果用 $\bar{x}\pm s$ 表示,采用 t 检验;组间计数资料结果用百分比表示,采用 χ^2 检验,以 $P<0.05$ 为差异有统计学意义。

2 结果

2.1 两组治疗前后微炎症因子水平的比较

治疗前,两组血清 hs-CRP、IL-6 和 TNF- α 水平比较差异均无统计学意义 ($P>0.05$)。治疗后,两组血清 hs-CRP、IL-6 和 TNF- α 水平均较治疗前显著降低,且观察组以上指标水平均显著低于对照组($P<0.05$),见表 1。

表 1 两组治疗后微炎症因子水平的比较

Table 1 Comparison of the serum microinflammatory factors levels between two groups after treatment

Groups	n	hs-CRP(mg/L)		IL-6 (ng/L)		TNF- α (mg/dl)	
		Before treatment	After treatment	Before treatment	After treatment	Before treatment	After treatment
Observation group	48	13.1 $\pm$ 3.0	5.4 $\pm$ 1.1*	104.7 $\pm$ 27.8	14.0 $\pm$ 2.1*	89.6 $\pm$ 14.5	13.1 $\pm$ 5.9*
Control group	48	12.9 $\pm$ 2.9	7.9 $\pm$ 2.0*	103.4 $\pm$ 25.9	15.7 $\pm$ 2.8*	90.7 $\pm$ 15.3	16.5 $\pm$ 8.7*
P		>0.05		>0.05		>0.05	

Remarks: Compared with this group before treatment, * $P<0.05$.

2.2 两组治疗前后实验室指标水平的比较

治疗前, 两组血清 BUN、Scr、ALB、HB 和 RB 水平比较差异均无统计学意义 ($P>0.05$)。治疗后, 两组血清 BUN、Scr 和

ALB 水平均较治疗前显著降低, HB 和 RBC 较治疗前明显升高, 且观察组血清 BUN、Scr 和 ALB 水平均显著低于对照组 ($P<0.05$), HB 和 RBC 均显著高于对照组 ($P<0.05$), 见表 2。

表 2 两组治疗前后实验室指标水平的比较

Table 2 Comparison of the serum laboratory indexes levels between two groups after treatment

Groups	n	BUN (mmol/L)		Scr (μ mol/L)		ALB (g/L)		HB (g/L)		RBC (10^{12} /L)	
		Before treatment	After treatment	Before treatment	After treatment	Before treatment	After treatment	Before treatment	After treatment	Before treatment	After treatment
Observation group	48	29.4 $\pm$ 8.9	13.1 $\pm$ 3.7*	998.6 $\pm$ 276.2	427.8 $\pm$ 100.6*	35.9 $\pm$ 5.0	29.8 $\pm$ 3.2*	75.0 $\pm$ 13.2	92.3 $\pm$ 17.9*	240.5 $\pm$ 58.7	377.4 $\pm$ 106.4*
Control group	48	28.9 $\pm$ 9.1	14.5 $\pm$ 3.1*	1037.8 $\pm$ 328.6	529.7 $\pm$ 110.4*	36.5 $\pm$ 4.3	33.4 $\pm$ 2.4*	74.4 $\pm$ 14.0	81.7 $\pm$ 18.5*	237.9 $\pm$ 61.2	306.2 $\pm$ 121.7*
<i>P</i>		>0.05	<0.05	>0.05	<0.05	>0.05	<0.05	>0.05	<0.05	>0.05	<0.05

Remarks: Compared with this group before treatment, * $P<0.05$.

2.3 两组治疗后并发症的发生情况比较

观察组治疗后并发心脑血管疾病的发生率显著低于对照组, 并发低蛋白血症和感染的发生率显著高于对照组, 差异具

有统计学意义 ($P<0.05$), 但两组总并发症得发生率比较差异无统计学意义 ($P>0.05$), 见表 3。

表 3 两组治疗后并发症的发生情况比较[例(%)]

Table 3 Comparison of the incidence of complications after treatment between two groups[n(%)]

Groups	n	Cardiovascular disease	Hypoproteinemia	Infection	Total complication rate
Observation group	48	4(8.3)	8(16.7)	8(16.7)	20(41.7)
Control group	48	21(43.8)	2(4.2)	1(2.1)	24(50.0)
<i>P</i>		<0.05	<0.05	<0.05	>0.05

2.4 两组治疗前后生活质量的比较

治疗前, 两组 SF-36 量表各项评分比较差异均无统计学意义 ($P>0.05$)。观察组治疗后体力功能、总体健康、心理健康评分

与对照组比较差异无统计学意义 ($P>0.05$), 但躯体疼痛、生命活力、社会职能、生理职能和情感职能评分均明显高于对照组, 差异具有统计学意义 ($P<0.05$), 见表 4。

表 4 两组治疗前后 SF-36 量表评分的比较(分)

Table 4 Comparison of the SF-36 scores between the two groups before and after treatment (points)

Groups	Treatment group(n=48)		Control group(n=48)	
	Before treatment	After treatment	Before treatment	After treatment
Physical function	30.3 $\pm$ 15.7	58.8 $\pm$ 23.7 [#]	31.2 $\pm$ 16.0	56.3 $\pm$ 27.4 [#]
Body pain	62.8 $\pm$ 17.1	78.1 $\pm$ 13.3**	60.6 $\pm$ 16.9	71.9 $\pm$ 24.8 [#]
Life vitality	58.2 $\pm$ 21.4	64.3 $\pm$ 20.7**	58.3 $\pm$ 22.0	58.1 $\pm$ 24.8
Social function	31.2 $\pm$ 10.2	73.5 $\pm$ 29.6**	31.4 $\pm$ 9.6	61.0 $\pm$ 30.2 [#]
Overall health	29.8 $\pm$ 15.6	43.8 $\pm$ 19.6 [#]	29.9 $\pm$ 16.2	42.2 $\pm$ 21.5 [#]
Mental health	45.2 $\pm$ 11.2	64.3 $\pm$ 18.4 [#]	45.1 $\pm$ 12.1	62.5 $\pm$ 17.9 [#]
Physiological function	41.6 $\pm$ 12.6	51.7 $\pm$ 20.5**	40.3 $\pm$ 16.0	44.9 $\pm$ 19.2 [#]
Emotional function	54.6 $\pm$ 16.3	63.9 $\pm$ 21.7**	54.4 $\pm$ 14.8	57.1 $\pm$ 14.7 [#]

Remarks: Compared with the control group after treatment, * $P<0.05$; compared with this group before treatment, * $P<0.05$.

3 讨论

近年来, 随着生活节奏的加快, 人们生活、工作压力不断增加, 生活不规律等原因导致慢性肾脏疾病发病率逐年升高, 长

期迁延造成肾实质损害和肾脏萎缩, 继而发展为严重、不可逆性的慢性肾衰竭, 临床肾脏替代治疗以透析治疗和肾移植为主, 但肾移植匹配度极低, 费用高昂, 且肾源极少, 很难被患者接受。因此, 透析治疗是目前临床首选的肾脏替代治疗方法, 包

括腹膜透析和血液透析。

血液透析采用机体半透膜原理,利用溶液扩散效果,加速排出体内有毒有害物质、过量电解质和代谢废物,维持机体水、电解质和酸碱平衡,以达到血液净化目的^[6,7],在以往临床中曾被作为清除尿毒症毒素最有效方法。血液透析过程必须于体外建立循环系统,治疗前后机体内环境变化幅度较明显,需使用抗凝药物避免血流动力学异常,且临床资料中显示其心脑血管疾病发生率较高^[8,9]。血液透析器孔径较小,针对炎性因子等大分子物质清除力相对不足^[10]。而腹膜透析则利用其高效吸附剂和特殊吸附材料的优势,于患者腹腔内置管,不需要建立体外循环系统,通过透析液灌注和腹膜另一侧毛细血管中血浆置换,清除体内多余水分和代谢废物,再利用透析液补充机体所需物质,极大降低了透析过程血容量异常改变可能性,且有效减少心脑血管疾病发生,提高安全性,更加有效地清除机体有害物质,同时,操作更方便,患者可自行操作,且可有效缓解经济压力,临床效果更具优势,是目前临床具有独特性,又优质的血液净化方法,可有效滤过 hs-CRP、IL-6 和 TNF- α 等大分子物质,但极易发生低蛋白血症和感染,需及时对症补充白蛋白和预防、治疗感染。

微炎症状态是一种特殊的病理状态,是指患者处于慢性肾衰竭尿毒症急性反应期,机体炎性因子和超敏 C-反应蛋白(hs-CRP)水平显著高于正常范围,但机体无感染发生^[11]。其中,hs-CRP、IL-6 和 TNF- α 是微炎症状态的重要标记物。已有研究表明^[10,11]慢性肾衰竭尿毒症及其并发症和微炎症状态关系密不可分,机体在多种微生物、内毒素、化学物质和免疫复合物刺激下,激活单核巨噬细胞,释放 IL-6 和 TNF- α 等促炎因子。有研究显示^[11]微炎症状态是心脑血管疾病、肾性贫血等的重要危险因素。因此,有效控制和降低微炎症因子水平对改善预后尤为关键。本研究结果显示观察组治疗后血清 hs-CRP、IL-6 和 TNF- α 水平、并发心脑血管疾病的发生率均低于对照组,表明腹膜透析对炎性因子水平控制效果更好,能够有效抑制微炎症反应发生,降低心脑血管疾病发生率。血液透析血流动力学变化大与其操作过程中血细胞粘附于透析器和管道以及肝素的使用等导致血细胞大量丢失有关,且腹膜透析目前对于小分子物质的滤过率也具有优势,有效降低 BUN、Scr 水平,减轻肾功能损害。本研究中,观察组治疗后血清 BUN、Scr、ALB 水平低于对照组,HB 和 RBC 值高于对照组,并发低蛋白血症和感染的发生率均高于对照组。因此,治疗过程中需密切动态监测血清白蛋白水平以及感染情况,及时予以补充白蛋白治疗和预防、控制感染治疗。此外,观察组治疗 6 个月后体力功能、总体健康、心理健康评分与对照组基本持平,但躯体疼痛、生命活力、社会职能、生理职能和情感职能评分高于对照组,表明腹膜透析治疗后可有效缓解患者疼痛,提高生命活力,增加社会职能和生理职能,增强情感沟通能力,改善患者生活质量。

综上所述,腹膜透析在慢性肾衰竭患者治疗中应用临床效果较好,抑制微炎症状态效果更明显,能提高小分子物质清除率,改善生活质量,降低心脑血管疾病发生率,但治疗中易发生低蛋白血症和感染等并发症,需及时补充白蛋白和加强预防感染措施等对症处理。

参考文献(References)

- [1] 杨金友,张巧玲,孙莉莉,等.慢性肾功能衰竭影响因素的病例对照研究[J].中国全科医学,2015,18(4): 413-416
Yang Jin-you, Zhang Qiao-ling, Sun Li-li, et al. A case - control study on influencing factors of chronic renal failure [J]. China General Practice Medicine, 2015, 18(4): 413-416
- [2] 雷茹.维持性血液透析患者超敏 C 反应蛋白水平及营养状况对肺功能的影响[J].海南医学院学报,2016,22(07): 661-664
Lei Ru. Effects of hypersensitive C-reactive protein and nutritional status on pulmonary function in maintenance hemodialysis patients [J]. Journal of Hainan Medical College,2016,22(07): 661-664
- [3] 邵秋媛,万骋,刘晶,等.腹膜透析对慢性肾功能衰竭患者炎症因子、营养指标以及肾功能的影响[J].海南医学院学报,2017,23(03): 365-368
Shao Qiu-yuan, Wan Cheng, Liu Jing, et al. Effect of Peritoneal Dialysis on Inflammatory Factors, Nutritional Index and Renal Function in Patients with Chronic Renal Failure [J]. Journal of Hainan Medical College, 2017, 23(03): 365-368
- [4] 胡玉纹.血液透析联合腹膜透析治疗慢性肾衰竭患者的疗效观察[J].中国慢性病预防与控制,2013,21(3): 338-339
Hu Yu-wen. Observation on Curative Effect of Hemodialysis Combined with Peritoneal Dialysis in Treating Chronic Renal Failure [J]. Chinese Journal of Prevention and Control of Chronic Non - Communicable Diseases, 2013, 21(3): 338-339
- [5] Xu H, Watanabe M, Qureshi A R, et al. Oxidative DNA damage and mortality in hemodialysis and peritoneal dialysis patients[J]. Perit Dial Int, 2015, 35(2): 206
- [6] 姚向飞,韦巧宁.不同透析方式对慢性肾功能衰竭患者血清叶酸和维生素 B12 水平的影响[J].临床误诊误治,2017,30(5): 75-76
Yao Xiang-fei, Wei Qiao-ning. Effects of Different Dialysis Methods on Serum Folic Acid and Vitamin B12 Levels in Patients with Chronic Renal Failure[J]. Clinical misdiagnosis, 2017, 30(5): 75-76
- [7] 张连云,朱铁锤,刘向东.120 例长期血液透析老年慢性肾衰竭患者临床特点分析[J].实用老年医学,2016,30(10): 815-817
Zhang Lian-yun, Zhu Tie-chui, Liu Xiang-dong. Analysis of clinical characteristics of 120 cases of long - term hemodialysis elderly patients with chronic renal failure [J]. Practical Elderly Medicine, 2016, 30(10): 815-817
- [8] Atapour A, Eshaghian A, Taheri D, et al. Hemodialysis versus peritoneal dialysis, which is cost-effective [J]. Saudi J Kidney Dis Transpl, 2015, 26(5): 962
- [9] 李萍,李杰,蔡明玉,等.腹膜透析联合血液透析治疗慢性肾衰竭合并难治性高血压的疗效观察[J].中国血液净化,2015,14(6): 358-361
Li Ping, Li Jie, Cai Ming-yu, et al. Effect of peritoneal dialysis combined with hemodialysis on chronic renal failure complicated with refractory hypertension[J]. China Blood Purification, 2015, 14 (6): 358 -361
- [10] Watkins M L. Efficacy of folic acid prophylaxis for the prevention of neural tube defects[J]. Dev Disabil Res Rev, 2015, 4(4): 282-290
- [11] 于明忠,刘建军,田晓,等.血液灌流对慢性肾功能衰竭维持性血液透析患者微炎症状态的影响[J].中国医药,2015,10(4): 527-531
Yu Ming-zhong, Liu Jian-jun, Tian Xiao, et al. Effects of hemoperfusion on microinflammatory state in maintenance

- hemodialysis patients with chronic renal failure[J]. Chinese medicine, 2015, 10(4): 527-531
- [12] 白旭峰. 肾康注射液联合尿毒清颗粒保留灌肠治疗慢性肾衰竭的临床疗效[J]. 中国医药科学, 2016, 6(7): 111-114
- Bai Xu-feng. Clinical Effect of Shenkang Injection Combined with Niao duqing Granule Preserved Enema on Chronic Renal Failure[J]. Chinese Medicine Science, 2016, 6(7): 111-114
- [13] 孙娅楠. 肾康注射液联合护理干预对慢性肾功能衰竭患者肾功能的影响[J]. 海南医学院学报, 2016, 22(18): 2126-2128
- Sun Ya-nan. Effect of Shenkang Injection Combined with Nursing Intervention on Renal Function in Patients with Chronic Renal Failure [J]. Journal of Hainan Medical College, 2016, 22(18): 2126-2128
- [14] 罗晓玲, 李东锋, 杨坤. 不同血管通路对慢性肾功能衰竭病人透析效果的影响[J]. 华南国防医学杂志, 2015, 29(3): 236-238
- Luo Xiao-ling, Li Dong-feng, Yang Kun. Effect of different vascular access on dialysis of chronic renal failure patients [J]. Journal of South China National Defense Medical Journal, 2015, 29(3): 236-238
- [15] 李波. 血液透析联合腹膜透析治疗慢性肾功能衰竭 84 例[J]. 陕西医学杂志, 2013, 42(6): 727-729
- Li Bo. Treatment of 84 cases of chronic renal failure with hemodialysis combined with peritoneal dialysis [J]. Shaanxi Medical Journal, 2013, 42(6): 727-729
- [16] 程汝兰, 张洪福. 慢性老年肾衰竭患者血液高通量透析治疗的临床研究[J]. 河北医学, 2015, 21(3): 434-436
- Cheng Ru-lan, Zhang Hong-fu. Clinical study of high - flux hemodialysis in patients with chronic senile renal failure [J]. Hebei Medical Journal, 2015, 21(3): 434-436
- [17] 吴风雷, 范花. 用高通量血液透析法与普通的血液透析法治疗慢性肾功能衰竭的效果对比 [J]. 当代医药论丛, 2015, 13(24): 288-289
- Wu Feng-lei, Fan Hua. Comparison of high-throughput hemodialysis versus conventional hemodialysis in the treatment of chronic renal failure[J]. Journal of Contemporary Medicine, 2015, 13(24): 288-289
- [18] Kugler C, Maeding I, Russell CL. Non-adherence in patients on chronic hemodialysis: an international comparison study [J]. J Nephrol, 2011, 24(3): 366-375
- [19] 李述真, 刘法芹. 不同血液透析方法对老年维持性血液透析患者体内微炎症和营养不良状态的影响 [J]. 中国老年学杂志, 2014, (21): 6070-6072
- Li Shu-zhen, Liu Fa-qin. Effects of different hemodialysis methods on microinflammation and malnutrition in elderly patients with maintenance hemodialysis[J]. Chinese Journal of Gerontology, 2014, (21): 6070-6072
- [20] 朱征西, 陆绍强, 梁碧琴, 等. 不同的血液净化方式对维持性血液透析患者微炎症状态的影响[J]. 中国血液净化, 2011, 10(1): 18-21
- Zhu Zheng-xi, Lu Shao-qiang, Liang Bi-qin, et al. Effects of different blood purification methods on microinflammatory state in maintenance hemodialysis patients [J]. China Blood Purification, 2011, 10(1): 18-21

(上接第 2464 页)

- Song Na-na, Liu Jun, Bogdan Moldoveanu, et al. The vagus nerve and pulmonary disease[J]. Fudan University Journal of Medical Sciences, 2012, 39(2): 117-122
- [22] Bonvini S J, Birrell M A, Smith J A, et al. Targeting TRP channels for chronic cough: from bench to bedside[J]. Naunyn-Schmiedeberg's Archives of Pharmacology, 2015, 388(4): 401-420
- [23] 叶珮, 严建平, 王宏. 诱导痰 P 物质和白细胞介素-4 检测在咳嗽变异性哮喘诊治中的临床价值[J]. 全科医学临床与教育, 2013, 11(3): 256-258
- Ye Sa, Yan Jian-ping, Wang Hong. Value of levels of SP and IL-4 in the induced sputum in the diagnosis and treatment of the patients with cough variant asthma [J]. Clinical Education of General Practice, 2013, 11(3): 256-258
- [24] Yang Z, Zhuang J, Zhao L, et al. Roles of Bronchopulmonary C-fibers in airway Hyperresponsiveness and airway remodeling induced by house dust mite [J]. Respiratory Research, 2017, 18(1): 199
- [25] Kamei J, Hayashi S S, Takahashi Y, et al. Role of cyclin-dependent kinase 5 in capsaicin-induced cough [J]. European Journal of Pharmacology, 2007, 566(1-3): 181-184
- [26] Ourydonat F, Carayon P, Thurneyssen O, et al. Functional characterization of the nonpeptide neurokinin3 (NK3) receptor antagonist, SR142801 on the human NK3 receptor expressed in Chinese hamster ovary cells [J]. Journal of Pharmacology & Experimental Therapeutics, 1995, 274(1): 148-154
- [27] Nénan S, Germain N, Lagente V, et al. Inhibition of inflammatory cell recruitment by the tachykinin NK (3)-receptor antagonist, SR 142801, in a murine model of asthma [J]. European Journal of Pharmacology, 2001, 421(3): 201
- [28] Hewitt M M, Adams G, Mazzone S B, et al. Pharmacology of bradykinin evoked coughing in guinea pigs [J]. Journal of Pharmacology & Experimental Therapeutics, 2016, 357(3): 620
- [29] Cheng Y M, Cao A L, Zheng J P, et al. Airway hyperresponsiveness induced by repeated esophageal infusion of HCl in guinea pigs[J]. American Journal of Respiratory Cell & Molecular Biology, 2014, 51(5): 701