· 临床研究 ·

血尿酸水平对老年充血性心力衰竭患者院内死亡的影响及降尿酸疗效

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【摘 要】 **目的** 研究老年充血性心力衰竭(CHF)合并高尿酸血症(HUA)患者临床特点,分析降尿酸治疗在改善 HUA 患者预后中的价值。**方法** 将 2020 年 7 月至 2023 年 5 月西安交通大学第二附属医院收治的 316 例老年 CHF 患者作为研究对象。根据其入院时血尿酸(SUA)水平,将其分为 HUA 组及尿酸正常(NHUA)组。比较两组患者临床资料,分析老年 CHF 合并 HUA 患者临床特点,统计患者院内死亡情况。采用 Cox 风险比例回归模型分析影响老年 CHF 患者院内死亡的相关因素。随机将 HUA 组患者分为 HUA-试验组与 HUA-对照组,其中试验组在常规服药基础上加用降尿酸药物别嘌醇。随访 1 年,对比两组干预效果。采用 SPSS 27.0 软件进行数据分析。根据数据类型,组间比较分别采用 t 检验及 χ^2 检验。**结果** 316 例 CHF 患者中有 180 例(56.96%)确诊为 HUA。HUA 组患者 SUA、血浆 N 末端脑钠肽前体(NT-proBNP)、白细胞介素-6(IL-6)、肿瘤坏死因子-α(TNF-α)、白细胞计数(WBC)水平以及纽约心脏病协会(NHYA)心功能分级Ⅲ~Ⅳ级者占比高于 NHUC 组,左心室射血分数(LVEF)水平低于 NUHA 组,差异均有统计学意义(P<0.05)。316 例老年 CHF 患者院内死亡共 23 例(7.28%),多因素 Cox 风险比例回归分析提示,年龄≥80 岁(HR=1.399, 95%CI 1.093~1.791)、NT-proBNT 水平(HR=1.067, 95%CI 1.022~1.114)、入院 24 h 内利尿剂使用剂量(HR=1.123, 95%CI 1.040~1.212)是患者院内死亡的危险因素,入院时 SBP 水平(HR=0.911, 95%CI 0.846~0.982)是其保护因素(P<0.05)。随访 1 年发现,HUA-试验组患者经治疗后,血肌酐、SUA、NT-proBNP、IL-6、TNF-α、WBC、左心室舒张末期内径水平均低于对照组,LVEF 水平高于对照组,差异均有统计学意义(P<0.05);HUA-试验组复合终点事件发生率为 39.02%(32/82),低于 HUA-对照组的 59.76%(49/82),差异有统计学意义(χ^2=7.050,P=0.008)。**结论** 入院时 SUA 水平与老年 CHF 患者院内死亡无关,但降尿酸治疗可减少患者出院后 1 年复合终点事件发生率。

【关键词】 老年人;充血性心力衰竭;高尿酸血症;尿酸水平;降尿酸治疗;预后
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Impact of serum uric acid level on in-hospital death in elderly patients with congestive heart failure and efficacy of uric acid-lowering therapy

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【**Abstract**】 **Objective** To investigate the clinical characteristics of elderly patients with congestive heart failure (CHF) complicated with hyperuricemia (HUA) and to analyze the value of uric acid-lowering therapy in improving the prognosis of HUA patients. **Methods** A total of 316 elderly CHF patients admitted to the Second Affiliated Hospital of Xi′an Jiaotong University from July 2020 to May 2023 were enrolled as the study subjects. According to the serum uric acid (SUA) levels at admission, they were divided into HUA group and non-HVA (NHUA) group. The clinical data were compared between two groups, and the clinical characteristics of elderly CHF patients with HUA were analyzed. The in-hospital mortality was recorded. The factors affecting the in-hospital mortality in elderly CHF patients were analyzed by the Cox proportional hazards regression model. The patients in the HUA group were randomized into HUA-trial group and HUA-control group. The trial group received uric acid-lowering allopurinol in addition to routine medication. After one year of follow-up, the intervention effects were compared. SPSS 27.0 was used for statistical analysis. Data comparison between two groups was performed using t test or χ^2 test depending on data type. **Results** Among the 316 CHF patients, 180 (56.96%) were diagnosed with HUA . The HUA group had higher levels of SUA, plasma N-terminal pro-brain natriuretic peptide (NT-proBNP), interleukin-6 (IL-6), tumor necrosis factor-α (TNF-α), white blood cell count (WBC), and proportion of patients with New York Heart Association (NYHA) functional class Ⅲ-Ⅳ than the NHUC group, but lower left ventricular ejection fraction (LVEF), with statistically significant differences

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($P<0.05$). Among 316 elderly CHF patients, 23 (7.28%) died in hospital. Multivariate Cox proportional hazards regression analysis indicated that age ≥ 80 years (*HR*=1.399, 95%*CI* 1.093-1.791), NT-proBNT level (*HR*=1.067, 95%*CI* 1.022-1.114), and diuretic dose within 24 h of admission (*HR*=1.123, 95%*CI* 1.040-1.212) were risk factor for in-hospital death, and systolic blood pressure (SBP) at admission (*HR*=0.911, 95%*CI* 0.846-0.982) was a protective factor ($P<0.05$). After one year of follow-up, levels of serum creatinine, SUA, NT-proBNP, IL-6, TNF-α, WBC, and left ventricular end-diastolic diameter in the HUA-trial group were lower than those in the HUA-control group, while the LVEF was higher than that in the HUA-control group, with statistically significant differences ($P<0.05$). The incidence of composite endpoint events after one year of follow-up was 39.02% (32/82) in the HUA-experimental group, lower than 59.76% (49/82) in the HUA-control group ($\chi^2=7.050$; $P=0.008$). **Conclusion** The SUA level at admission is not associated with in-hospital mortality in elderly CHF patients, but uric acid-lowering therapy can reduce the incidence of composite endpoint events one year after discharge.

【Key words】 aged; congestive heart failure; hyperuricemia; uric acid level; uric acid-lowering therapy; prognosis

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充血性心力衰竭(congestive heart failure, CHF)是各种心血管疾病的最终阶段,其致病机制复杂,预后差,尽管随着临床医学的不断发展,关于CHF的预防及治疗手段也不断丰富,但CHF再入院率及病死率依旧较高,寻找可能的适合干预的新危险因素在临床中具有重要意义。高尿酸血症(hyperuricemia, HUA)与CHF之间的关系密切,有研究显示,血尿酸(serum uric acid, SUA)水平升高是中重度CHF患者预后受损的重要标志[1],但也有研究持不同意见[2]。此外,降尿酸治疗在改善CHF患者预后中的价值也存在争议[3,4]。基于此,本研究通过探讨SUA与老年CHF患者院内死亡之间的关系,及降尿酸治疗在改善患者出院后1年预后状态中的价值,旨在为临床延缓CHF病情进展,改善患者预后提供参考。

1 对象与方法

1.1 研究对象

将2020年7月至2023年5月西安交通大学第二附属医院收治的316例老年CHF患者作为研究对象。本研究经西安交通大学第二附属医院伦理委员会批准(伦理批号:20200114),患者及其家属均知情且同意。

充血性心力衰竭诊断参照欧洲心脏病学会急慢性心力衰竭的诊断和治疗指南[5]:患者具有典型心力衰竭症状与体征,左心室射血分数(left ventricular ejection fraction, LVEF)正常或降低,血浆N末端脑钠肽前体(N-terminal pro-brain natriuretic peptide, NT-proBNP)≥25 pg/ml,具有引起心力衰竭的其他心脏结构及收缩和(或)舒张功能改变的客观证据。纳入标准:患者年龄≥60岁;符合充血性心力衰竭诊断;纽约心脏病协会(New York Heart Association, NYHA)心功能分级Ⅱ~Ⅳ级;入院前或住院期间至少2次SUA水平检测且结果差异<20 μmol/L;临床资料完整。排除标准:合并恶性心律失常;严重肝肾功能不全;参与研究前1个月内急性心肌梗死史;合并恶性肿瘤、免疫疾病、急慢性感染及严重血液相关疾病;近1个月内使用降尿酸药物。

1.2 方法

1.2.1 HUA诊断及分组 平素饮食条件下,不同日两次空腹血检测SUA提示男性>420 μmol/L,女性>360 μmol/L即可诊断为HUA。根据CHF患者是否合并HUA,将其分为HUA组与非HUA(NHUA组)。

1.2.2 治疗方法 参照欧洲心脏病学会急慢性心力衰竭的诊断和治疗指南[5]中相关标准,给予患者地高辛、利尿剂、血管紧张素转化酶抑制剂、β受体阻滞剂、醛固酮受体拮抗剂、阿司匹林、他汀类药物、氯吡格雷等药物治疗,治疗期间根据患者病情调整药物用量。遵循随机原则,采用随机数表法将HUA组患者分为HUA-试验组及HUA-对照组,其中试验组在此基础上加用别嘌醇(重庆青阳药业有限公司,国药准字H50020548)治疗,每日3次,连续服药6个月。在治疗期间,所有患者均采用低嘌呤饮食,戒烟戒酒,同时给予患者适当的体育活动与限制体质量相关健康指导。

1.2.3 资料收集 (1)一般人口学及临床资料:收集患者性别、年龄、既往基础性疾病史、入院时血压、NYHA心功能分级、心力衰竭病因(包括高血压性心脏病、瓣膜性心脏病、扩张性心肌病、冠心病)、是否合并肺部感染。(2)血生化指标及超声心动图检查:患者入院24 h内完善血生化指标检测及超声心动图检查。采集其外周静脉血,检测血肌酐(serum creatinine, SCr)、尿氮素(urine nitrogen, BUN)、白

细胞介素-6(interleukin-6, IL-6)、肿瘤坏死因子-α(tumor necrosis factor-α, TNF-α)、白细胞计数(white blood cell, WBC)、血浆 NT-proBNP 水平,超声心动图检查记录 LVEF 以及左心室舒张末期内径(left ventricular end-diastolic dimension, LVEDD)水平。

1.2.4 不良终点事件统计 随访 1 年,主要终点为患者因 CHF 再入院、全因死亡、心血管原因死亡、心力衰竭恶化事件等复合终点事件。

1.2.5 观察指标 (1)对比 HUA 组及 NHUA 组患者临床资料,分析 CHF 合并 HUA 临床特点;(2)分析 HUA-试验组及 HUA-对照组患者治疗前后各血生化指标及超声心动图检查结果,以及其 1 年复合终点事件发生率。

1.3 统计学处理

采用 SPSS 27.0 统计软件进行数据分析。计量资料用均数±标准差($\bar{x}\pm s$)表示,采用 t 检验;计数资料用例数(百分率)表示,采用 χ^2 检验。采用 Cox 风险比例回归模型分析影响老年 CHF 患者院内死亡的危险因素。$P<0.05$ 为差异有统计学意义。

2 结 果

2.1 HUA 组及 NHUA 组患者临床资料

316 例患者中有 180 例(56.96%,180/316)确诊为 HUA。HUA 组患者 SUA、NT-proBNP、IL-6、TNF-α、WBC 水平以及 NHYA 心功能分级Ⅲ~Ⅳ级患者占比均高于 NHUC 组,LVEF 水平低于 NUHA 组,差异均有统计学意义(均 $P<0.05$;表 1)。

2.2 CHF 院内死亡的 Cox 多因素回归分析

316 例老年 CHF 患者院内死亡共 23 例(7.28%),先后行单因素及多因素 Cox 风险比例回归分析提示,年龄≥80 岁、NT-proBNT 水平、入院 24 h 内利尿剂使用剂量是患者院内死亡的危险因素($P<0.05$),入院时 SBP 水平是其保护因素($P<0.05$;表 2)。

表 1 HUA 组及 NHUA 组临床资料比较

Table 1 Comparison of clinical data between HUA group and NHUA group

Item	HUA group(n=180)	NHUA group(n=136)	t/χ^2	P value
Age(years, $\bar{x}\pm s$)	67.49±4.16	68.03±4.43	1.111	0.267
Gender[n(%)]			0.132	0.716
Male	99(55.00)	72(52.94)		
Female	81(45.00)	64(47.06)		
BMI(kg/m^2, $\bar{x}\pm s$)	23.25±2.15	22.96±2.24	1.166	0.245
Smoking history[n(%)]	50(27.78)	43(31.62)	0.550	0.458
History of alcohol drinking[n(%)]	45(25.00)	35(25.74)	0.022	0.882
Diabetes mellitus[n(%)]	31(17.22)	20(14.71)	0.362	0.547
Hypertension[n(%)]	22(12.22)	15(11.03)	0.107	0.744
History of myocardial infarction[n(%)]	13(7.22)	9(6.62)	0.044	0.834
History of cerebral infarction[n(%)]	6(3.33)	4(2.94)	0.039	0.844
Atrial fibrillation[n(%)]	45(25.00)	38(27.94)	0.346	0.556
Pulmonary infection[n(%)]	30(16.67)	21(15.44)	0.086	0.769
HR(beats/min, $\bar{x}\pm s$)	81.15±3.15	82.01±4.89	1.896	0.059
SBP(mmHg, $\bar{x}\pm s$)	125.15±7.46	123.79±8.03	1.553	0.122
DBP(mmHg, $\bar{x}\pm s$)	79.12±5.49	78.45±5.55	1.069	0.286
SCr(mmol/L, $\bar{x}\pm s$)	93.79±8.76	94.03±9.13	0.237	0.813
SUA(μmol/L, $\bar{x}\pm s$)	484.15±36.78	351.49±33.67	32.913	<0.001
NT-proBNP(ng/ml, $\bar{x}\pm s$)	569.63±113.45	311.45±116.71	19.784	<0.001
IL-6(ng/L, $\bar{x}\pm s$)	207.45±26.79	171.46±23.65	12.428	<0.001
TNF-α(pmol/L, $\bar{x}\pm s$)	43.59±7.16	36.79±6.82	8.531	<0.001
WBC(10^9/L, $\bar{x}\pm s$)	6.43±1.15	6.14±1.04	2.312	0.021
LVEF(%, $\bar{x}\pm s$)	37.03±4.79	39.79±5.09	4.936	<0.001
LVEDD(mm, $\bar{x}\pm s$)	57.43±5.43	56.64±6.21	1.203	0.230
NHYA[n(%)]			9.314	0.002
Ⅱ	76(42.22)	81(59.56)		
Ⅲ-Ⅳ	104(57.78)	55(40.44)		

HUA: hyperuricemia; NHUA: no hyperuricemia; BMI: body mass index; HR: heart rate; SBP: systolic blood pressure; DBP: diastolic blood pressure; SCr: serum creatinine; SUA: serum uric acid; NT-proBNP: N-terminal pro-brain natriuretic peptide; IL-6: interleukin-6; TNF-α: tumor necrosis factor-α; WBC: white blood cell; LVEF: left ventricular ejection fraction; LVEDD: left ventricular end-diastolic dimension; NHYA: New York Heart Association. 1 mmHg=0.133 kPa

表2 CHF院内死亡的Cox多因素回归分析

Table 2 Cox multivariate regression analysis of in-hospital death of CHF

Factor	Univariate analysis			Multivariate analysis		
	β	*HR*(95%*CI*)	*P* value	β	*HR*(95%*CI*)	*P* value
Male	0.451	1.570(0.881-2.799)	0.127			
Age≥80 years	0.379	1.461(1.080-1.976)	0.014	0.336	1.399(1.093-1.791)	0.008
History of myocardial infarction	0.598	1.818(1.203-2.750)	0.005	0.491	1.634(0.972-2.747)	0.065
History of cerebral infarction	0.615	1.850(0.863-3.965)	0.115			
Atrial fibrillation	0.378	1.459(0.946-2.251)	0.088			
Pulmonary infection	0.436	1.547(0.878-2.725)	0.132			
NYHA Ⅲ-Ⅳ	0.096	1.101(1.008-1.202)	0.033	0.087	1.091(0.997-1.194)	0.059
Systolic blood pressure	-0.116	0.890(0.825-0.961)	0.003	-0.093	0.911(0.846-0.982)	0.015
HR	-0.084	0.919(0.835-1.012)	0.087			
Serum sodium	0.715	2.044(0.992-4.213)	0.053			
Serum creatinine	0.779	2.179(0.966-4.916)	0.061			
Serum BUN	0.319	1.376(0.903-2.097)	0.139			
NT-proBNP	0.073	1.076(1.012-1.143)	0.019	0.065	1.067(1.022-1.114)	0.003
SUA	0.083	1.087(1.033-1.143)	0.002	0.079	1.082(0.995-1.177)	0.067
LVEF	0.915	2.497(0.823-7.571)	0.107			
LVEDD	0.298	1.347(0.928-1.955)	0.118			
Diuretic dose within 24 h of admission	0.139	1.149(1.052-1.255)	0.002	0.116	1.123(1.040-1.212)	0.003

CHF: congestive heart failure; NYHA: New York Heart Association; HR: heart rate; BUN: urine nitrogen; NT-proBNP: N-terminal pro-brain natriuretic peptide; SUA: serum uric acid; LVEF: left ventricular ejection fraction; LVEDD: left ventricular end-diastolic dimension.

2.3 HUA-试验组与HUA-对照组基线资料

316例老年CHF患者院内死亡共23例(7.28%),其中HUA组共死亡16例,将剩余164例HUA组患者分为HUA-试验组及HUA-对照组,每组患者82例,两组患者基线资料比较,差异无统计学意义($P>0.05$;表3)。

2.4 HUA-试验组及HUA-对照组患者治疗前后临床资料

干预1年后,HUA-试验组及HUA-对照组SCr、SUA、NT-proBNP、IL-6、TNF-α、WBC、LVEDD水平均较同组治疗前下降,LVEF水平较同组治疗前上升;且HUA-试验组患者经治疗后,SCr、SUA、NT-proBNP、IL-6、TNF-α、WBC、LVEDD水平均低于HUA-对照组,LVEF水平高于HUA-对照组,差异均有统计学意义($P<0.05$;表4)。

2.5 HUA-试验组及对照组终点事件发生率比较

随访1年,HUA-试验组复合终点事件发生率为39.02%(32/82),低于HUA-对照组的59.76%(49/82),差异有统计学意义($\chi^2=7.050$, $P=0.008$)。

表3 HUA-试验组与HUA-对照组基线资料比较

Table 3 Comparison of baseline data between HUA-experimental group and HUA-control group ($n=82$)

Item	HUA-experimental group	HUA-control group	t/χ^2	*P* value
Age(years, $\bar{x}\pm s$)	66.98±3.49	67.94±3.36	1.794	0.075
Gender[*n*(%)]			0.026	0.873
Male	50(60.98)	49(59.76)		
Female	32(39.02)	33(40.24)		
BMI(kg/m^2, $\bar{x}\pm s$)	23.16±2.13	23.46±2.08	0.912	0.363
Smoking history[*n*(%)]	22(26.83)	24(29.27)	0.121	0.728
History of alcohol drinking[*n*(%)]	23(28.05)	20(24.39)	0.284	0.594
Diabetes mellitus[*n*(%)]	14(17.07)	12(14.63)	0.183	0.667
Hypertension[*n*(%)]	10(12.20)	8(9.76)	0.250	0.617
History of myocardial infarction[*n*(%)]	5(6.10)	6(7.32)	0.097	0.755
History of cerebral infarction[*n*(%)]	2(2.44)	3(3.66)	0.206	0.650
Atrial fibrillation[*n*(%)]	18(21.95)	22(26.83)	0.529	0.467
Pulmonary infection[*n*(%)]	13(15.85)	15(18.29)	0.172	0.678
NHYA[*n*(%)]			0.225	0.635
Ⅱ	33(40.24)	36(43.90)		
Ⅲ-Ⅳ	49(59.76)	46(56.10)		

HUA: hyperuricemia; BMI: body mass index; NHYA: New York Heart Association.

表 4 HUA-试验组及 HUA-对照组患者治疗前后临床资料比较

Table 4 Comparison of clinical data before and after treatment between HUA-experimental group and HUA-control group

($n=82$, $\bar{x}\pm s$)

Group	SCr (mmol/L)	SUA (μmol/L)	NT-proBNP (ng/ml)	IL-6 (ng/L)	TNF-α (pmol/L)	WBC (10^9/L)	LVEF (%)	LVEDD (mm)
HUA-experimental								
Before treatment	93.29±8.76	482.97±36.78	571.63±113.45	206.55±26.79	43.87±7.16	6.47±1.15	36.79±4.15	57.74±5.39
After treatment	81.46±8.93*#	339.45±34.14*#	193.46±61.15*#	161.15±16.33*#	33.49±8.07*#	4.46±1.09*#	43.45±4.91*#	42.13±4.33*#
HUA-control								
Before treatment	93.96±7.15	486.15±37.29	566.79±117.45	208.13±30.27	42.96±6.49	6.33±1.03	37.23±4.39	57.29±5.09
After treatment	86.71±6.29*	443.53±32.19*	226.79±57.46*	186.43±15.98*	37.02±8.79*	5.23±1.16*	40.06±5.09*	46.74±4.37*

HUA: hyperuricemia; SCr: serum creatinine; SUA: serum uric acid; NT-proBNP: N-terminal pro-brain natriuretic peptide; IL-6: interleukin-6; TNF-α: tumor necrosis factor-α; WBC: white blood cell; LVEF: left ventricular ejection fraction; LVEDD: left ventricular end-diastolic dimension. Compared with the same group before treatment, *$P<0.05$; compared with the HUA-control group after treatment, #$P<0.05$.

3 讨 论

HUA 的发病机制主要涉及尿酸产生过多与尿酸排泄障碍,有研究显示,90%的原发 HUA 由尿酸排泄障碍所致[6]。本研究 316 例老年 CHF 患者中 180 例(56.96%)经检验合并 HUA,提示老年 CHF 患者普遍合并 HUA。肾脏是尿酸代谢的主要器官,而 CHF 患者心室射血功能下降,会降低肾脏灌注量,进而影响尿酸排泄,引起 HUA[7,8]。此外,本研究发现,合并 HUA 的老年 CHF 患者血浆 NT-proBNP水平以及 NHYA 心功能分级Ⅲ~Ⅳ级者占比更高,LVEF 水平更低,且炎症相关指标(包括 IL-6、TNF-α 以及 WBC 水平)也高于 NHUA 组患者,提示合并 HUA 的老年 CHF 患者心功能更差,机体炎症反应更严重。分析其原因,可能与高 SUA 水平将损伤血管内皮、促进血管平滑肌增生、促进血小板聚集与细胞凋亡、参与 CHF 病情进展、恶化心功能相关[9]。此外,高 SUA 水平还将激活炎症通路,促进各种炎症因子释放,参与 CHF 进程[10,11]。

积极识别 CHF 院内死亡高危风险者,做好 CHF 危险分层,在指导临床工作中具有重要意义。由于 CHF 的异质性,各研究所报道的 CHF 院内死亡风险各不相同。本研究中,316 例老年 CHF 患者中共 23 例院内死亡,死亡率为 7.28%,Cox 风险比例单因素回归分析提示,SUA 水平是影响院内死亡的相关因素,但其最终未进入 Cox 多因素回归模型,提示 SUA 不是引起老年 CHF 患者院内死亡的独立危险因素,与某些研究结论不同[12,13]。这可能与各研究所纳入的病例个体差异相关。此外,本研究发现,虽然 SUA 不是引起老年 CHF 患者院内死亡的独立危险因素,但降尿酸治疗在改善患者预后中具有价值,这可能与 Cox 风险比例分析以患者是否院内死亡作为因变量、随访时间过短、并未发现 SUA 与 CHF 远期预后之间的关系相关。

关于降尿酸治疗是否可以改善 CHF 患者预后一直存在争议[14,15]。为验证降尿酸在改善老年 CHF 患者中的预后,本研究以别嘌醇作为降酸药物,在 CHF 合并 HUA 患者服用 1 年后,对其疗效进行评估,结果发现,加用别嘌醇的 HUA-试验组患者, SCr、SUA、NT-proBNP、IL-6、TNF-α、WBC、LVEDD 水平均低于 HUA-对照组,LVEF 水平高于对照组,提示加用别嘌醇可有效降低机体炎症反应,改善心功能。且随访 1 年后发现,加用别嘌醇可有效降低老年 CHF 患者再入院、死亡等复合终点事件发生率。有研究表示,HUA 患者存在黄嘌呤氧化酶上调现象,而黄嘌呤氧化酶上调会使氧自由基增多,同时减少一氧化氮释放,进而促进炎症反应与氧化代谢紊乱,参与心功能障碍发生机制[16]。尿酸同时还可活化血管紧张素Ⅱ,增加醛固酮水平,促进血管平滑肌增殖与血管重构,促进心力衰竭进展,此外,HUA 能降低机体间充质干细胞数量与质量,进而降低机体免疫力[17]。推测降尿酸治疗可逆转以上变化,改善 CHF 患者结局[18]。

综上,入院时 SUA 水平并不是老年 CHF 患者院内死亡的独立影响因素,但降尿酸治疗可减少患者出院后 1 年复合终点事件发生率。但以上结论还需开展多中心、大样本量研究加以证实,同时还需延长随访时间,观察降尿酸治疗在改善 CHF 患者病情及预后中的长期疗效。此外,受限于研究条件,本研究也并未讨论降尿酸治疗在改善炎症及心功能中的具体作用机制,存在一定的局限性。

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