·临床研究·

慢性心力衰竭患者贫血的发生及对预后的影响

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【摘 要】 **目的** 回顾性地分析慢性心力衰竭(CHF)住院患者贫血发生率及对死亡率的影响。**方法** 选择2006年1月至2015年10月在商洛市中心医院心血管内科住院的CHF患者481例,根据纽约心脏协会(NYHA)分级标准分为Ⅰ组、Ⅱ组、Ⅲ组、Ⅳ组。根据血红蛋白(Hb)浓度分为Hb<80,80~99,100~119,120~139,140~159,>160 g/L六个亚组,比较不同组实验室指标及预后情况。**结果** (1)随着心力衰竭程度的加重,左室射血分数(LVEF)、Hb、红细胞压积(HCT)水平明显降低;血肌酐(SCr)水平和贫血发生率逐渐增高,组间比较差异均有统计学意义($P<0.05$)。(2)贫血组患者在年龄、严重心力衰竭(Ⅲ级和Ⅳ级)患者的比率、LVEF、死亡率方面与非贫血组比较,差异有统计学意义($P<0.05$)。(3)Hb 120~139 g/L组的SCr水平明显低于其他组($P<0.01$)。Hb 140~159 g/L组死亡率最低(2.4%, $P<0.01$)。(4)多因素logistic回归分析表明,心功能分级、年龄、SCr、LVEF是住院死亡率增高的危险因素,而Hb则是住院死亡率降低的保护因素。**结论** 合并贫血的CHF患者病情重,死亡率高。临床医师在积极抗心力衰竭治疗的同时应重视贫血的纠正,以更好地改善CHF患者的预后。

【关键词】 慢性心力衰竭;贫血;血红蛋白;死亡率
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Incidence of anemia and its influence on prognosis of patients with chronic heart failure

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【**Abstract**】 **Objective** To analyze the incidence of anemia and its effect on the mortality of the patients with chronic heart failure (CHF) retrospectively. **Methods** A total of 481 CHF patients admitted in our department from January 2006 to October 2015 were enrolled in this study. They were divided into groups Ⅰ-Ⅳ according to their cardiac function by New York Heart Association (NYHA) Functional Classification. They were also assigned into 6 groups based on hemoglobin (Hb) level, that is, <80, 80-99, 100-119, 120-139, 140-159, and >160 g/L group. Their laboratory parameters and prognoses were analyzed and compared among the different groups. **Results** (1) With the increasing severity of heart failure (from the NYHA Class Ⅰ to Ⅳ), the left ventricular ejection fraction (LVEF), Hb level, and hematocrit (HCT) were significantly decreased, but serum creatinine (SCr) and the incidence of anemia were significantly increased. Significant differences were observed among the intra-groups ($P<0.05$). (2) There were obvious differences in age, proportion of severe heart failure (NYHA Class Ⅲ and Ⅳ), LVEF and mortality between the anemia group and non-anemia group ($P<0.05$). (3) SCr level was the lowest in the patients with Hb of 120-139 g/L ($P<0.01$), and hospital mortality was the lowest in the patients with Hb of 140-159 g/L (2.4%, $P<0.01$). (4) Multivariate logistic regression analysis showed that the cardiac function classification, age, SCr and LVEF were the risk factors for hospital mortality, but Hb was the protective factor. **Conclusion** CHF patients complicated with anemia are commonly in severe condition and associated with high mortality. Therefore, clinicians should actively treat heart failure and correct anemia at the same time in order to improve the prognosis of the patients.

【**Key words**】 chronic heart failure; anemia; hemoglobin; mortality

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慢性心力衰竭(chronic heart failure,CHF)是心脏病患者反复住院的主要原因,是多种心血管疾病发展的终末状态,也是最主要的死因[1,2]。临床相当一部分CHF患者合并贫血,本文主要分析住院

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CHF患者贫血患病率其及与心功能之间的关系，并评估了血红蛋白（hemoglobin，Hb）浓度对于CHF患者住院死亡率的影响，从而有助于病情分析和治疗。

1 对象与方法

1.1 对象

选择2006年1月至2015年10月在商洛市中心医院心血管内科住院的CHF患者481例，其中男性279例，女性202例。年龄（57.8±16.4）岁。CHF的诊断遵循欧洲心脏病学协会（European Society of Cardiology，ESC）指南[3]。所有CHF患者按纽约心脏联合会（New York Heart Association，NYHA）标准分级，分为Ⅰ、Ⅱ、Ⅲ、Ⅳ级。根据Hb浓度又分为6个亚组，即＜80，80～99，100～119，120～139，140～159，＞160 g/L组。

排除标准：严重肾脏疾病、原发性血液系统疾病、慢性呼吸衰竭、肝硬变晚期、妊娠等原因引起的继发性贫血。恶性肿瘤、脑血管病肢体功能障碍。

1.2 方法

1.2.1 资料收集 查阅患者住院病历，收集以下资料。（1）姓名、性别、年龄、既往史、NYHA分级、住院天数、是否死亡；（2）心脏彩色超声：左室射血分数（left ventricular ejection fraction，LVEF）、左室收缩末期内径（left ventricular end-systolic dimension，LVESD）、左室舒张末期内径（left ventricular end-diastolic dimension，LVEDD）；（3）相关化验指标：血肌酐（serum creatinine，SCr）、Hb、红细胞压积（hematocrit，HCT）。

1.2.2 贫血的定义 男性Hb＜120 g/L、女性Hb＜110 g/L诊断为贫血，根据该标准分为贫血组和非贫血组。

1.3 统计学处理

采用SPSS16.0软件进行统计分析。计量资料用$\bar{x}\pm s$表示，两组间比较采用t检验，多组间比较采用方差分析，进一步两两比较采用q检验。计数资料用例数或百分率表示，组间比较采用χ^2检验。多因素相关分析采用logistic回归分析，计算各研究因素的比值比（OR值）。$P<0.05$为差异有统计学意义。

2 结 果

2.1 不同心功能分级患者心脏彩色超声及血液生化指标的比较

随着心功能分级水平逐渐增高，Hb和HCT水平呈逐渐下降趋势，贫血患病率及SCr水平呈逐渐增高趋势，LVEF逐渐降低，组间比较差异有统计学意义（$P<0.05$；表1）。

2.2 贫血组与非贫血组患者死亡率及相关指标的比较

贫血组患者年龄较非贫血组小，差异有统计学意义（$P<0.001$）；贫血组患者NYHA Ⅲ－Ⅳ级比率高于非贫血组（$P<0.05$）；贫血组LVEF明显低于非贫血组（$P<0.001$），而死亡率则明显升高（$P<0.001$）；他们的平均住院天数差异无统计学意义（$P>0.05$；表2）。

2.3 CHF患者不同Hb浓度组相关指标的比较

Hb120～139 g/L组的LVEDD、SCr值明显低于其他组（$P<0.05$，$P<0.01$）；Hb140～159 g/L组死亡率最低（2.4%），差异有统计学意义（$P<0.01$；表3）。

2.4 CHF患者住院死亡危险因素的多元logistic回归分析

年龄、性别、住院天数、心功能分级、SCr、Hb浓度等为自变量，以是否死亡为因变量，进行logistic回归分析。年龄（$P=0.01$）、心功能分级（$P=0.001$）、Hb浓度（$P=0.01$）、SCr（$P=0.01$）、LVEF（$P=0.001$）进入回归方程，其中年龄、心功能分级、SCr、LVEF是CHF患者住院死亡率增高的危险因素，而Hb是住院死亡率降低的保护因素（表4）。

表1 不同心功能分级患者LVEF及血液生化指标的比较

Table 1 Comparison of LVEF and blood biochemical indicators in patients with different NYHA classes

Item	NYHA Ⅰ（$n=43$）	NYHA Ⅱ（$n=124$）	NYHA Ⅲ（$n=202$）	NYHA Ⅳ（$n=112$）
SCr（μmol/L，$\bar{x}\pm s$）	81.1±3.5	85.4±4.6	97±10.2*#	109±21.3*#△
Hb（g/L，$\bar{x}\pm s$）	135.8±11.4	134.7±13.2	129.8±21.3*	118.3±36.9*#△
HCT（%，$\bar{x}\pm s$）	40.3±2.8	38.7±4.5	35.2±3.1*	33.9±6.3*#
Anemia[n（%）]	6（13.9）	22（17.7）	53（26.2）*#	48（42.8）*#△
LVEF（%，$\bar{x}\pm s$）	65.0±4.2	59.0±8.7*	50.0±6.3*#	45.0±7.8*#

SCr：serum creatinine；Hb：hemoglobin；HCT：hematocrit；LVEF：left ventricular ejection fraction. Compared with NYHA Ⅰ group，*$P<0.05$；compared with NYHA Ⅱ group，#$P<0.05$；compared with NYHA Ⅲ group，△$P<0.05$

表2 贫血组与非贫血组患者死亡率及相关指标比较

Table 2 Comparison of mortality and related indicators between anemia and non-anemia group

Item	Anemia group (n=129)	Non-anemia group (n=352)
Age(years, $\bar{x}\pm s$)	54.9±15.1	60.1±13.7***
Hb(g/L, $\bar{x}\pm s$)	94.0±13.7	139.0±5.1***
NYHA Ⅲ-Ⅳ[n(%)]	101(78.3)	213(60.5)*
LVEF(%, $\bar{x}\pm s$)	46.0±14.3	53.0±13.8***
Mortality[n(%)]	31(24.0)	12(3.5)***
Length of hospital stay(d, $\bar{x}\pm s$)	19.4±12.1	18.8±13.8

Hb: hemoglobin; NYHA: New York Heart Association; LVEF: left ventricular ejection fraction. Compared with anemia group, * $P<0.05$, *** $P<0.001$

3 讨 论

研究结果显示,住院CHF患者合并贫血较常见,患病率约26.8%。国外相关文献报道患病率为4.0%~61.0%,多为18%~20%[4-6]。造成患病率变化大的原因主要是地域、种族、疾病谱、贫血诊断标准的不一致、缺乏大规模的流行病学研究以及每个研究中纳入重度CHF患者的比例不同[2]。

贫血是心血管疾病的第五个危险因素[7],我们的研究也证实贫血与心力衰竭严重程度密切相关[8]。本研究共纳入481例CHF患者,其中贫血患者129例。随着NYHA分级水平增高,Hb、HCT水平逐渐下降,贫血的患病率逐渐增高,从心功能Ⅰ级的13.9%上升至42.8%。NYHA Ⅲ和Ⅳ级的CHF患者的Hb水平比Ⅰ和Ⅱ级CHF患者的Hb水平明显降低($P<0.01$)。

贫血也是影响CHF患者预后的独立危险因素[9,10],是CHF患者住院死亡率增加的预测因素[8]。Hb水平降低使得红细胞携氧总量下降,机体组织低氧,一氧化氮释放导致外周血管扩张,外周阻力下降,从而激活肾上腺交感神经系统和肾素-血管紧张素-醛固酮系统,抗利尿激素分泌增多导致水钠潴留,在一定程度上加重了CHF患者的临床症状。此外,长期的神经内分泌激活可使心肌重塑和心室扩大。这些因素导致了合并贫血的CHF患者住院和死亡风险增高[10]。

国外一项荟萃分析结果表明,150万例CHF患者中合并贫血的死亡率是未合并贫血者的2倍,即使在校正年龄、肾功能不全等危险因素后死亡率仍为非贫血者的1.5倍[11]。PRAISE研究调查了1130例CHF患者后发现,贫血患者的死亡风险比非贫血者增加52%。本文研究也进一步证实,贫血组患者的住院死亡率高达24.0%,而非贫血组仅3.5%,差异有统计学意义。logistic回归分析显示Hb是避免CHF患者死亡的有益因素,但并不是水平越高死亡风险越低。研究显示,Hb 120~159 g/L时,住院死亡率最低。国外的研究[12]证实,CHF患

表3 慢性心力衰竭患者不同血红蛋白浓度组各项指标的比较

Table 3 Comparison of various indicators in chronic heart failure patients with different hemoglobin concentrations

Item	Hb concentration(g/L)					
	<80(n=7)	80~99(n=28)	100~119(n=105)	120~139(n=189)	140~159(n=125)	>160(n=27)
LVEF(%, $\bar{x}\pm s$)	60.1±7.5	64.2±6.8	55.6±4.2*#	50.9±7.3*#	44.8±5.6*#△▲	43.5±3.6*#△
LVEDD(mm, $\bar{x}\pm s$)	5.0±0.7	6.2±0.4*	5.6±0.5*#	5.3±0.6#	6.0±0.1*	6.3±0.8*
SCr(μmol/L, $\bar{x}\pm s$)	162.4±18.7	130.7±13.6*	98.7±10.4*#	86.3±9.5**##△△	91.6±10.0*#△	99.4±11.2*#▲
Mortality[n(%)]	2(28.0)	5(17.9)*	10(9.5)*#	6(3.2)*#△	6(2.4)**##△△	3(11.1)*#▲☆

LVEF: left ventricular ejection fraction; LVEDD: left ventricular end-diastolic diameter; SCr: serum creatinine. Compared with Hb < 80 g/L, * $P<0.05$, ** $P<0.01$; compared with Hb 80~99 g/L, # $P<0.05$, ## $P<0.01$; compared with Hb 100~119 g/L, △ $P<0.05$, △△ $P<0.01$; compared with Hb 120~139 g/L, ▲ $P<0.05$; compared with Hb 140~159 g/L, ☆ $P<0.05$

表4 慢性心力衰竭患者死亡率的多元logistic回归分析

Table 4 Analysis of mortality in patients with chronic heart failure

Item	B	OR	95% CI	Wald	P value
Age	1.017	2.084	1.025-2.976	9.684	0.01
LVEF	1.235	3.162	2.123-4.651	12.901	0.001
SCr	1.164	2.187	1.089-3.065	14.538	0.01
Hb	-1.029	2.364	2.040-3.034	11.079	0.01
NYHA-grading	1.534	2.591	2.684-3.069	12.341	0.001

LVEF: left ventricular ejection fraction; SCr: serum creatinine; Hb: hemoglobin

者死亡率与 Hb 水平并非单纯的线性关系，而是“U”型关系，即对于未给予 β 受体阻滞剂的心力衰竭患者，Hb 水平无论过高或非常低，死亡风险均增高。

总之，合并贫血的 CHF 患者病情重，死亡率高，临床医师在积极抗心力衰竭治疗的同时应重视贫血的纠正，以便更好地改善预后，降低死亡率[13,14]。本文系回顾性研究，缺乏贫血原因等方面的指标，无法确定 Hb 的靶目标值以及纠正贫血后对死亡率的影响，此方面尚需大规模、多中心前瞻性研究。

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