

APACHE II评分与老年重症肺炎 需有创机械通气患者谵妄发生的关系

裴兴华 于海明 吴艳红 周煦

410005 湖南长沙,湖南省人民医院重症医学科

通讯作者:周煦,Email:zhouxumd@163.com

DOI: 10.3760/cma.j.issn.2095-4352.2017.09.011

【摘要】 目的 探讨急性生理学与慢性健康状况评分系统 II (APACHE II) 评分与老年重症肺炎需有创机械通气(MV)患者谵妄发生的关系。方法 采用回顾性研究方法,选择2015年1月至2017年3月湖南省人民医院重症加强治疗病房(ICU)收治的行有创MV治疗的老年重症肺炎患者89例。于有创MV前24h内进行APACHE II评分;采用ICU意识模糊评估法(CAM-ICU)评估谵妄的发生,并将患者分为谵妄组与非谵妄组,记录两组患者首次谵妄发生时间、MV时间和ICU住院时间。按APACHE II评分将患者分为 ≤ 15 、16~20、21~25、26~30、31~35、36~40分6组,观察各组谵妄发生率。采用线性回归和Pearson相关法分析患者APACHE II评分与谵妄发生的相关性;绘制受试者工作特征曲线(ROC),分析APACHE II评分对谵妄发生的预测价值。结果 89例患者均纳入最终分析,其中35例发生谵妄,54例未发生谵妄,谵妄发生率为39.33%,首次谵妄发生时间为 (1.85 ± 1.30) d。谵妄组患者MV时间和ICU住院时间较非谵妄组明显延长[MV时间(d): 9.43 ± 4.77 比 6.08 ± 3.30 ,ICU住院时间(d): 14.60 ± 6.59 比 9.69 ± 4.61 ,均 $P < 0.01$],且谵妄组患者APACHE II评分较非谵妄组明显升高(分: 29.89 ± 5.45 比 21.48 ± 4.76 , $P < 0.01$)。随着APACHE II评分升高,患者谵妄发生率逐渐升高。相关分析显示:老年患者APACHE II评分与首次谵妄发生时间呈显著负相关($r = -0.411$, $P = 0.014$),与谵妄发生率呈线性正相关($r = 0.982$, $P = 0.000$),提示APACHE II评分越高,谵妄发生率越高,且首次谵妄发生越早。ROC曲线分析显示:APACHE II评分预测谵妄发生的ROC曲线下面积(AUC)为0.877;当APACHE II评分 > 27 分时,敏感度为92.59%,特异度为71.43%,阳性预测值为83.33%,阴性预测值为86.21%。结论 随APACHE II评分升高,老年重症肺炎需有创MV患者谵妄发生率逐渐升高,APACHE II评分对此类患者谵妄的发生有预测价值。

【关键词】 急性生理学与慢性健康状况评分系统 II; 肺炎,重症; 老年; 机械通气; 谵妄

基金项目:湖南省卫生计生委科研项目(B2017090)

Correlation between APACHE II scores and delirium probability of senile severe pneumonia patients undergoing invasive mechanical ventilation

Pei Xinghua, Yu Haiming, Wu Yanhong, Zhou Xu

Department of Critical Care Medicine, Hunan Provincial People's Hospital, Changsha 410005, Hunan, China

Corresponding author: Zhou Xu, Email: zhouxumd@163.com

【Abstract】 Objective To investigate the correlation between acute physiology and chronic health evaluation II (APACHE II) scores and delirium probability of senile severe pneumonia patients undergoing invasive mechanical ventilation (MV). **Methods** A retrospective study was conducted. Eighty-nine senile severe pneumonia patients undergoing invasive MV admitted to intensive care unit (ICU) of Hunan Provincial People's Hospital from January 2015 to March 2017 were enrolled. APACHE II scores were collected 24 hours before invasive MV. Consciousness assessment method-ICU (CAM-ICU) was used to diagnose delirium, and the patients were divided into delirium group and non-delirium group. The first delirium occurrence time, duration of MV and the length of ICU stay were recorded. The patients were divided into ≤ 15 , 16-20, 21-25, 26-30, 31-35, 36-40 groups according to APACHE II score, and the incidence of delirium in all groups were observed. The linear regression and Pearson correlation were used to analyze the correlation between APACHE II scores and delirium probability. Receiver operating characteristic (ROC) curve was plotted to analyze the predictive effect of APACHE II score on delirium. **Results** Eighty-nine patients were enrolled in the final analysis, of which 35 had delirium, and 54 had no delirium, with delirium incidence of 39.33%, and the first delirium occurrence time of (1.85 ± 1.30) days. The duration of MV and the length of ICU stay of delirium group were significantly higher than those of non-delirium group [duration of MV (days): 9.43 ± 4.77 vs. 6.08 ± 3.30 , length of ICU stay (days): 14.60 ± 6.59 vs. 9.69 ± 4.61 , both $P < 0.01$]. The APACHE II score in delirium group was significantly higher than that in non-delirium group (29.89 ± 5.45 vs. 21.48 ± 4.76 , $P < 0.01$). With the increase in APACHE II scores, the delirium incidence was gradually increased. Correlation analysis showed that there was a negative correlation between APACHE II scores and first delirium occurrence time ($r = -0.411$, $P = 0.014$), and a significant linear positive correlation between APACHE II scores and delirium incidence in all patients was found ($r = 0.982$, $P = 0.000$), which indicated the higher APACHE II scores, the higher delirium incidences and the earlier first delirium occurrence time was. ROC curve analysis showed that the area under ROC curve (AUC) of APACHE II scores on

predicting delirium occurrence was 0.877, when the cut-off value of APACHE II score was over 27, the sensitivity was 92.59%, the specificity was 71.43%, the positive predictive value was 83.33%, and the negative predictive value was 86.21%. **Conclusions** With the increase in APACHE II score, the incidence of delirium was increased gradually in senile severe pneumonia patients receiving invasive MV. APACHE II score played an important clinical value in evaluating the delirium probability of these patients

【Key words】 Acute physiology and chronic health evaluation II ; Severe pneumonia; Elderly; Mechanical ventilation; Delirium

Fund program: Science and Technology Planning Project of Hunan Provincial Health and Family Planning Commission (B2017090)

年龄是发生重症肺炎的危险因素之一,以老年人群发病率更高。老年重症肺炎患者起病隐匿,常伴有免疫功能低、合并症多且病死率高^[1]。早期机械通气(MV)能改善患者的动脉血气、提供呼吸支持、抑制呼吸肌疲劳,从而降低病死率^[2]。但有研究表明,谵妄的发生可延长患者MV时间和重症加强治疗病房(ICU)住院时间,甚至影响其预后和转归^[3]。目前尚缺乏客观科学的指标用于预测MV患者谵妄的发生。急性生理学与慢性健康状况评分系统II(APACHE II)是目前国际应用最广泛和权威的疾病评价系统^[4],应用APACHE II评估老年重症肺炎需MV患者谵妄的发生情况,指导制定针对性预防措施,对患者的预后和转归具有非常重要的意义。本研究通过APACHE II评分系统对老年重症肺炎需MV患者进行评估,分析其对MV患者谵妄发生的预测潜力,并探讨具体分值量化的评估价值。

1 资料与方法

1.1 研究对象:采用回顾性研究方法,选择2015年1月至2017年3月因重症肺炎收住本院ICU需气管插管MV的老年患者89例,呼吸机使用期间均应用咪达唑仑和芬太尼镇静镇痛治疗,维持Richmond躁动-镇静量表(RASS)评分在-1~2分。

1.1.1 纳入标准:①年龄>60岁;②符合美国感染性疾病学会/美国胸科学会(IDSA/ATS)制定的重症肺炎诊断标准^[5];③有创MV时间>24h。

1.1.2 排除标准:①有精神病史;②恶性肿瘤。

1.1.3 伦理学:本研究符合医学伦理学标准,经医院伦理委员会批准(审批号:2017-7),所有治疗及检测均获得过患者或家属的知情同意。

1.2 观察指标和评分:参照APACHE II评分系统^[6]对患者有创MV前24h内各项指标进行评分和统计;采用ICU意识模糊评估法(CAM-ICU)评估患者MV治疗后谵妄发生情况^[7];记录患者首次谵妄发生时间、MV时间和ICU住院时间。

1.3 统计学处理:应用SPSS 19.0统计软件对数据进行统计学分析。采用Kolmogorov-Smirnov法对

计量资料进行正态性检验,正态分布的计量资料以均数±标准差($\bar{x} \pm s$)表示,组间比较采用t检验;计数资料以率表示,组间比较采用 χ^2 检验;采用Pearson相关法分析APACHE II评分与首次谵妄发生时间的相关性;根据APACHE II评分将患者分为≤15、16~20、21~25、26~30、31~35、36~40分6组,采用线性回归和Pearson相关法分析6组APACHE II均值与谵妄发生率的相关性;绘制受试者工作特征曲线(ROC),分析APACHE II评分对谵妄发生的评估价值,并计算预测截断值。 $P < 0.05$ 表示差异有统计学意义。

2 结果

2.1 两组一般情况及临床资料比较(表1):89例有创MV老年患者均纳入分析,其中男性57例、女性32例,年龄61~80岁、平均(69.58±6.15)岁;35例患者发生谵妄,54例未发生谵妄,谵妄发生率为39.33%,首次谵妄发生时间为(1.85±1.30)d。谵妄组与非谵妄组患者性别、年龄差异无统计学意义(均 $P > 0.05$);谵妄组患者MV时间和ICU住院时间均较非谵妄组明显延长(均 $P < 0.01$)。

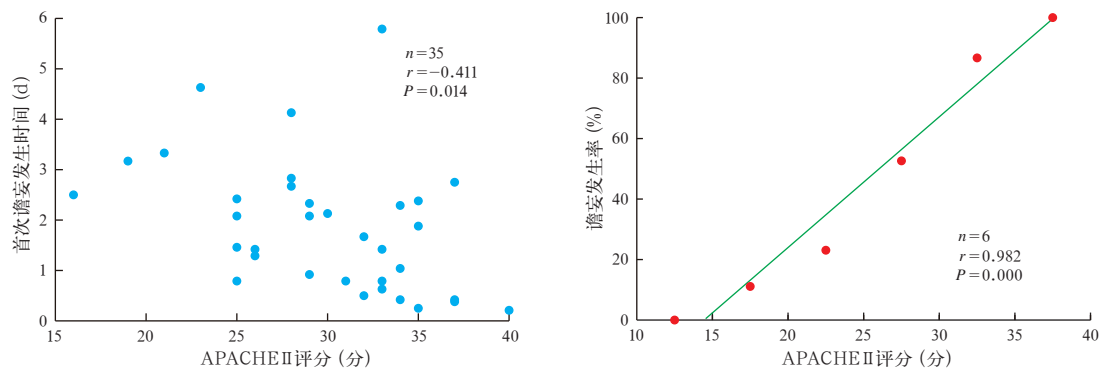
表1 是否发生谵妄两组老年重症肺炎需有创机械通气(MV)患者一般情况及临床资料比较

组别	例数	性别(例)		年龄(岁, $\bar{x} \pm s$)	MV时间(d, $\bar{x} \pm s$)	ICU住院时间(d, $\bar{x} \pm s$)
		男性	女性			
非谵妄组	54	35	19	69.37±6.29	6.08±3.30	9.69±4.61
谵妄组	35	22	13	69.91±6.02	9.43±4.77	14.60±6.59
χ^2/t 值		0.035		0.405	3.927	4.141
P 值		0.851		0.686	0.000	0.000

注:ICU为重症加强治疗病房

2.2 两组APACHE II评分比较(表2):谵妄组与非谵妄组患者APACHE II评分系统中年龄评分和慢性健康状况评分均较为接近,差异无统计学意义(均 $P > 0.05$);而谵妄组患者急性生理学评分和APACHE II评分较非谵妄组明显升高(均 $P < 0.01$)。

2.3 不同APACHE II评分患者谵妄发生率比较(表3):按照APACHE II评分分组,结果显示,随APACHE II评分升高,患者谵妄发生率也逐渐升高。



注：APACHE II 为急性生理学与慢性健康状况评分系统 II

图 1 老年重症肺炎需有创机械通气(MV)患者 APACHE II 评分与首次谵妄发生时间(左)和谵妄发生率(右)的相关性

表 2 是否发生谵妄两组老年重症肺炎需有创机械通气(MV)患者 APACHE II 评分系统指标比较(x±s)

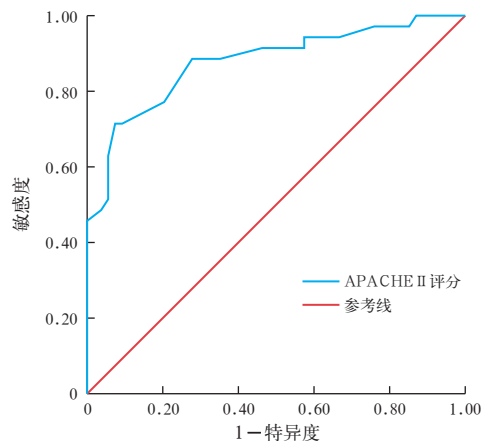
组别	例数(例)	急性生理学评分(分)	年龄评分(分)	慢性健康状况评分(分)	APACHE II 评分(分)
非谵妄组	54	12.67±4.61	4.87±1.15	3.94±1.45	21.48±4.76
谵妄组	35	21.26±5.35	5.00±1.03	3.63±1.52	29.89±5.45
t 值		8.056	0.541	-0.998	7.686
P 值		0.000	0.590	0.326	0.000

注：APACHE II 为急性生理学与慢性健康状况评分系统 II

表 3 不同 APACHE II 评分老年重症肺炎需有创机械通气(MV)患者谵妄发生率的变化

APACHE II 评分(分)	例数(例)	非谵妄(例)	谵妄(例)	谵妄发生率(%)
≤15	7	7	0	0
16~20	18	16	2	11.11
21~25	26	20	6	23.08
26~30	19	9	10	52.63
31~35	15	2	13	86.67
36~40	4	0	4	100.00

注：APACHE II 为急性生理学与慢性健康状况评分系统 II



注：APACHE II 为急性生理学与慢性健康状况评分系统 II，ROC 曲线为受试者工作特征曲线

图 2 APACHE II 评分预测老年重症肺炎需有创机械通气(MV)患者谵妄发生的 ROC 曲线

2.4 相关性分析(图 1):老年重症肺炎需有创 MV 患者 APACHE II 评分与首次谵妄发生时间呈显著负相关($r=-0.411, P=0.014$),提示 APACHE II 评分越高,首次谵妄发生越早。APACHE II 评分与谵妄发生率呈线性正相关($r=0.982, P=0.000$),提示随 APACHE II 评分升高,患者谵妄发生率也逐渐升高。

2.5 APACHE II 评分的 ROC 曲线分析(图 2): APACHE II 评分预测谵妄发生的 ROC 曲线下面积(AUC)为 0.877,标准误(s_x)为 0.040,95% 可信区间(95%CI)为 0.799~0.955; APACHE II 评分>27 分时,敏感度为 92.59%,特异度为 71.43%,阳性预测值为 83.33%,阴性预测值为 86.21%。

3 讨论

重症肺炎由肺组织炎症进展并恶化加重造成,可引起器官功能不全,甚至危及生命。老年人存在

基础疾病多、呼吸系统屏障减弱和免疫系统功能减退等特点,因此重症肺炎发生率较高,是造成老年患者死亡的主要原因之一^[8-9]。MV 是重症肺炎的重要治疗措施,能有效改善气体交换、纠正低氧血症和(或)高碳酸血症,为患者提供良好的呼吸支持^[10]。但长期 MV 在改善患者呼吸功能的同时,也容易引起谵妄,造成 MV 时间和 ICU 住院时间延长,甚至引发多器官功能障碍或死亡^[11]。谵妄是一种急性认知功能障碍的急性脑综合征,表现为意识障碍、行为无目的、注意力不集中等^[12],早期预测并采取针对性预防措施,能减少老年重症肺炎需 MV 患者谵妄的发生,降低疾病严重程度,提高疗效。APACHE II 作为目前 ICU 应用最广泛的评分系统,对许多疾病的严重程度评估、预后预测具有较好的科学价值,应用 APACHE II 评分系统预测老年重症肺炎患者 MV 后谵妄的发生,对于临床诊治具有积极的意义。

本研究显示,89 例患者中 35 例发生谵妄,发生率为 39.33%。相关分析显示,APACHE II 评分与首

次谵妄发生时间呈显著负相关,提示评分越高,谵妄发生越早。有文献报道老年MV患者谵妄发生率较高^[13]。本研究结果显示,谵妄组MV时间和ICU住院时间较非谵妄组明显延长。谵妄的发生可导致医源性肺炎、误吸、压疮等并发症发生率升高,造成MV患者脱机困难、意外拔管,导致住院时间延长和病死率增加^[14]。同时,谵妄组APACHE II评分明显高于非谵妄组,与刘春峰等^[15]报道的结果一致。

本研究结果显示,APACHE II评分系统中年龄评分和慢性健康状况评分在谵妄与非谵妄两组间无明显差异,这是由于本研究的目标人群为老年重症肺炎患者,且多伴有慢性阻塞性肺疾病(COPD)等呼吸系统疾病,或有冠心病、肝肾功能损伤和免疫功能障碍等其他系统慢性疾病,因此,年龄和慢性健康状况两项评分无差异。急性生理学评分能反映疾病严重程度,本研究显示,谵妄患者急性生理学评分和APACHE II评分较非谵妄患者更高。参照APACHE II评分将患者分组后发现,APACHE II评分与谵妄发生率呈线性正相关,提示随评分升高,患者谵妄发生率也逐渐升高。ROC曲线分析显示,APACHE II评分预测老年重症肺炎需MV患者谵妄发生的AUC为0.877,当APACHE II评分>27分时,敏感度为92.59%,特异度为71.43%,阳性预测值为83.33%,阴性预测值为86.21%,提示有创MV前24h内APACHE II评分>27分者发生谵妄的可能较大。

APACHE II评分系统包括12项生理指标、年龄和慢性健康情况,操作简单、实用性强,对预测谵妄有较强的实用价值。因为谵妄的危险因素,如疾病严重程度、年龄、基础疾病等都能通过APACHE II评分体现,医务工作者可以在APACHE II评分基础上,结合患者其他谵妄危险因素^[16],对谵妄发生风险高的老年重症肺炎需MV患者采取有针对性的预防措施,从而减少谵妄的发生,提高救治成功率。

综上,APACHE II评分能用于老年重症肺炎需MV患者谵妄发生的预测,但本研究样本量较小,仍需大样本临床研究进一步证实。另外,APACHE II临界值需要大样本的验证样本集的检验,以得出更科学客观的结果,更好地发挥其作用和价值。

参考文献

[1] 石泽亚,秦月兰,祝益民,等.纤维支气管镜肺泡灌洗联合振动排痰治疗重症肺炎机械通气患者的效果观察:一项286例患者前瞻性随机对照研究[J].中华危重病急救医学,2017,29(1):66-70. DOI: 10.3760/cma.j.issn.2095-4352.2017.01.014.
Shi ZY, Qin YL, Zhu YM, et al. Effect of bronchoalveolar lavage with fiberoptic bronchoscopy combined with vibration sputum drainage on mechanically ventilated patients with severe

pneumonia: a prospective randomized controlled trial in 286 patients [J]. Chin Crit Care Med, 2017, 29 (1): 66-70. DOI: 10.3760/cma.j.issn.2095-4352.2017.01.014.
[2] 曾慧,张珍,龚媛,等.胸肺物理治疗用于机械通气患者的疗效:一项前瞻性随机对照研究[J].中华危重病急救医学,2017,29(5):403-406,412. DOI: 10.3760/cma.j.issn.2095-4352.2017.05.004.
Zeng H, Zhang Z, Gong Y, et al. Effect of chest physiotherapy in patients undergoing mechanical ventilation: a prospective randomized controlled trial [J]. Chin Crit Care Med, 2017, 29 (5): 403-406, 412. DOI: 10.3760/cma.j.issn.2095-4352.2017.05.004.
[3] 刘丹,吕杰,安友仲.机械通气老年危重症患者谵妄及预后的危险因素分析[J].中华危重病急救医学,2016,28(11):1003-1008. DOI: 10.3760/cma.j.issn.2095-4352.2016.11.011.
Liu D, Lyu J, An YZ. Risk factors of delirium and outcomes in senile critical patients undergoing mechanical ventilation [J]. Chin Crit Care Med, 2016, 28 (11): 1003-1008. DOI: 10.3760/cma.j.issn.2095-4352.2016.11.011.
[4] 池锐彬,古伟光,梁美华,等.血清胱抑素C联合APACHE II评分对重症急性肾损伤患者诊断和预后预测的价值[J].中国中西医结合急救杂志,2016,23(4):404-407. DOI: 10.3969/j.issn.1008-9691.2016.04.016.
Chi RB, Gu WG, Liang MH, et al. Clinical value of serum cystatin C combined with APACHE II score in diagnosis and predicting prognosis of critically ill patients with acute kidney injury [J]. Chin J TCM WM Crit Care, 2016, 23 (4): 404-407. DOI: 10.3969/j.issn.1008-9691.2016.04.016.
[5] Lim WS, Baudouin SV, George RC, et al. BTS guidelines for the management of community acquired pneumonia in adults: update 2009 [J]. Thorax, 2009, 64 Suppl 3 : iii1-55. DOI: 10.1136/thx.2009.121434.
[6] Wheeler MM. APACHE: an evaluation [J]. Crit Care Nurs Q, 2009, 32 (1): 46-48. DOI: 10.1097/01.CNQ.0000343134.12071.a5.
[7] Ely EW, Inouye SK, Bernard GR, et al. Delirium in mechanically ventilated patients: validity and reliability of the confusion assessment method for the intensive care unit (CAM-ICU) [J]. JAMA, 2001, 286 (21): 2703-2710.
[8] Chong CP, Street PR. Pneumonia in the elderly: a review of severity assessment, prognosis, mortality, prevention, and treatment [J]. South Med J, 2008, 101 (11): 1134-1140; quiz 1132, 1179. DOI: 10.1097/SMJ.0b013e31818247f1.
[9] 莫新,唐皓,曾丽金,等.血清胆碱酯酶含量对重症肺炎患者病情和预后的评估价值[J].中华危重病急救医学,2016,28(1):38-43. DOI: 10.3760/cma.j.issn.2095-4352.2016.01.008.
Mo X, Tang H, Zeng LJ, et al. The value of determination of serum cholinesterase levels in judgment of severity and prognosis in patients with severe pneumonia [J]. Chin Crit Care Med, 2016, 28 (1): 38-43. DOI: 10.3760/cma.j.issn.2095-4352.2016.01.008.
[10] 蒋翠霞.血浆脑钠肽前体和降钙素原水平检测在机械通气脱机中的应用分析[J].实用检验医师杂志,2016,8(2):103-105. DOI: 10.3969/j.issn.1674-7151.2016.02.012.
Jiang CX. Application of pro-brain natriuretic peptide and procalcitonin levels detection in the ventilation offline [J]. Chin J Clin Pathol, 2016, 8 (2): 103-105. DOI: 10.3969/j.issn.1674-7151.2016.02.012.
[11] Mehta S, Cook D, Devlin JW, et al. Prevalence, risk factors, and outcomes of delirium in mechanically ventilated adults [J]. Crit Care Med, 2015, 43 (3): 557-566. DOI: 10.1097/CCM.0000000000000727.
[12] 郭晋平,冯顺易.右美托咪定减少重症加强治疗病房谵妄发生率及延长谵妄出现时间的研究[J].中国中西医结合急救杂志,2016,23(2):193-195. DOI: 10.3969/j.issn.1008-9691.2016.02.022.
Guo JP, Feng SY. Dexmedetomidine reduces the incidence of delirium and the duration of delirium in intensive care unit [J]. Chin J TCM WM Crit Care, 2016, 23 (2): 193-195. DOI: 10.3969/j.issn.1008-9691.2016.02.022.
[13] Gleason LJ, Schmitt EM, Kosar CM, et al. Effect of delirium and other major complications on outcomes after elective surgery in older adults [J]. JAMA Surg, 2015, 150 (12): 1134-1140. DOI: 10.1001/jamasurg.2015.2606.
[14] Hsieh SJ, Soto GJ, Hope AA, et al. The association between acute respiratory distress syndrome, delirium, and in-hospital mortality in intensive care unit patients [J]. Am J Respir Crit Care Med, 2015, 191 (1): 71-78. DOI: 10.1164/rccm.201409-16900C.
[15] 刘春峰,姚炳荣,徐爱明,等. APACHE II评分预测ICU有创机械通气患者谵妄的应用研究[J/CD].中华临床医师杂志(电子版),2015,9(8):1344-1347. DOI: 10.3877/cma.j.issn.1674-0785.2015.08.015.
Liu CF, Yao BR, Xu AM, et al. Research on APACHE II scores predicting delirium incidence of patients receiving invasive mechanical ventilation in ICU [J/CD]. Chin J Clin (Electron Ed), 2015, 9 (8): 1344-1347. DOI: 10.3877/cma.j.issn.1674-0785.2015.08.015.
[16] Zaal IJ, Devlin JW, Peelen LM, et al. A systematic review of risk factors for delirium in the ICU [J]. Crit Care Med, 2015, 43 (1): 40-47. DOI: 10.1097/CCM.0000000000000625.
(收稿日期:2017-01-09)