

doi: 10.13241/j.cnki.pmb.2018.06.032

2015-2016 年宿州市肾结石患病现况调查及危险因素分析*

刚向辉 陈 军 鲁卫民 常宝元 张多兵

(安徽省宿州市立医院泌尿外科 安徽 宿州 234000)

摘要 目的:分析 2015-2016 年安徽省宿州市肾结石患病情况,并分析该地区肾结石患病的危险因素,为肾结石的防治提供依据。**方法:**选择 2015 年 1 月~2016 年 12 月间于我院就诊的肾结石患者 110 例作为研究组,选择同期本院体检的健康志愿者 110 例作为对照组。调查两组基本信息、临床资料、饮食习惯等,并应用单因素和多因素 Logistic 回归分析分析肾结石患病的危险因素。**结果:**108 名肾结石患者年龄 18~75 岁,45~55 岁所占比例最高,占 34.04%,其次是 35~44 岁,占 25.53%,55~64 岁,占 17.02%。单因素分析显示,宿州市肾结石患者发病与吸烟指数、饮酒指数、饮食习惯、每日饮水量、直系亲属肾结石史、尿路感染史、BMI 有关($P<0.05$),与文化程度、月收入无关($P>0.05$)。多因素 Logistic 回归分析结果显示饮酒指数 ≥ 200 、喜食肉蛋、喜食海鲜、每日饮水量 <1000 mL、直系亲属有肾结石史、有尿路感染史、体质指数(BMI) >24 kg/m²是宿州市肾结石患者发病的危险因素($P<0.05$)。**结论:**宿州市肾结石患者发病年龄多集中于 45~55 岁,且该地区发病的危险因素包括饮酒指数 ≥ 200 、喜食肉蛋、喜食海鲜、每日饮水量 <1000 mL、直系亲属有肾结石史、有尿路感染史、BMI >24 kg/m²,可作为防治肾结石的参考依据。

关键词:肾结石;宿州市;危险因素;调查

中图分类号:R692.4 文献标识码:A 文章编号:1673-6273(2018)06-1150-05

Kidney Stones in Suzhou City during 2015 to 2016: Prevalence Investigation and Risk Factors Analysis*

GANG Xiang-hui, CHEN Jun, LU Wei-min, CHANG Bao-yuan, ZHANG Duo-bing

(Department of Urology Surgery, Suzhou Municipal Hospital, Suzhou, Anhui, 234000, China)

Abstract Objective: To analyze the prevalence of kidney stones in Suzhou city of Anhui province during 2015 to 2016, and to analyze the risk factors of kidney stones in this region, and to provide basis for the prevention and treatment of kidney stones. **Methods:** A total of 110 patients with kidney stones, who were treated in Suzhou Municipal Hospital from January 2015 to December 2016, were selected as study group, and 110 healthy people were selected as control group in the same period. The basic information, clinical data and dietary habits of the two groups were investigated, and the risk factors of kidney stones were analyzed by single factor and multiple factor Logistic regression analysis. **Results:** Among 108 patients aged 18~75 years with kidney stones, the highest proportion was 45~55 years old, accounting for 34.04%, followed by 35~45 years old, accounting for 25.53%, and the age of 55~65 years old was accounted for 17.02%. Univariate analysis showed that the incidence of kidney stones in Suzhou city was related to smoking index, drinking index, dietary habits, daily drinking water, history of kidney stones in direct relatives, urinary tract infection and body mass index (BMI) ($P<0.05$), but it was not related to educational level and monthly income ($P>0.05$). Multivariate Logistic regression analysis results showed that drinking index ≥ 200 , eating meat and eggs, eating seafood, daily drinking water <1000 mL, having history of kidney stones in direct relatives, having history of urinary tract infection, BMI >24 kg/m² were risk factors of patients with kidney stones in Suzhou city ($P<0.05$). **Conclusion:** The age of patients with kidney stones in Suzhou city is mainly concentrated in 45~55 years old, and the risk factors of incidence in this region, including drinking index ≥ 200 , eating meat and eggs, eating seafood, daily drinking water <1000 mL, having history of kidney stones in direct relatives, having history of urinary tract infection, and BMI >24 kg/m², can be used as a reference for the prevention and treatment of kidney stones.

Key words: Kidney stones; Suzhou city; Risk factors; Investigation

Chinese Library Classification(CLC): R692.4 **Document code:** A

Article ID: 1673-6273(2018)06-1150-05

前言

肾结石是发生于肾盂、肾盏及肾盂与输尿管连接部位的一类结石,是泌尿系统的常见病,多发于青壮年男性^[1,2]。临床表现为腰腹部绞痛、恶心呕吐、血尿等,易引起患者忽视,从而延误最佳的治疗时机^[3]。该病可引起血尿和肾区剧烈疼痛,临床反复发作,并可诱发尿路感染和尿路梗阻,严重者甚至发生肾功能衰竭,危及患者生命。有研究报道,沿海地区为肾结石高发地区^[4],宿州市位于安徽省东北部,是长江三角区的重要城市。以往

* 基金项目:安徽省卫生厅科研基金资助项目(2010C115)

作者简介:刚向辉(1976-),男,本科,主治医师,从事泌尿临床方面的研究,E-mail: yffxd@163.com

(收稿日期:2017-10-16 接受日期:2017-10-31)

有研究报道华东地区成人肾结石患病率为 5.8%^[5]。近年来随着人们生活习惯和饮食习惯的改变,肾结石的患病率呈逐年升高的趋势,发病年龄年轻化^[6,7],但关于宿州市肾结石的患病现状仍缺乏相关报道。同时肾结石的发病原因复杂,涉及遗传、饮食、环境和生活习惯等多种因素^[8,9]。为进一步了解宿州市肾结石患者患病的危险因素,我们对我院收治的肾结石患者进行了分析,现报道如下。

1 资料和方法

1.1 临床资料

选择 2015 年 1 月~2016 年 12 月期间于我院就诊的肾结石患者 110 例作为研究组,纳入标准:(1)所有患者均有肾区疼痛、血尿等临床表现,并经 CT 或 B 超确诊为肾结石;(2)病程 6 个月~10 年;(3)所有纳入对象均为宿州市常住人口,居住时间 ≥ 10 年;(4)所有患者对本研究知情同意,并签署知情同意书。排除标准:(1)先天性发育畸形、肾脏肿瘤患者;(2)肾结石合并轻中度积水者;(3)重度积水者。其中男性 62 例、女性 48 例,年龄 18~75 岁,平均年龄(45.01 ± 8.34)岁;病程 6 个月~10 年,平均(4.25 ± 1.16)年。选择同期本院体检的健康志愿者 110 例作为对照组,其中男性 61 例,女性 49 例,年龄 18~76 岁,平均年龄(44.89 ± 8.12)岁。本研究经医院伦理委员会同意。

1.2 研究方法

1.2.1 问卷调查 参考目前关于肾结石流行病学^[10]调查资料进行设计,问卷内容包括:年龄、性别、文化程度、家族疾病史、收入、饮食习惯、吸烟、饮酒、尿路感染史等。吸烟和饮酒情况采用吸烟指数和饮酒指数表示,吸烟指数 = 每天吸烟支数 $\times$ 吸烟

年限;饮酒指数 = 每天饮酒克数 $\times$ 饮酒年限。所有调查人员在试验前进行统一培训,详细了解问卷调查方法和注意事项,问卷调查中应如实填写,填写后立即回收,并核实是否有效,本研究发放调查问卷 220 份,回收有效问卷 215 份,回收率 97.73%,其中研究组回收有效问卷 108 份,回收率 98.18%,对照组回收有效问卷 107 份,回收率 97.27%。

1.2.2 体格检查 对所有受试者进行身高、体重测量,并计算体质质量指数(Body mass index, BMI), $BMI = \text{体重} / \text{身高}^2$,由同一组专业医师进行肾脏 B 超检查,受试者俯卧位,将 B 超探头置于背侧肾区,沿受试者肾脏长轴方向进行纵切面检查,移动探头行扇形平扫,当 B 超显示有以下特征诊断为肾结石:(1)肾脏内出现强光点或光团回声,后方同时伴有垂直声影;(2)肾脏内出现多个强回声光带或声影等。

1.3 统计学方法

本研究中采集的所有数据均录入 SPSS25.0 统计学软件进行统计学分析,计数资料以比或率(%)表示,并实施 χ^2 检验,计量资料以均数 $\pm$ 标准差($\bar{x} \pm s$)表示,实施 t 检验,应用多因素 Logistic 回归分析分析肾结石患病的危险因素, $P < 0.05$ 为差异有统计学意义。

2 结果

2.1 宿州市肾结石患者的年龄构成情况分析

108 名肾结石患者男性 61 例,女性 47 例,年龄 18~75 岁,平均年龄 (44.86 ± 8.25) 岁,其中 45~55 岁所占比例最高,占 34.04%;其次是 35 岁~44 岁,占 25.53%;55~64 岁,占 17.02%。见表 1。

表 1 宿州市肾结石患者的年龄构成情况分析[n(%)]

Table 1 Analysis of age composition of patients with kidney stones in Suzhou city[n(%)]

Age groups	Male	Female	Total
18~24	3(3.70)	1(4.92)	4(2.13)
25~34	7(11.11)	5(11.48)	12(10.64)
35~44	16(25.93)	12(26.23)	28(25.53)
45~54	18(31.48)	16(29.51)	34(34.04)
55~64	10(16.67)	8(17.02)	18(17.02)
65~75	7(11.11)	5(11.47)	12(10.64)
Total	61	47	108

2.2 宿州市肾结石患者发病的单因素分析

单因素分析显示,宿州市肾结石患者发病与吸烟指数、饮酒指数、饮食习惯、每日饮水量、直系亲属肾结石史、尿路感染史、BMI 有关($P < 0.05$),与文化程度、月收入无关($P > 0.05$),见表 2。

2.3 宿州市肾结石患者发病的多因素 Logistic 回归分析

以是否患有肾结石为自变量,以吸烟指数、饮酒指数、喜食肉蛋、喜食海鲜、每日饮水量、直系亲属肾结石史、尿路感染史、BMI 为因变量进行多因素 Logistic 回归分析,结果显示饮酒指数 ≥ 200 、喜食肉蛋、喜食海鲜、每日饮水量 < 1000 mL、直系亲属有肾结石史、有尿路感染史、BMI > 24 kg/m² 是宿州市肾结石

患者发病的危险因素($P < 0.05$),见表 3。

3 讨论

肾结石是临床上常见的上尿路结石,易引起肾脏的损伤和感染^[11,12]。近年来,我国肾结石发病率不断增高,如何开展肾结石的防治工作已得到临床的重视。然而肾结石发病原因复杂,目前仍未完全明确。有报道显示,我国肾结石发病率较高,沿海地区肾结石发病率较内地高,同时不同年龄段肾结石发病率不同^[13]。宿州市位于长江三角地区,襟连沿海,背倚中原,从近年来泌尿外科临床收治情况来看,肾结石患者并不少见,但目前关于宿州市肾结石的患病现状仍缺乏相关报道。本研究选择我

表 2 宿州市肾结石患者发病的单因素分析[n(%)]

Table 2 Univariate analysis of the incidence of kidney stones in Suzhou city[n(%)]

Factors		Study group(n=108)	Control group(n=107)	X ²	P
Degree of Education	Primary school	7(6.48)	8(7.48)	0.100	0.992
	Junior middle school	32(29.63)	32(29.91)		
	High school	51(47.22)	50(46.73)		
	University and above	18(16.67)	17(15.89)		
Monthly income (yuan)	≤ 4000	25(23.15)	22(20.56)	0.283	0.868
	4000~6000	64(59.26)	67(62.62)		
	≥ 6000	19(17.59)	18(16.82)		
Smoking index	0~100	46(42.59)	68(63.55)	9.479	0.002
	≥ 100	62(57.41)	39(36.45)		
Drinking index	0~200	55(50.93)	75(70.09)	8.261	0.004
	≥ 200	53(49.07)	32(29.91)		
Eating habits	Eating vegetables	26(24.07)	35(32.71)	13.023	0.005
	Eating meat and eggs	28(25.93)	15(14.02)		
	Eating seafood	42(38.89)	30(28.04)		
	Balanced diet	12(11.11)	27(25.23)		
Daily drinking water (mL)	<1000	48(44.44)	22(20.56)	14.672	0.001
	1000~2000	31(28.70)	50(46.73)		
	>2000	29(26.85)	35(32.71)		
History of renal stone in lineal relatives	Yes	21(19.44)	3(2.80)	15.009	0.000
	No	87(80.56)	104(97.20)		
History of urinary tract infection	Yes	18(16.67)	4(3.74)	9.780	0.002
	No	90(83.33)	103(96.26)		
BMI(kg/m ²)	<18	17(15.74)	36(33.64)	22.855	0.000
	18~24	49(45.37)	58(54.21)		
	>24	42(38.89)	13(12.15)		

表 3 宿州市肾结石患者发病的多因素 Logistic 回归分析

Table 3 Multivariate Logistic regression analysis of the incidence of kidney stones in Suzhou city

Relevant indexs	B	SE	Wald X ²	P	OR	95%CI
Smoking index≥ 100	1.128	0.132	3.852	0.086	0.582	0.273~0.747
Drinking≥ 200	1.087	0.128	8.782	0.015	1.284	0.728~1.798
Eating meat and eggs	1.305	0.358	12.332	0.000	3.039	2.158~3.865
Eating seafood	1.735	0.307	13.812	0.000	3.531	2.568~5.862
Daily drinking water<1000 mL	0.828	0.510	5.425	0.025	0.826	0.445~1.398
Having history of renal stone in lineal relatives	1.075	0.582	9.512	0.005	2.862	1.952~3.732
Having history of urinary tract infection	1.108	0.128	11.527	0.000	3.017	2.642~3.952
BMI>24 kg/m ²	0.872	0.320	6.725	0.020	2.827	2.452~3.551

院就诊的肾结石患者及体检的健康志愿者进行对照研究发现, 108 名肾结石患者平均年龄(44.86± 8.25)岁。其中 45~55 岁所占比例最高, 占 34.04%, 其次是 35~44 岁, 占 25.53%, 55~64 岁, 占 17.02%。肾结石发病率并非随年龄增长而不断升高, 这

可能与本研究中病例选择有关, 也可能是 35 岁~65 岁人群是社会主力人群, 大多从事工作与劳动, 平时进食量多, 水分摄入不足, 压力相对较大, 或者可能与激素、内分泌因素有关^[14,15]。其具体数据有待于今后开展大规模的抽样调查获得。

本研究结果显示,饮酒指数 ≥ 200 、喜食肉蛋、喜食海鲜、每日饮水量 $<1000\text{ mL}$ 、直系亲属有肾结石史、有尿路感染史、 $\text{BMI}>24\text{ kg/m}^2$ 是宿州市肾结石患者发病的危险因素。其中,大量饮酒可能影响机体代谢,导致血管异常收缩,是高血压、心脑血管疾病的危险因素^[16,17]。大量饮酒人群可能同时存在生活不规律、饮食结构异常等问题,从而加重肾结石的患病风险。目前有研究表明,肾结石的形成与尿钙排泄率过高、草酸代谢异常及磷酸钙饱和度高等有关^[18]。长期饮酒可能干扰体内尿钙、草酸、磷酸钙代谢,从而增加肾结石患病风险。研究表明,饮食习惯是影响肾结石发病的另一危险因素。食物蛋白中含有大量的甘氨酸、甘醇酯和羟脯氨酸等,这些物质在体内可以转化为草酸^[19]。肉蛋中的嘌呤前体和嘌呤也可以在体内代谢为尿酸^[20]。因此大量摄食肉蛋类会增加体内草酸、尿酸含量,当这些物质与钙质结合后可形成结石。海鲜中除含有大量的蛋白质外,还含有大量的嘌呤、胆固醇等,这些都是导致结石病发生的重要危险因素^[21]。同时海鲜中还有大量的钙质可以与磷酸、草酸等形成草酸钙和磷酸钙,增加肾结石的发病风险。本研究中喜食肉蛋人群发生肾结石风险增加3.039倍,喜食海鲜人群发生肾结石风险增加3.531倍,证实饮食习惯是宿州市肾结石发病的主要影响因素,与Vezzoli G等研究相符^[22]。因此应提倡均衡饮食、多吃素食,以降低肾结石发病风险。饮水量是宿州市肾结石患者发病的又一危险因素。饮水量过低可能降低碳酸钙、草酸钙和磷酸钙的排泄,加大结石形成风险。另外本研究结果还显示直系亲属有肾结石史人群发生肾结石风险增加2.862倍。目前研究认为,肾结石患者家属成员中肾结石患病率也较高^[23,24]。本研究结果符合这一报道,这可能与原发性高尿酸血症、胱氨酸血症等某些遗传性疾病有关,也可能与肾结石患者家属成员有相似的生活习惯有关^[25,26]。有尿路感染史也是促进肾结石形成的重要因素,某些细菌可以产生尿素酶,通过分解尿素使尿液的碱性升高,促进结石形成。肥胖也是肾结石的危险因素,一方面肥胖人群可能因胰岛素抵抗引起尿酸生成增加,促进尿酸钙生成^[27,28]。同时肥胖者大多摄入肉蛋较多,尿液中尿钙排泄率过高、草酸代谢异常及磷酸钙饱和度高,因此患肾结石风险较高^[29,30]。

综上所述,肾结石发病率并非随年龄增长而不断升高,35~55岁是肾结石的高发年龄。饮酒指数 ≥ 200 、喜食肉蛋、喜食海鲜、每日饮水量 $<1000\text{ mL}$ 、直系亲属有肾结石史、有尿路感染史、 $\text{BMI}>24\text{ kg/m}^2$ 是宿州市肾结石患者发病的危险因素,应针对以上因素做好肾结石的防治工作。

参考文献(References)

- [1] Mahmud HM, Mahmud SM. Acute kidney injury in Ureteric Stones: Single centre short term analysis [J]. Pak J Med Sci, 2017, 33(4): 808-812
- [2] Dhayat NA, Gradwell MW, Pathare G, et al. Furosemide/Fludrocortisone Test and Clinical Parameters to Diagnose Incomplete Distal Renal Tubular Acidosis in Kidney Stone Formers[J]. Clin J Am Soc Nephrol, 2017, 12(9): 1507-1517
- [3] He XZ, Ou TW, Cui X, et al. Analysis of the safety and efficacy of combined extracorporeal shock wave lithotripsy and percutaneous nephrolithotomy for the treatment of complex renal calculus [J]. Eur Rev Med Pharmacol Sci, 2017, 21(11): 2567-2571
- [4] 谢伟基,张夏兰,廖翼曼,等.汕头地区在职人员的慢性肾脏病发病率调查[J].中国中西医结合肾病杂志, 2014, 15(10): 880-886
Xie Wei-ji, Zhang Xia-lan, Liao Yi-man, et al. The Epidemiological Study of Chronic Kidney Disease in Occupational Populations in Shantou [J]. Chinese Journal of Integrated Traditional and Western Nephrology, 2014, 15(10): 880-886
- [5] 李小军,刘丹,马颖慧,等.湖南省花垣县肾结石病流行病学调查[J].中南民族大学学报(自然科学版), 2016, 35(3): 48-50
Li Xiao-jun, Liu Dan, Ma Ying-hui, et al. Epidemiology Investigation of Renal Calculus in Huayuan County of Hunan Province [J]. Journal of South-Central University for Nationalities (Natural Science Edition), 2016, 35(3): 48-50
- [6] Mello MF, Marchini GS, Camara C, et al. A large 15 - year database analysis on the influence of age, gender, race, obesity and income on hospitalization rates due to stone disease[J]. Int Braz J Urol, 2016, 42(6): 1150-1159
- [7] Zeng G, Mai Z, Xia S, et al. Prevalence of kidney stones in China: an ultrasonography based cross-sectional study [J]. BJU Int, 2017, 120(1): 109-116
- [8] Taguchi K, Yasui T, Milliner DS, et al. Genetic Risk Factors for Idiopathic Urolithiasis: A Systematic Review of the Literature and Causal Network Analysis[J]. Eur Urol Focus, 2017, 3(1): 72-81
- [9] Fagagnini S, Heinrich H, Rossel JB, et al. Risk factors for gallstones and kidney stones in a cohort of patients with inflammatory bowel diseases[J]. PLoS One, 2017, 12(10): e0185193
- [10] 李卓,郑土康,田换书,等.湛江地区尿石症住院患者结石成分的调查与分析[J].现代医院, 2017, 17(4): 520-523
Li Zhuo, Zheng Tu-kang, Tian Huan-shu, et al. Analysis of the Compositions of Urinary Stones in Zhanjiang Region [J]. Modern Hospital, 2017, 17(4): 520-523
- [11] 安宇,黄建林,张峰,等.输尿管软镜与经皮肾镜钬激光碎石术对肾结石患者肾功能的影响 [J]. 现代生物医学进展, 2015, 15(35): 6863-6866
An Yu, Huang Jian-lin, Zhang Feng, et al. Effect of flexible ureteroscopy and percutaneous nephrolithotomy with holmium laser lithotripsy on renal function in patients with renal calculi[J]. Progress in Modern Biomedicine, 2015, 15(35): 6863-6866
- [12] Parkhomenko E, Tran T, Thai J, et al. Percutaneous Management of Stone Containing Calyceal Diverticula: Associated Factors and Outcomes[J]. J Urol, 2017, 198(4): 864-868
- [13] 谢海琴,王丹军,马建城,等.深圳 9434 名体检者肾结石检出结果分析[J].现代医学影像学, 2015, 24(5): 760-761
Xie Hai-qin, Wang Dan-jun, Ma Jian-cheng, et al. Investigation of the Prevalence of Kidney Stone in 9434 in Shenzhen City [J]. Modern Medical Imaging, 2015, 24(5): 760-761
- [14] Lin SY, Lin CL, Chang YJ, et al. Association Between Kidney Stones and Risk of Stroke: A Nationwide Population-Based Cohort Study[J]. Medicine (Baltimore), 2016, 95(8): e2847
- [15] Xu LHR, Adams-Huet B, Poindexter JR, et al. Temporal Changes in Kidney Stone Composition and in Risk Factors Predisposing to Stone Formation[J]. J Urol, 2017, 197(6): 1465-1471
- [16] Tverdal A, Magnus P, Selmer R, et al. Consumption of alcohol and cardiovascular disease mortality: a 16 year follow-up of 115, 592

- Norwegian men and women aged 40-44 years [J]. *Eur J Epidemiol*, 2017, 32(9): 775-783
- [17] Apostolidou C, Adamopoulos K, Lymperaki E, et al. Cardiovascular risk and benefits from antioxidant dietary intervention with red wine in asymptomatic hypercholesterolemics [J]. *Clin Nutr ESPEN*, 2015, 10(6): e224-e233
- [18] Ferraro PM, Curhan GC, Gambaro G, et al. Total, Dietary, and Supplemental Vitamin C Intake and Risk of Incident Kidney Stones [J]. *Am J Kidney Dis*, 2016, 67(3): 400-407
- [19] Ferraro PM, Mandel EI, Curhan GC, et al. Dietary Protein and Potassium, Diet-Dependent Net Acid Load, and Risk of Incident Kidney Stones[J]. *Clin J Am Soc Nephrol*, 2016, 11(10): 1834-1844
- [20] Kassemi M, Thompson D. Prediction of renal crystalline size distributions in space using a PBE analytic model.2.Effect of dietary countermeasures[J]. *Am J Physiol Renal Physiol*, 2016, 311(3): F531-F538
- [21] De SK, Liu X, Monga M. Changing trends in the American diet and the rising prevalence of kidney stones[J]. *Urology*, 2014, 84(5): 1030-1033
- [22] Vezzoli G, Dogliotti E, Terranegra A, et al. Dietary style and acid load in an Italian population of calcium kidney stone formers[J]. *Nutr Metab Cardiovasc Dis*, 2015, 25(6): 588-593
- [23] Ferraro PM, Taylor EN, Gambaro G, et al. Dietary and Lifestyle Risk Factors Associated with Incident Kidney Stones in Men and Women [J]. *J Urol*, 2017, 198(4): 858-863
- [24] Kuwabara M, Niwa K, Ohtahara A, et al. Prevalence and complications of hypouricemia in a general population: A large-scale cross-sectional study in Japan[J]. *PLoS One*, 2017, 12(4): e0176055
- [25] Stiburkova B, Stekrova J, Nakamura M, et al. Hereditary Renal Hypouricemia Type 1 and Autosomal Dominant Polycystic Kidney Disease[J]. *Am J Med Sci*, 2015, 350(4): 268-271
- [26] 李小琴,欧阳炎,陈磊,等.象山半岛渔民肾结石患病现状及危险因素分析[J].*浙江医学*, 2017, 39(14): 1207-1209
- Li Xiao-qin, Ou Yang-yan, Chen Lei, et al. Prevalence and risk factors of kidney stones among fishermen in Xiangshan Peninsula [J]. *Zhejiang Medical Journal*, 2017, 39(14): 1207-1209
- [27] Bartani Z, Heydarpour B, Alijani A, et al. The Relationship Between Nephrolithiasis Risk with Body Fat Measured by Body Composition Analyzer in Obese People[J]. *Acta Inform Med*, 2017, 25(2): 126-129
- [28] Trudeau V, Karakiewicz PI, Boehm K, et al. The Effect of Obesity on Perioperative Outcomes Following Percutaneous Nephrolithotomy[J]. *J Endourol*, 2016, 30(8): 864-870
- [29] Ozgor F, Tepeler A, Elbir F, et al. Comparison of miniaturized percutaneous nephrolithotomy and flexible ureterorenoscopy for the management of 10-20 mm renal stones in obese patients [J]. *World J Urol*, 2016, 34(8): 1169-1173
- [30] Doizi S, Letendre J, Bonneau C, et al. Comparative study of the treatment of renal stones with flexible ureterorenoscopy in normal weight, obese, and morbidly obese patients [J]. *Urology*, 2015, 85(1): 38-44

(上接第 1043 页)

- [15] 黄丽芳, 陈明.《伤寒论》真武汤证理论探讨 [J]. *中华中医药学刊*, 2016, 34(1): 30-32
- Huang Li-fang, Chen Ming. Discuss the Theory of Zhenwutang Syndrome of "Shanghanlun" [J]. *Chinese Archives of Traditional Chinese Medicine*, 2016, 34(1): 30-32
- [16] 邱伯雍, 王永霞. 慢性心力衰竭流行病学及防治研究进展[J]. *中华实用诊断与治疗杂志*, 2017, 31(06): 619-621
- Qiu Bo-yong, Wang Yong-xia. Research Progress in Epidemiology and Prevention of Chronic Heart Failure [J]. *Journal of Chinese Practical Diagnosis and Therapy*, 2017, 31(06): 619-621
- [17] 李尚洪, 张斌霞. 中药治疗慢性心力衰竭的作用机制[J]. *吉林中医药*, 2016, 36(04): 359-362
- Li Shang-hong, Zhang Bin-xia. Mechanism of Traditional Chinese Medicine in Treatment of Chronic Heart Failure [J]. *Jilin Journal of Traditional Chinese Medicine*, 2016, 36(04): 359-362
- [18] Shen yi. Apoptosis of Mouse Cardiomyocytes Induced by Interleukin -1 Beta and its Mechanism in Vitro[D]. Shandong University, 2014
- [19] 邓新桃, 郑金国, 石桂良, 等. IL-6 及 BNP 与心力衰竭的关系[J]. *南京医科大学学报(自然科学版)*, 2014, 34(10): 1350-1351
- Deng Xin-tao, Zheng Jin-guo, Shi Gui-liang, et al. The Relationship between IL-6 and BNP with Heart Failure [J]. *Acta Universitatis Medicinalis Nanjing(Natural Science)*, 2014, 34(10): 1350-1351
- [20] 韩额尔德木图, 马月宏, 王海燕, 等. 慢性心衰的病理生理及发病机制研究进展[J]. *中西医结合心脑血管病杂志*, 2016, (12): 1349-1352
- 52
- E Er De Mu Tu Han, Ma Yue-hong, Wang Hai-yan, et al. Research Progress of Pathophysiology and Pathogenesis of Chronic Heart Failure [J]. *Chinese Journal of Integrative Medicine on Cardio-/Cerebrovascular Disease*, 2016, (12): 1349-1352
- [21] Liao Yu-jie. The Change and the Diagnostic and Prognostic Values of Measurement of Cardiac Troponin I, Highsensitive C Reactiveprotein and B Type Natriuretic Peptide before or after Treatment in Patients with Heart Failure [J]. *Laboratory Medicine*, 2010, 25(2): 92-95
- [22] 韩治伟, 刘晓飞, 王勇. 正确解读 BNP 和 NT-proBNP[J]. *中日友好医院学报*, 2013, 27(02): 113-115
- Han Zhi-wei, Liu Xiao-fei, Wang Yong. Correct Interpretation of BNP and NT-proBNP[J]. *Journal of China-Japan Friendship Hospital*, 2013, 27(02): 113-115
- [23] Chen Han-zhu, Zhong Nan-shan, Lu Zai-ying. Internal Medicine[M]. Eighth Edition. Beijing: People's Medical Publishing House, 2013: 166-174
- [24] 刘爱东, 代娜, 王秀华. 稳心颗粒对慢性心力衰竭大鼠血流动力学、血浆内皮素及心肌细胞结构的影响[J]. *中西医结合心脑血管病杂志*, 2006, (12): 1069-1070
- Liu Ai-dong, Dai na, Wang Xiu-hua. Effects of Wenxin Granule on Hemodynamics, Plasma Endothelin and Myocardial Cell Structure in Rats with Chronic Heart Failure [J]. *Chinese Journal of Integrative Medicine on Cardio-/Cerebrovascular Disease*, 2006, (12): 1069-1070