·临床研究·

早期腹内压水平对急性重症胰腺炎患者并发急性肾损伤的预测价值

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【摘 要】 **目的** 探讨早期腹内压(IAP)水平对急性重症胰腺炎(SAP)患者并发急性肾损伤(AKI)的预测价值。**方法** 选取2016年1月至2017年9月由上海市宝山区中西医结合医院急诊科收入重症监护室的SAP患者60例,根据患者入院后72 h内早期IAP水平,以连续2次IAP水平高于12 mmHg(1 mmHg=0.133 kPa)为标准,将患者分为高腹内压(IAH)组和非高腹内压(non-IAH)组。收集并比较2组患者间一般资料、AKI发生情况及行连续肾脏替代疗法(CRRT)比例差异。采用受试者工作特征(ROC)曲线分析早期IAP水平对SAP患者并发AKI的预测价值。采用SPSS 17.0软件进行统计分析。根据数据类型,组间比较采用 t 检验或 χ^2 检验。**结果** IAH组患者肿瘤坏死因子-α[(2.30±0.79) *vs* (1.88±0.55)mg/ml, $P=0.04$]及白细胞介素-6[(217.04±77.16) *vs* (178.86±60.93)ng/L, $P=0.02$]水平显著高于non-IAH组,差异有统计学意义。IAH组患者AKI[45.8%(11/24) *vs* 16.7%(6/36), $P=0.02$]、行CRRT比例[29.2%(7/24) *vs* 5.6%(2/36), $P=0.02$]明显高于non-IAH组。早期IAP水平预测SAP患者并发AKI的ROC曲线下面积为0.728 (*OR*=4.231, 95% *CI* 1.289~13.889; $P<0.05$);早期IAP水平最佳截断点为12 mmHg,灵敏度为82.4%,特异度为34.9%,具有中度准确性。**结论** 早期IAP水平升高对SAP患者并发AKI具有预测价值,可用于评估SAP患者的AKI发生风险。

【关键词】 急性重症胰腺炎;腹内压水平;急性肾损伤
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Predictive value of early phase intra-abdominal pressure for severe acute pancreatitis complicated with acute kidney injury

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【**Abstract**】 **Objective** To investigate the predictive value of early phase intra-abdominal pressure (IAP) for severe acute pancreatitis (SAP) complicated with acute kidney injury (AKI). **Methods** A total of 60 SAP patients were enrolled in this study who were treated in the Intensive Care Unit of the Emergency Department in our hospital from January 2016 to September 2017. The patients were divided into intra-abdominal hypertension (IAH) group and non-intra-abdominal hypertension (non-IAH) group, depending on whether 2 consecutive IAP measurements were higher than 12 mmHg (1 mmHg=0.133 kPa) within 72 h after admission. The 2 groups were then compared in the baseline data, incidence of AKI and proportion of continuous renal replacement therapy (CRRT). Receiver operating characteristic (ROC) curve was employed to analyze the predictive value of IAP in the early phase of SAP for AKI. SPSS statistics 17.0 was used for analysis. Student's t test or Chi-square test was conducted for the comparison according to the data type. **Results** The IAH group had significantly higher readings than the non-IAH group in tumor necrosis factor-α [(2.30±0.79) *vs* (1.88±0.55)mg/ml, $P=0.04$] and interleukin-6 [(217.04±77.16) *vs* (178.86±60.93)ng/L, $P=0.02$], and the difference was statistically significant. AKI [45.8%(11/24) *vs* 16.7%(6/36), $P=0.02$] and CRRT [29.2%(7/24) *vs* 5.6%(2/36), $P=0.02$] were significantly higher in the former than in the latter. The area under ROC curve was 0.728 (*OR*=4.231, 95% *CI* 1.289-13.889, $P<0.05$) for IAP in the early phase of SAP in predicting AKI; the cut-off point of the IAP in the early phase of SAP was 12 mmHg with a sensitivity of 82.4% and a specificity of 34.9% and had a moderate accuracy. **Conclusion** Elevated IAP in the early phase of SAP has predictive value for AKI and can be used to assess the risk of AKI.

【**Key words**】 severe acute pancreatitis; intra-abdominal pressure; acute kidney injury

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急性重症胰腺炎(severe acute pancreatitis, SAP)是临床常见的急腹症之一,是由于胰酶激活引发的全身炎症反应综合征(systemic inflammatory response syndrome,SIRS)和多器官功能障碍综合征(multiple organ dysfunction syndrome,MODS),病死率高。其中肾脏是常见的受损器官之一,其损伤的发生率仅次于肺脏,为14%~43%,但病死率高至71%~84%[1]。SAP合并急性肾损伤(acute kidney injury,AKI)是患者早期死亡的重要原因[2],但SAP相关性肾损伤的发病机制尚未完全明确,目前认为有效循环血量不足、肾脏血流动力学异常是其主要原因[3]。SAP常导致患者毛细血管通透性增加、腹腔内脏器官水肿、大量坏死组织形成及大量腹腔渗液等,引起腹内压(intra-abdominal pressure,IAP)水平增高。研究证实腹腔高压、腹腔间隔室综合征是肾损伤的重要因素[4],需要及时治疗。本研究选取SAP患者60例,探讨早期IAP水平对AKI发生的诊断作用,为临床医师尽早防御SAP患者并发AKI提供参考。

1 对象与方法

1.1 研究对象

选取2016年1月至2017年9月上海市宝山区中西医结合医院急诊科收入重症监护室住院的SAP患者60例,其中男性31例,女性29例,年龄(59.2±12.8)岁。SAP诊断标准符合中华医学会外科学分会胰腺外科学组《急性胰腺炎诊治指南(2014)》的分级标准[5]。排除标准:(1)入院时或入院后72 h内行呼吸机辅助治疗;(2)入院时或入院后72 h内需急诊手术治疗;(3)发病时间>2 d;(4)原发的肝肾功能衰竭需行替代治疗(肾脏移植、透析疗法、肝移植、人工肝和肝细胞移植治疗)。根据患者入院72 h内IAP水平进行分组,以连续2次IAP水平高于12 mmHg(1 mmHg=0.133 kPa)为标准,分为高腹内压(intra-abdominal hypertension, IAH)组($n=24$)和非高腹内压(non-intra-abdominal hypertension, non-IAH)组($n=36$)。入选者均签署知情同意书。

1.2 方法

(1)记录患者年龄、性别、既往病史、急性生理与慢性健康状况评分系统Ⅱ(acute physiology and chronic health evaluation Ⅱ,APACHE Ⅱ)及生化指标等一般资料。(2)测量IAP。入院后采用间接方法(测量膀胱内压)测量入选患者IAP水平。患者每4 h检测膀胱内压,持续72 h。具体方法:患者平卧,在无菌下进行操作,经尿道插入Forley导尿管,排空膀胱后,将50~100 ml无菌等渗盐水经导尿管注入膀胱内,夹闭导尿管,连接导尿管与集尿袋,在导尿管与集尿袋之间连接"T"型管或三通接头,接压力计进行测定,以耻骨联合处为调零点,测得水柱高度即为压力值,记录最高IAP水平。(3)AKI的判断。患者入院当天起每48 h检测血肌酐(serum critinine, SCr),每6 h收集患者尿液统计其尿量。AKI的诊断标准根据2012年改善全球肾脏病预后组织(Kidney Disease: Improving Global Outcomes,KDIGO)制定的RIFLE(Risk, Injury, Failure, Loss and End-stage renal failure)分级诊断标准[6]:48 h内SCr增高≥26.5 μmol/L;或SCr增高至基础值1.5倍及以上;且是已知或经推断发生在入院7 d之内;或持续6 h尿量<0.5 ml/(kg·h)。(4)记录AKI发生及行连续肾脏替代疗法(continuous renal replacement therapy,CRRT)患者例数。观察终点为患者治疗后转出ICU或死亡。

1.3 统计学处理

采用SPSS 17.0软件进行统计分析。计量资料以均值±标准差($\bar{x}\pm s$)表示,组间比较采用t检验;计数资料以百分率表示,组间比较采用χ^2检验。采用受试者工作特征(receiver operating characteristic, ROC)曲线分析早期IAP对SAP患者并发AKI的预测价值。$P<0.05$为差异有统计学意义。

2 结 果

2.1 2组患者一般资料比较

2组患者性别、年龄、高血压病史、糖尿病史、APACHE Ⅱ评分及入院时SCr、血尿素氮(blood urea nitrogen, BUN)、血丙氨酸转氨酶(alanine aminotransferase,ALT)、血白蛋白(albumin,ALB)水平差异无统计学意义($P>0.05$)。IAH组患者肿瘤坏死因子-α(tumor necrosis factor-α,TNF-α)及白细胞介素-6(interleukin-6, IL-6)水平显著高于non-IAH组,差异有统计学意义($P<0.05$;表1)。

2.2 2组AKI发生及行CRRT情况比较

IAH组患者11例(45.8%)发生AKI,7例(29.2%)行CRRT,non-IAH组患者6例(16.7%)发生AKI,2例(5.6%)行CRRT,2组AKI发生比例($P=0.02$)及行CRRT比例($P=0.02$)差异均有统计学意义。

2.3 早期IAP水平对SAP患者并发AKI的预测

以早期IAP水平为检验变量,以SAP患者并发AKI为状态变量,建立ROC曲线。结果显示,ROC

表1 2组患者一般资料比较

Table 1 Comparison of baseline data between IAH group and non-IAH group

Item	IAH group (n=24)	Non-IAH group (n=36)	P value
Age(years, $\bar{x}\pm s$)	57.9±14.7	60.1±11.5	0.10
Gender(male/female, n)	11/13	20/16	0.46
History of hypertension[n(%)]	15(62.5)	20(55.6)	0.59
History of diabetes[n(%)]	9(37.5)	15(41.7)	0.75
APACHE Ⅱ(score, $\bar{x}\pm s$)	22.17±4.69	20.67±4.20	0.68
SCr(μmol/L, $\bar{x}\pm s$)	71.92±22.42	71.08±21.26	0.97
BUN(mmol/L, $\bar{x}\pm s$)	8.39±2.36	7.53±2.21	0.57
ALT(U/L, $\bar{x}\pm s$)	42.50±23.02	48.69±22.31	0.93
ALB(g/L, $\bar{x}\pm s$)	35.25±5.53	32.22±4.82	0.24
TNF-α(mg/ml, $\bar{x}\pm s$)	2.30±0.79	1.88±0.55	0.04
IL-6(ng/L, $\bar{x}\pm s$)	217.04±77.16	178.86±60.93	0.02

IAH: intra-abdominal hypertension; APACHE Ⅱ: acute physiology and chronic health evaluation Ⅱ; SCr: serum creatinine; BUN: blood urea nitrogen; ALT: alanine aminotransferase; ALB: albumin; TNF-α: tumor necrosis factor-α; IL-6: interleukin-6

曲线下面积为0.728(OR=4.231,95% CI 1.289~13.889;P<0.05),具有中等[7]准确性。其早期IAP最佳截断点为12 mmHg,预测SAP患者并发AKI的灵敏度为82.4%,特异度为34.9%(图1)。

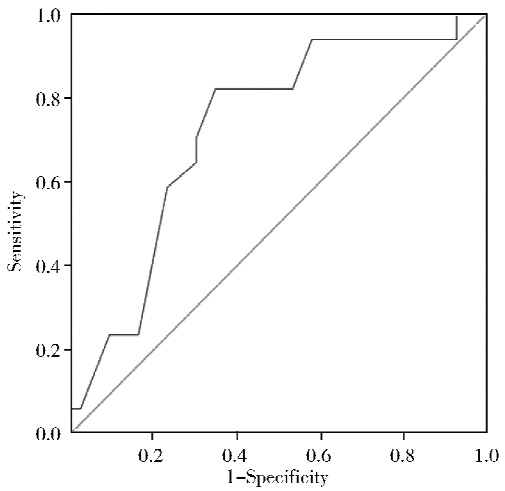


图1 早期腹内压水平预测SAP患者并发AKI的ROC曲线

Figure 1 ROC curve of early intra-abdominal pressure for prediction of AKI in SAP patients

SAP: severe acute pancreatitis; AKI: acute kidney injury; ROC: receiver operating characteristic

3 讨 论

腹腔与外界相对隔绝,正常人的IAP为0~5 mmHg。任何引起腹腔内容物增加的因素都可增加IAP水平,其主要表现为腹胀、腹肌紧张、低血压、气道压力升高、高碳酸血症和少尿等。IAP达到12 mmHg时,绝大多数器官的功能均受到不同程度损害[8],其中最易累及心血管系统、泌尿系统及呼吸系统。

SAP发病迅速,病情复杂,死亡率高。控制胰腺局部及全身炎症,改善脏器功能是治疗SAP的关键。患者发生SAP时胰腺、胰周、腹膜后组织水肿、坏死,腹腔内渗液增加并发生继发性肠麻痹,IAP开始升高,引起腹腔内高压症。而IAH可使下腔静脉、肾静脉和肾脏直接受压,导致血浆肾素活性、醛固酮水平增加,外周血管收缩,加重肾脏水肿,引起AKI[9]。本研究中2组患者早期肝肾功能无显著性差异,但IAH组患者TNF-α及IL-6水平高于non-IAH组,提示SAP早期不仅有大量炎症介质释放,还随着IAP升高而增加,而这可能会引起全身毛细血管通透性增加,肾血流量下降,亦有可能会引发AKI[10]。

CRRT是AKI的主要治疗方法,通过清除过度生成的炎性因子及SCr、BUN,使机体免疫系统恢复平衡,增加抗炎因子的合成,减轻机体过度的炎症反应[11]。Pupelis等[12]研究提示,早期CRRT可以促进体液平衡,降低胰腺炎患者IAP,且不会增加感染率。本组资料中,IAH组患者AKI发生率、行CRRT比例明显高于non-IAH组,提示SAP患者早期IAP水平可能与肾功能指标相关,导致有较多患者行CRRT,因此IAP对预测SAP患者肾功能的变化可能有一定意义。进一步采用ROC曲线分析SAP患者早期IAP水平对AKI的预测作用,结果显示SAP早期IAP水平对AKI预测的灵敏度较高(82.4%),具有中等准确性,且截断点是12 mmHg,提示早期IAP水平对SAP患者急性肾损伤的预测效果良好。因此,对于早期IAP升高的SAP患者需要及时进行AKI检测及尿量的观察,以便发现患者的肾功能动态变化,预防AKI的发生。

综上,SAP患者早期IAP水平升高,对AKI有一定的预测价值。但由于本研究样本量较小,观察

时间较短,且属于单中心研究,有必要扩大样本量,适当延长观察时间,并进行多中心的深入研究。

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