

APACHEⅣ评分、NTproBNP、LP-PLA2水平变化对老年出血性脑卒中患者预后转归的评估价值

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摘要:目的 分析急性生理学与慢性健康状况(APACHEⅣ)评分、N末端脑钠肽前体(NTproBNP)、脂蛋白相关性磷脂酶A2(LP-PLA2)水平变化对老年出血性脑卒中(HS)患者预后转归的评估价值。方法 选取2022年1月—2023年8月首都医科大学附属北京康复医院收治的98例老年HS患者,于治疗前选取全自动免疫透射比浊法检测NT-proBNP水平;选取酶联免疫吸附法检测LP-PLA2水平,选取APACHEⅣ评分评估患者病情严重程度。给予患者持续生命体征监测、控制血压、血糖、止血、脑水肿,保证营养和维持水电解质平衡、降温等对症治疗。采用电话、上门随访6个月,选用改良Rankin评分量表(MRS)评估患者预后状况,将MRS评分 ≤ 2 分纳入预后良好组,将MRS评分3~6分纳入预后不良组。对比预后不良组和预后良好组患者基础资料,分析APACHEⅣ评分、NTproBNP、LP-PLA2水平评估老年HS患者预后不良的影响因素及预测价值。结果 98例老年HS患者,预后不良有20例,占比20.41%。预后不良组NIHSS评分、APACHEⅣ评分、NTproBNP、LP-PLA2水平均高于预后良好组($P < 0.05$)。经Logistic回归方程分析(引入水准为0.05,排除水准为0.10),结果显示:NIHSS评分[OR = 1.822(95% CI: 1.352, 2.456)],APACHEⅣ评分[OR = 1.180(95% CI: 1.091, 1.276)],NTproBNP水平[OR = 1.013(95% CI: 1.007, 1.019)],LP-PLA2水平[OR = 1.034(95% CI: 1.016, 1.052)]是预测老年HS患者预后不良的危险因素($P < 0.05$)。经ROC曲线分析,NIHSS评分、APACHEⅣ评分、NTproBNP、LP-PLA2、联合预测老年HS患者预后不良的灵敏度分别为65.00%、80.00%、70.00%、65.00%、90.00%,特异度分别为73.10%、71.80%、73.10%、76.90%、56.40%。NIHSS评分、APACHEⅣ评分、NTproBNP、LP-PLA2联合预测老年HS患者预后不良具有较高的价值(AUC为0.924)。结论 对NIHSS评分、APACHEⅣ评分、NTproBNP、LP-PLA2水平是预测老年HS患者预后不良的危险因素,早期识别和纠正可逆因素有助于改善老年HS患者预后不良。

关键词:急性生理学与慢性健康;健康状况评分;N末端脑钠肽前体;脂蛋白相关性磷脂酶A2;老年出血性脑卒中;预后转归

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Evaluation value of APACHEⅣ score, NTproBNP and LP-PLA2 levels in prognosis of elderly patients with hemorrhagic stroke HOU Lu, SHI Yan, LI Guoqing, YAN Meixia, YANG Kai*. (Beijing Rehabilitation Hospital Affiliated to Capital Medical University Elderly Rehabilitation Center, Beijing 100144, China)

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Abstract: Objective To evaluate the value of acute physiology and Chronic health status(APACHEⅣ) score, N-terminal brain natriuretic peptide precursor(NTproBNP) and lipoprotein-associated phospholipase A2(LP-PLA2) levels in the prognosis of elderly patients with hemorrhagic stroke(HS). **Methods** 98 elderly patients with HS treated in Beijing Rehabilitation Hospital Affiliated to Capital Medical University Elderly Rehabilitation Center hospital from January 2022 to August 2023 were selected, and the level of NT-proBNP was detected by automatic immune transmission turbidimetry before treatment. Enzyme-linked immunosorbent assay(ELISA) was used to detect LP-PLA2 levels, and APACHEⅣ score was used to evaluate the severity of patients' disease. Patients were given continuous vital signs monitoring, control of blood pressure, blood sugar, hemostasis, cerebral edema, nutrition, water and electrolyte balance, cooling and other symptomatic treatments. The patients were followed up by telephone and home for 6 months, and the improved Rankin score scale(MRS) was used to evaluate the prognosis of the patients. MRS Score ≤ 2 points was included in the good prognosis group, and MRS Score 3-6 points was included in the poor prognosis group. By comparing

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the basic data of patients in the poor prognosis group and the good prognosis group, the influencing factors and predictive value of APACHEⅣ score, NTproBNP and LP-PLA2 levels in evaluating the poor prognosis of elderly patients with HS were analyzed. **Results** Of 98 elderly patients with HS, 20 cases (20.41%) had poor prognosis. The levels of NIHSS score, APACHEⅣ score, NTproBNP and LP-PLA2 in the poor prognosis group were higher than those in the good prognosis group ($P < 0.05$). Logistic regression equation analysis (introduction level 0.05, exclusion level 0.10) showed that: NIHSS score [$OR = 1.822$ (95% CI : 1.352, 2.456)], APACHEⅣ score [$OR = 1.180$ (95% CI : 1.091, 1.276)], NTproBNP level [$OR = 1.013$ (95% CI : 1.007, 1.019)], LP-PLA2 level [$OR = 1.034$ (95% CI : 1.016, 1.052)] was a risk factor for predicting poor prognosis in elderly patients with HS ($P < 0.05$). According to ROC curve analysis, the sensitivity of NIHSS score, APACHEⅣ score, NTproBNP, LP-PLA2 and combined prediction of poor prognosis in elderly HS patients was 65.00%, 80.00%, 70.00%, 65.00% and 90.00%, respectively. The specificity was 73.10%, 71.80%, 73.10%, 76.90% and 56.40%, respectively. The combination of NIHSS score, APACHEⅣ score, NTproBNP and LP-PLA2 had high value in predicting poor prognosis in elderly patients with HS (AUC = 0.924). **Conclusion** NIHSS score, APACHEⅣ score, NTproBNP and LP-PLA2 levels are risk factors for predicting poor prognosis in elderly patients with HS. Early identification and correction of reversible factors are helpful to improve poor prognosis in elderly patients with HS.

Key words: Acute physiology and chronic health; Health status score; N-terminal brain natriuretic peptide precursor; Lipoprotein-associated phospholipase A2; Senile hemorrhagic stroke; Prognosis

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出血性脑卒中(HS)发生率占所有卒中的10%~20%,其中40%左右HS患者会在发病1个月内死亡^[1]。HS主要由情绪激动、身体疲劳等因素引起,导致患者血压突然升高,引发颅内出血,严重破坏患者脑组织,威胁其生命安全^[2]。故早期识别HS发生风险并给予积极干预,对改善患者预后具有重要意义。急性生理学与慢性健康状况(APACHEⅣ)评分是一种急性病生理和慢性健康状况评估系统,广泛应用于重症患者的病情评估和预后预测^[3-4]。N末端脑钠肽前体(NTproBNP)是一种生物标志物,用于评估心脏功能和预测心血管事件。脑卒中患者心脏功能往往受到一定影响,其水平变化可反映心脏受损程度^[5]。脂蛋白相关性磷脂酶A2(LP-PLA2)是一种参与脂质代谢和炎症反应的酶^[6]。研究表明^[7],LP-PLA2表达在脑卒中患者中较高,且与患者病情严重程度呈正相关。本研究采取回顾性分析,探究APACHEⅣ评分、NTproBNP、LP-PLA2水平变化对老年HS患者预后转归的评估价值,旨在为临床后续研究提供新思路。现报道如下。

1 资料与方法

1.1 基础资料

选取2022年1月—2023年8月我院收治的98例老年HS患者。纳入标准:(1)符合《基层脑血管病规范诊疗手册》^[8]中HS的诊断标准,且经头颅CT或MRI检查确诊;(2)年龄>60岁,临床资料齐全者;(3)发病48h内经急诊收入院;(4)精神状态

正常,无认知功能障碍;(5)均知晓此次研究并签署知情同意书。排除标准:(1)伴有肝、肾等脏器功能不全者;(2)合并严重感染、恶性肿瘤者;(3)重度脑外伤史;(4)中途退出及不能配合本研究者;(5)合并传染性疾病、血液系统疾病;(6)自身免疫性疾病。本研究经本院伦理委员会审核批准。

1.2 方法

1.2.1 收集患者基础资料 于治疗前收集患者基础资料,包含性别、年龄、体质量指数(BMI)、合并疾病[高血压、高血脂、冠心病]、意识障碍[格拉斯哥昏迷评分(GCS)^[9]]、急性生理学与慢性健康状况(APACHEⅣ)、神经功能缺损评分量表(NIHSS)^[10]评分、白细胞计数、红细胞计数、血小板计数、舒张压、收缩压。

于治疗前抽取患者空腹静脉血5 mL,3 000 r/min离心20 min,离心半径13.5 cm,取上清液,选取全自动免疫透射比浊法检测NT-proBNP水平;选取酶联免疫吸附法检测LP-PLA2水平,试剂盒由康尔克生物科技有限公司提供。

1.2.2 治疗方法 参考《脑卒中精准诊疗与康复》^[11]的标准,给予患者持续生命体征监测、控制血压、血糖、止血、脑水肿,保证营养和维持水电解质平衡、降温等对症治疗。

1.2.3 预后状况 采用电话、上门随访6个月,选用改良Rankin评分量表(MRS)^[12]评估患者预后状况,将MRS评分≤2分纳入预后良好组,将MRS评分3~6分纳入预后不良组。

1.3 统计学分析

采用SPSS-24软件分析,计量资料均符合正态分布,以 $(\bar{x} \pm s)$ 表示采用 t 检验。计数资料以“ $n(\%)$ ”表示,采用 χ^2 检验。影响因素分析采用二元 Logistic 逐步回归模型。选用受试者操作特征(ROC)曲线来评估诊断效能, $P < 0.05$ 表示差异有统计学意义。

2 结果

2.1 分析 HS 患者预后状况

98例老年HS患者,预后不良有20例,占比20.41%。

2.2 分析预后不良组和良好组患者基础资料

预后不良组和良好组患者年龄、合并疾病、舒张压、收缩压、性别、BMI、GCS评分、白细胞计数、红细胞计数、血小板计数对比无统计学差异($P > 0.05$)。预后不良组NIHSS评分高于预后良好组($P < 0.05$),见表1。

表1 对比预后不良组和预后良好组患者基础资料 $[\bar{x} \pm s, n(\%)]$

Tab.1 Comparison of Basic Data between Patients with Poor Prognosis and Patients with Good Prognosis $[\bar{x} \pm s, n(\%)]$

组别	n	年龄(岁)	合并疾病(例)			性别(例)		BMI (kg/m ²)	GCS评分 (分)
			高血压	高血脂	冠心病	男	女		
预后不良组	20	72.63±4.12	6(30.00)	7(35.00)	9(45.00)	11(55.00)	9(45.00)	23.56±1.54	10.26±1.05
预后良好组	78	71.36±3.98	14(17.95)	18(23.08)	21(26.92)	51(65.38)	27(34.62)	24.03±1.61	9.74±1.36
t/χ^2		1.264	0.778	1.191	2.449		0.739	1.175	1.590
P		0.209	0.378	0.275	0.118		0.390	0.243	0.115

续表

组别	n	NIHSS评分 (分)	白细胞计数 ($\times 10^9/L$)	红细胞计数 ($\times 10^9/L$)	血小板计数 ($\times 10^9/L$)	舒张压 (mmHg)	收缩压 (mmHg)
预后不良组	20	15.56±2.36	8.02±1.81	4.63±0.85	156.36±30.41	95.63±4.85	136.52±12.02
预后良好组	78	12.95±2.04	7.41±1.42	4.37±0.75	160.47±33.47	96.78±5.03	138.95±12.84
t		4.942	1.617	1.346	0.499	0.919	0.764
P		0.000	0.109	0.182	0.619	0.361	0.446

2.3 分析预后不良组和良好组 APACHEⅣ评分、NTproBNP、LP-PLA2水平

预后不良组 APACHEⅣ评分、NTproBNP水平、LP-PLA2水平均高于预后良好组($P < 0.05$),见表2。

2.4 APACHEⅣ评分、NTproBNP、LP-PLA2水平评估老年HS患者预后不良的影响因素

以老年HS患者预后状况作为因变量(预后良好=0,预后不良=1),将NIHSS评分、APACHEⅣ评分、NTproBNP水平、LP-PLA2水平(赋值:实测值)作为自变量。经 Logistic 回归方程分析(引入水准为0.05,排除水准为0.10),结果显示:NIHSS评分 $[OR = 1.822(95\% CI: 1.352, 2.456)]$ 、APACHEⅣ评分 $[OR = 1.180(95\% CI: 1.091, 1.276)]$ 、NT-

proBNP水平 $[OR = 1.013(95\% CI: 1.007, 1.019)]$ 、LP-PLA2水平 $[OR = 1.034(95\% CI: 1.016, 1.052)]$ 是预测老年HS患者预后不良的危险因素($P < 0.05$),见表3。

表2 分析预后不良组和良好组 APACHEⅣ评分、NTproBNP、LP-PLA2水平 $[\bar{x} \pm s]$

Tab.2 Analysis of APACHE IV scores, NTproBNP, and LP-PLA2 levels in the poor prognosis group and the good prognosis group $[\bar{x} \pm s]$

组别	n	APACHEⅣ 评分(分)	NTproBNP (pg/mL)	LP-PLA2 ($\mu g/L$)
预后不良组	20	71.04±9.24	1323.57±103.74	334.20±39.52
预后良好组	78	59.95±7.98	1189.54±99.43	289.74±35.69
t 值		5.367	5.332	4.863
P值		0.000	0.000	0.000

表3 多因素 Logistic 回归分析

Tab.3 Multivariate Logistic Regression Analysis

相关因素	β	SE	Wald χ^2	OR	95%CI		P
					下限	上限	
NIHSS评分	0.600	0.152	15.500	1.822	1.352	2.456	0.000
APACHEⅣ评分	0.165	0.040	17.214	1.180	1.091	1.276	0.000
NTproBNP	0.013	0.003	16.141	1.013	1.007	1.019	0.000
LP-PLA2	0.033	0.009	14.234	1.034	1.016	1.052	0.000

2.5 ROC曲线分析评估老年HS患者预后不良的价值

经ROC曲线分析,NIHSS评分、APACHEIV评分、NTproBNP、LP-PLA2、联合预测老年HS患者预后不良的灵敏度分别为65.00%、80.00%、

70.00%、65.00%、90.00%,特异度分别为73.10%、71.80%、73.10%、76.90%、56.40%。NIHSS评分、APACHEIV评分、NTproBNP水平、LP-PLA2水平联合预测老年HS患者预后不良具有较高的价值(AUC为0.924),见表4、图1。

表4 ROC曲线分析评估老年HS患者预后不良的价值

Tab.4 ROC curve analysis for evaluating the value of poor prognosis in elderly HS patients

项目	截断值	灵敏度	特异度	AUC	95%CI		P
					下限	上限	
NIHSS评分	14.26分	0.650	0.731	0.794	0.675	0.914	0.000
APACHEIV评分	64.50分	0.800	0.718	0.821	0.693	0.930	0.000
NTproBNP	1256.56 pg/mL	0.700	0.731	0.830	0.722	0.938	0.000
LP-PLA2	311.97 μg/L	0.650	0.769	0.794	0.689	0.898	0.000
联合	-	0.900	0.564	0.924	0.846	1.000	0.000

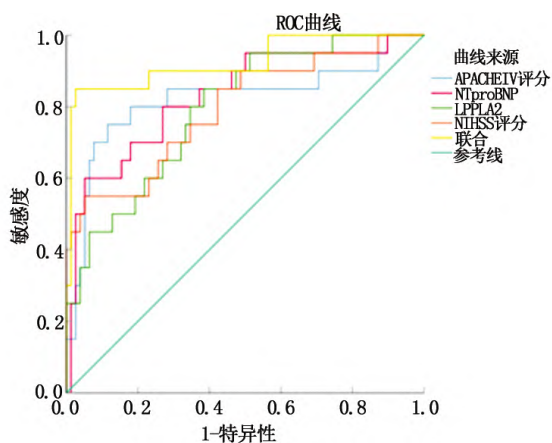


图1 ROC曲线分析评估老年HS患者预后不良的价值

Fig.1 ROC curve analysis for evaluating the value of poor prognosis in elderly HS patients

3 讨论

老年HS表现为突然口眼歪斜,全身疲乏、麻木、无力等症状,严重者可导致昏迷甚至死亡。因此,早期诊断和治疗,对提升患者生命质量具有重要意义。解晓霞等^[13]研究指出,HS患者预后不良率为20.60%。本研究纳入98例老年HS患者,预后不良率为20.41%,低于文献报道发生率,这可能与纳入样本量相关,表明老年HS患者预后不良的发生率相对较高。因此,对于此类患者,早期的识别和诊断对改善患者预后尤为重要。

APACHE评分系统包含4个不同的版本,其中APACHEIV评分是目前最新的版本。该评分主要基于患者入院24h内的相关变量,对预测医院死亡率具有较高的鉴别能力和校准度。B型脑钠肽(BNP)主要在心室肌细胞中表达,是评估心功能衰

竭程度的一个敏感指标。既往文献报告^[14]指出,机体出现组织损伤时,脑钠前体会被分解,从而产生NT-proBNP、BNP,而NT-proBNP浓度更高、半衰期更长,因此在脑组织损伤的情况下,对于疾病的评估具有更高的敏感性。LP-PLA2是磷脂酶A2c超家族的一个成员,由丝氨酸、组氨酸和天冬氨酸组成,在血液循环中,LP-PLA2主要由成熟的巨噬细胞和淋巴细胞合成并分泌。李菁等^[15]研究中指出,LP-PLA2水平变化与脑卒中患者病情、预后等密切相关。本研究经Logistic回归方程分析,结果显示:NIHSS评分、APACHEIV评分、NTproBNP、LP-PLA2水平是预测老年缺血性脑卒中患者预后不良的危险因素。APACHEIV评分通过对患者的生理指标、年龄、慢性健康状况等多方面信息的综合评价,对患者的病情严重程度和预后进行量化^[16]。APACHEIV评分越高,意味着患者的病情越严重,预后风险越高。NIHSS评分是评估急性缺血性脑卒中严重程度的一种工具,其通过评估患者神经功能缺损量化疾病的严重性^[17]。HS患者NIHSS评分高,表示有更严重的神经系统损伤,预后效果越差^[18]。NTproBNP是心脏生物标志物之一,广泛用于评估心功能和预测心血管事件^[19]。NTproBNP水平的升高通常反映了心脏负荷的增加和心功能的下降,老年HS患者中,心脏功能的状态对整体预后有着重要影响^[20-21]。LP-PLA2是一种炎症标志物,与动脉粥样硬化和心血管疾病的风险相关。LP-PLA2通过水解磷脂中的酯键,释放出溶血磷脂酸和自由脂肪酸,这些产物能够促进炎症反应和细胞黏附,进而损伤血管壁^[22]。LP-PLA2表达升高预

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示着更严重的动脉损伤,从而影响其预后状况^[23-24]。

本研究经 ROC 曲线分析,NIHSS 评分、APACHE Ⅳ 评分、NTproBNP、LP-PLA2 联合预测老年 HS 患者预后不良具有较高的价值。可见,通过深入了解上述指标变化,能更好地评估患者预后状况,从而制定更加科学合理的治疗方案,提高患者预后效果。

综上所述,NIHSS 评分、APACHE Ⅳ 评分、NTproBNP、LP-PLA2 是预测老年 HS 患者预后不良的危险因素,早期识别和纠正可逆因素有助于改善老年 HS 患者预后不良。但本研究存在一定局限性,如研究的样本量相对较小,可能影响结果的普遍性和可推广性,未来研究需要扩大样本量,以更全面地评估 APACHE Ⅳ 评分、NTproBNP、LP-PLA2 水平变化对老年 HS 患者预后转归的评估价值。

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