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改良 HEART 评分法对急诊胸痛患者分层治疗的指导价值研究 *

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摘要 目的:研究改良 HEART 评分法对急诊胸痛患者分层治疗的指导价值。**方法:**选择我院急诊科收治的急性胸痛患者 197 例,根据疾病分为心源性胸痛组(n=132)和非心源性胸痛组(n=65),所有患者均行改良 HEART 评分和传统 HEART 评分,并根据评分进行危险分层,比较患者去向,建立受试者工作特征(ROC)曲线,评价 HEART 评分对危险分层和预后预测的价值。**结果:**心源性胸痛组改良 HEART 评分和常规 HEART 评分均高于非心源性胸痛组,两组改良 HEART 评分和常规 HEART 评分比较差异有统计学意义($P<0.05$)。改良 HEART 评分低危者 100%未住院,中危 62.71%住院,高危住院、入 ICU 的构成比例为 73.17%、36.59%;HEART 评分低危 11.11%住院,中危住院、入 ICU 的构成比例为 57.38%、6.56%,高危住院、入 ICU 的构成比例为 68.57%、31.43%,差异有统计学意义($P<0.05$)。改良 HEART 评分用于对心源性胸痛患者分层的 AUC 值为 0.916,敏感度为 0.883,明显高于 HEART 评分的 0.831 和 0.765。**结论:**改良 HEART 评分法可提高急诊胸痛患者分层的准确性,对指导患者去向和治疗价值较高。

关键词:改良 HEART 评分法;急诊;胸痛;分层治疗;指导价值

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A Study on the Guiding Value of the Improved HEART Grading Method for the Treatment of Patients with Emergency Chest Pain*

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ABSTRACT Objective: To study the guiding value of the improved HEART score in treating patients with acute chest pain. **Methods:** 197 cases of patients with acute chest pain in our hospital emergency department were selected and divided into the cardiac chest pain group (n=132) and the non cardiac chest pain group (n=65) according to the cause of disease, all the patients were given improved HEART scoring and conventional HEART scoring, risk stratification according to the HEART score the destination was compared between the two groups of patients, the receiver-operating characteristic (ROC) curve was build to evaluate the value of improved HEART scoring for the risk stratification and prognosis. **Results:** The improved HEART score and HEART score of cardiac chest pain group were higher than those of the non cardiac chest pain group ($P<0.05$). 100% patients with low risk of improved HEART score was not hospitalized, and 62.71% of the patients were hospitalized, the proportion of high-risk hospitalization and ICU were 73.17% and 36.59%. The proportion of hospitalized patients admitted to the ICU were 57.38% and 6.56%, and the proportion of high-risk hospitalization and ICU were 68.57% and 31.43% ($P<0.05$). The AUC value of improved HEART score for risk stratification of patients with cardiac chest pain was 0.916 and the sensitivity was 0.883, which was significantly higher than of the HEART score (0.831 and 0.765). **Conclusion:** The improved HEART score can improve the accuracy of risk stratification for the emergency chest pain patients, and it is of high value in guiding patients' prognosis and treatment.

Key words: Improved HEART grading method; Emergency; Chest pain; Stratification treatment; Guidance value

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前言

胸痛是急诊科的常见急症,据统计,各级医院急诊内科就诊患者中,5%-30%主诉为胸痛,特别是三级医院胸痛为主诉的患者占 20%-30%^[9-11]。胸痛的病因繁多,患者病情严重性悬殊极大,如不能准确分层及时处理,会导致预后不良^[1]。据统计,在我国约有 7%有急性心肌梗死表现的患者未得到准确诊断而被漏诊^[2],而漏诊患者的死亡率较高,可达 25%^[3]。目前,我国二、三

级医院急诊工作较繁忙,高峰期经常存在拥挤现象,部分患者候诊时间较长,进一步增加了危重患者潜在的医疗风险^[4,5]。因此,急诊患者快速、准确的评价方法成一直是急诊医学研究的热点。

我院急诊科虽有“胸痛中心”由医生直接诊治胸痛患者,省略了分诊台护士评估环节,为患者赢得了宝贵的时间,采用传统的胸痛五因子 HEART 评分系统虽可评价患者的病情,但在分层和去向指导上敏感性较差,特别是对不典型胸痛患者的

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判断存在较大偏差^[6]。为此,本研究采用改良 HEART 评分法,增加了随机血糖和糖化血红蛋白两种指标检测,现对其分层指导价值进行评价,现报道如下。

1 资料与方法

1.1 一般资料

选择我院急诊科 2016 年 1 月 -2017 年 8 月收治的急性胸痛患者 197 例,根据胸痛病因分组,心源性胸痛组 132 例,男 81 例,女 51 例,年龄 41-76 岁,平均年龄(63.7±11.6)岁,其中急性冠脉综合征 124 例,急性心肌炎 3 例,主动脉夹层 5 例;非心源性胸痛组 65 例,男 40 例,女 25 例,年龄 42-74 岁,平均年龄(65.1±10.4)岁,自发性气胸 17 例,肋神经、肋软骨炎 8 例,皮下蜂窝组织炎 5 例,纵膈气肿 11 例,其它 19 例。两组年龄、性别比较差异无统计学意义($P>0.05$)。

1.2 研究方法

197 例急性胸痛患者均直接送至“胸痛中心”就诊,详细询问病情、病史等,完善相关检查,包括心电图、肌钙蛋白水平、随机血糖及糖化血红蛋白等检测后,由胸痛医生分别采用改良 HEART 评分法和传统的 HEART 评分,根据评分进行危险分层,并跟踪患者去向(离院、专科病房住院、ICU)和预后(存活、死亡),建立受试者工作特征(ROC)曲线,比较改良 HEART 评分法和传统的 HEART 评分在危险分层和预后上的 AUC 值、敏

感度、特异度,计算改良 HEART 评分入 ICU 及死亡截断值。

1.3 分层标准

HEART 评分范围 0-7 分,分层标准如下:低危 0-2 分,中危 3-4 分,高危 5-7 分^[7];改良 HEART 评分范围 0-10 分,分层标准如下:低危 0-3 分,中危 4-6 分,高危 7-10 分^[8]。

1.4 统计学方法

应用 SPSS13.0 统计软件进行数据分析,计量资料以($\bar{x}\pm s$)表示,采用 t 检验,计数资料采用 χ^2 检验,等级组间比较采用 Wann-Whitney 秩和检验,以 $P<0.05$ 为差异有统计学意义。建立受试者工作特征 (ROC) 曲线,评价改良 HEART 评分和 HEART 评分 ROC 曲线下面积 AUC 值, >0.9 为准确性较高; $0.7-0.9$ 为有一定的准确性; $0.5-0.7$ 为准确性较低; $=0.5$ 为无诊断价值。

2 结果

2.1 心源性和非心源性胸痛患者两种评分系统评分的比较

心源性胸痛组患者改良 HEART 评分和 HEART 评分均明显高于非心源性胸痛组,差异有统计学意义($P<0.05$)。心源性胸痛组改良 HEART 评分和 HEART 评分比较差异有统计学意义($P<0.05$)。非心源性胸痛组改良 HEART 评分和 HEART 评分比较差异无统计学意义($P>0.05$)。详见表 1。

表 1 心源性和非心源性胸痛患者改良 HEART 评分和 HEART 评分比较[分, $\bar{x}\pm s$]

Table 1 Comparison of the improved HEART score and HEART score between cardiogenic and non-cardiogenic chest pain patients[scores, $\bar{x}\pm s$]

Group	HEART score	Improved HEART score	P
Non-cardiogenic chest pain group(n=65)	2.63±0.42	2.77±0.51	0.893
Cardiogenic chest pain group(n=132)	4.82±0.76	6.31±1.24	0.011
P	0.007	0.000	-

2.2 心源性胸痛患者两种评分危险分层治疗及心脏事件比较

改良 HEART 评分危险分层经秩和检验,准确性高于

HEART 评分,差异有统计学意义($P<0.05$)。两组评分法危险分层患者预后差异无统计学意义($P>0.05$)。详见表 2。

表 2 心源性胸痛患者两种评分危险分层患者去向及预后比较[例(%)]

Table 2 Comparison of the whereabouts and prognosis of patients with cardiogenic chest pain between two types of risk stratification[n(%)]

Scoring method	Risk stratification	n	Whereabouts			Prognosis	
			Out of the hospital	In the hospital	In the ICU	Survival	Death
HEART score	Low risk	36	32 (88.89)	4 (11.11)	0 (0.00)	36 (100.00)	0 (0.00)
	In a crisis	61	22 (36.07)	35 (57.38)	4 (6.56)	60 (98.36)	1 (1.64)
	At high risk of	35	0 (0.00)	24 (68.57)	11 (31.43)	32 (91.43)	3 (8.57)
Improved HEART score	Low risk	32	32 (100.00)	0 (0.00)	0 (0.00)	32 (100.00)	0 (0.00)
	In a crisis	59	22 (37.29)	37 (62.71)	0 (0.00)	59 (100.00)	0 (0.00)
	At high risk of	41	0 (0.00)	26 (73.17)	15 (36.59)	37 (90.24)	4 (9.76)

2.3 两种评分对心源性胸痛患者分层的价值比较

改良 HEART 评分对分层治疗的 ROC 曲线下面积 AUC 值为 0.916, 敏感度为 0.883, 高于 HEART 评分的 0.831 和 0.765, 改良 HEART 评分和 HEART 评分对预后评估的 AUC 值、敏感性无显著差异。改良 HEART 评分入 ICU 截断值为 6.58, 预后截断值为 7.51。详见表 3、表 4, ROC 曲线见图 1、图 2。

3 讨论

肿瘤、外伤、各种炎症及理化因素刺激脊髓后根传入纤维、肋间神经、支配心脏及主动脉的感觉纤维等均可引起胸痛^[12-14]。根据胸痛的病因可分为心源性胸痛和非心源性胸痛^[15]。引起胸痛的心源性疾病有急性冠脉综合征、急性心肌炎、主动脉夹层等;引起非心源性胸痛的原因主要有胸膜、神经、肺、胃肠道、骨骼肌肉等^[16-18]。胸痛的临床表现多样而复杂,临床危险性存在较大差别。传统的 HEART 评分系统五因子分别为年龄、病史、危

险因素、心电图及肌钙蛋白水平,是 2008 年由荷兰学者创立的一种非创伤性胸痛甄别评分系统^[19,20],在区别心源性胸痛和非心源性胸痛上敏感性较高,但对心源性胸痛的进一步分层上准确性较差,尤其是存在潜在危险的危重胸痛患者,表面上并无明显的某一器官衰竭表现,但如不能准确分层并采取有效的干

预,病情可能会在数小时或数天后恶化,给治疗造成困难甚至危及生命。因此,有必要对 HEART 评分系统进行改良,使之在较短的时间对急诊胸痛患者的危险程度做出正确的评估,快速筛查出高危患者并及时分流,对患者的预后有积极的意义。

表 3 改良 HEART 评分和 HEART 评分对分层治疗评估的价值

Table 3 The value of improved HEART score and HEART score for stratified treatment evaluation

Indicators	AUCvalue	95%CI	Sensitivity	Specific degrees	ICU Cutoff value
HEART score	0.831	0.645-0.727	0.765	0.628	-
Improved HEART score	0.916	0.738-0.914	0.883	0.642	6.58

表 4 改良 HEART 评分和 HEART 评分对预后评估的价值

Table 4 The value of improved HEART score and HEART score for prognosis assessment.

Indicators	AUCvalue	95%CI	sensitivity	Specific degrees	Prognosis Cutoff value
HEART score	0.842	0.628-0.827	0.792	0.671	-
Improved HEART score	0.871	0.642-0.836	0.823	0.683	7.51

国外大标本研究显示随机血糖与 30 天死亡率、12 个月死亡率呈明显线性关系^[21]。法国一项大样本研究显示^[22]33.1%的非糖尿病急性冠脉综合征患者入院随机血糖 >7.9 mmol/L,而且调查显示非糖尿病急性冠脉综合征患者血糖升高,死亡的风险也随之增加^[23-26]。因此,血糖和糖化血红蛋白是心血管病的独立危险因素。改良 HEART 评分法增加了随机血糖和糖化血红蛋白两种指标检测^[27-29]。本研究对我院急诊科收治的急性胸痛患者分别采用改良 HEART 评分法后,再行传统的 HEART 评分,结果显示心源性胸痛组患者改良 HEART 评分和 HEART 评分均明显高于非心源性胸痛组,说明两种评分法均可准确判断病因。但改良 HEART 评分危险分层准确性高于 HEART 评分,且改良 HEART 评分对分层治疗的 ROC 曲线下面积 AUC 值为 0.916,高于 HEART 评分的 0.831,敏感度为 0.883,高于 HEART 评分的 0.765,说明改良 HEART 评分较之传统的 HEART 评分对指导分层治疗更具临床价值。

改良 HEART 评分是在 HEART 评分基础上进一步完善的适用于急诊胸痛患者的评分系统,对诊断和治疗均有指导价值。林松梅等^[30]评价了改良 HEART 评分对急诊胸痛的分层价值,认为改良 HEART 评分对鉴别心源性胸痛、非心源性胸痛、急性心肌梗死及预测心血管事件上有较高的价值,本研究结果与林松梅等研究结果基本相符。本研究应用改良 HEART 评分除预测患者去向和预后外,还根据胸痛患者危险分层分流,采取不同的处理策略,提供不同的通道,及时安排相应的检查,如低危、中危患者安排心电图和冠脉 CT 检查,阴性患者基本可排除冠心病诊断;阳性患者进一步行冠脉造影确诊,避免漏诊。高危患者开通绿色通道,直接行冠脉造影,明确是否患有冠心病,以免错过最佳治疗时间窗,也避免先行无创检查,实现医疗资源的合理配置,将有效资源用于高危患者的诊治。

综上所述,本研究结果表明改良 HEART 评分增加随机血糖和糖化血红蛋白水平,分层的准确性明显提高,而且随机血糖和糖化血红蛋白检测容易、经济可行,可很快得到检验结果,适应急诊的需求。本研究中改良 HEART 评分对入 ICU 截断值

为 6.58,预后截断值为 7.51,据此可快速筛查出心源性胸痛危重症患者,提高急诊胸痛救治的及时性和准确性。

参考文献(References)

- [1] 谷松涛,吴琦.B 型钠尿肽对次大面积肺血栓栓塞症危险分层、治疗及预后评估的临床意义[J].天津医药,2012,40(2): 114-117
Gu Song-tao, Wu Qi. Clinical Significance of BNP for Risk Stratification, Treatment and Prognosis in Submassive PTE [J]. Tianjin pharmaceutical, 2012, 40(2): 114-117
- [2] 江慧琳,陈晓辉.重视急性胸痛的危险分层,优化急性胸痛管理流程[J].中华急诊医学杂志,2015,24(7): 700-703
Jiang Hui-lin, Chen Xiao-hui. To emphasize the risk stratification of acute chest pain and optimize the management process of acute chest pain[J]. Chinese journal of emergency medicine, 2015, (7): 700-703
- [3] Patel M R, Peterson E D, Dai D, et al. Low diagnostic yield of elective coronary angiography [J]. New England Journal of Medicine, 2010, 362(10): 886-895
- [4] 杨新春,张大鹏.心血管急救(2)急性胸痛的诊断与鉴别诊断[J].中国循环杂志,2013,28(8): 569-571
Yang Xin-chun, zhang da-peng. Cardiovascular emergency treatment (2) the diagnosis and differential diagnosis of acute chest pain [J]. Chinese Circulation Journal, 2013, 28(8): 569-571
- [5] 尹红军,刘杰,董晖,等.急诊非 ST 抬高急性冠脉综合征患者的分层诊断[J].中国急救复苏与灾害医学杂志,2014,(4): 308-310
Yin Hong-jun, Liu Jie, Dong Hui, et al. Hierarchical diagnosis of non-ST-elevation acute coronary syndrome in emergency room [J]. China first aid recovery and disaster medicine journal, 2014, (4): 308-310
- [6] 王琦,李虎,欧东波,等.胸痛中心急救护理流程的建立及在急诊经皮冠状动脉介入治疗中的应用[J].安徽医药,2017,(6): 1144-1147
Wang Qi, Li Hu, Ou Dong-bo, et al. Establishment and application of emergency nursing process in the center of chest pain on the emergency percutaneous coronary intervention [J]. Anhui medicine, 2017, (6): 1144-1147
- [7] 周洪峰,王秀杰.急性非创伤性胸痛危险分层评分的研究进展[J].医

- 学综述, 2016, 22(18): 3614-3617, 3618
- Zhou Hong-feng, Wang Xiu-jie. The Research Progress of Risk Stratification Score for Acute Non-traumatic Chest Pain[J]. Medical review, 2016, 22(18): 3614-3617, 3618
- [8] 郭武松, 刘亚辉, 邓庆才. 高血压病患者脉压与冠心病危险性的相关性研究[J]. 心血管病防治知识, 2016, (5): 9-11
- Guo Wu-song, Liu Ya-hui, Deng Qing-cai. Correlation between pulse pressure and risk of coronary artery disease in patients with hypertension [J]. Knowledge of cardiovascular disease prevention, 2016, (5): 9-11
- [9] Pryor D B, Shaw L, Mc CANTS C B, et al. Value of the history and physical in identifying patients at increased risk for coronary artery disease[J]. Annals of internal medicine, 2003, 118(2): 81-90
- [10] 彭继仁, 葛莹. 联合检测和肌钙蛋白 T 对急性心肌梗死早期诊断的价值[J]. 中国循环杂志, 2014, (10): 772-775
- Peng Ji-ren, Ge Xuan. Diagnostic Value of Combined Examination of Copeptin and High Sensitivity Cardiac Troponin T in Patients at Early Stage of Acute Myocardial Infarction [J]. China circulation journal, 2014, (10): 772-775
- [11] 王明晓, 薛军. 急诊胸痛患者临床分析[J]. 中国急救复苏与灾害医学杂志, 2012, 7(4): 303-306
- Wang Ming-xiao, Xue Jun. Clinical analysis of the patients with chest pain in emergency room [J]. China first aid recovery and disaster medicine journal, 2012, 7(4): 303-306
- [12] 赵燕, 张毅刚, 王海波, 等. HEART 和 HEARTS3 评分体系对非 ST 段抬高胸痛患者心血管事件风险的评估价值对比[J]. 岭南心血管病杂志, 2017, 23(4): 365-368
- Zhao Yan, Zhang Yi-gang, Wang Hai-bo, et al. Value of HEART and HEARTS3 scoring system in evaluating cardiovascular event risk in patients with non ST segment elevation chest pain[J]. Lingnan journal of cardiovascular disease, 2017, 23(4): 365-368
- [13] Højlund-Carlsen P F, Johansen A, Christensen H W, et al. Potential impact of myocardial perfusion scintigraphy as gatekeeper for invasive examination and treatment in patients with stable angina pectoris: observational study without post-test referral bias[J]. European heart journal, 2006, 27(1): 29-34
- [14] De Meester K, Das T, Hellemaans K, et al. Impact of a standardized nurse observation protocol including MEWS after Intensive Care Unit discharge[J]. Resuscitation, 2013, 84(12): 184-189
- [15] 杨扬, 张伟, 彭明, 等. 急诊预防致死性胸痛患者误诊措施的研究[J]. 中国急救医学, 2014, (5): 423-425
- Yang Yang, Zhang Wei, Peng Ming, et al. Protecting for misdiagnosis of fatal chest pain in emergency room [J]. Chinese emergency medicine, 2014, (5): 423-425
- [16] Fullerton JN, Price CL, Silvey NE, et al. Is the Modified Early Warning Score (MEWS) superior to clinician judgment in detecting critical illness in the pre-hospital environment[J]. Resuscitation, 2012, 83(5): 557-562
- [17] 刘伟静, 寇宁. 胸痛中心建立对急性 ST 段抬高型心肌梗死再灌注治疗的影响: 一项建立前后对比研究结果[J]. 中国中西医结合急救杂志, 2017, (2): 119-122
- Liu Wei-jing, Kou Ning. The influence of establishment of Chest Pain Center on reperfusion therapy in patients with acute ST segment elevated myocardial infarction: a result of comparative study before and after establishment [J]. Chinese journal of integrated Chinese and western medicine, 2017, (2): 119-122
- [18] 侯晋, 周晟勃, 李波. 基于急诊胸痛中心概念的远程急救系统探索与研究[J]. 中国数字医学, 2017, (3): 83-85
- Hou Jin, Zhou Sheng-jie, Li Bo, et al. Exploration and Research of Remote Emergency System Based on Emergency Chest Pain Center [J]. Chinese digital medicine, 2017, (3): 83-85
- [19] 姜彬言, 王高生, 李婷婷, 等. 急性冠状动脉事件的全球性注册研究评分和校正改良式早期预警系统评分在急性心源性胸痛患者中的应用[J]. 中国临床保健杂志, 2017, (5): 505-508
- Jiang Bin-yan, Wang Gao-sheng, Li Ting-ting, et al. The application of global registry of acute coronary events score and modified early warning score in patients with acute cardiogenic chest pain[J]. Chinese journal of clinical health, 2017, (5): 505-508
- [20] 王珏. 急性胸痛的急诊治疗效果观察[J]. 中国医药指南, 2017, (18): 148-149
- Wang Yu. Acute chest pain emergency treatment effect observation [J]. China medical guide, 2017, (18): 148-149
- [21] 权欣, 孙妍, 李慧, 等. 掌上超声诊断仪对胸闷、胸痛急诊患者的针对性检查[J]. 中华医学超声杂志(电子版), 2016, (6): 471-475
- Quan Xin, Sun Yan, Li Hui, et al. Focused echocardiography on patients with chest pain or dyspnea using a pocket size device in Emergency Department [J]. Chinese medical ultrasound magazine (electronic version), 2016, (6): 471-475
- [22] Sprinks J. Swift take-up of standardized early warning system across NHS trusts[J]. Nurs Stand, 2013, 27(21): 7-9
- [23] 杨建中, 王晓静, 帕尔哈提·拜合提, 等. 乌鲁木齐市院外急救胸痛患者病种分析[J]. 中国急救复苏与灾害医学杂志, 2014, (1): 36-38
- Yang Jian-zhong, Wang Xiao-jing, Palhati bijti, et al. The analysis on types of chest pain in first-aid in Urumqi [J]. China first aid recovery and disaster medicine journal, 2014, (1): 36-38
- [24] 李阳, 安旭生. GRACE 评分、TIMI 危险评分及 BNP 对急诊胸痛患者心血管不良事件的预测价值 [J]. 医学临床研究, 2016, (10): 1966-1968
- Li Yang, An Xu-sheng. Predictive Value of GRACE score, TIMI risk score, and BNP on Adverse Cardiovascular Events in Emergency Patients with Chest Pain [J]. Medical clinical research, 2016, (10): 1966-1968
- [25] 杨雪峰, 于海超. 急诊胸痛中心的现状与未来[J]. 心血管病学进展, 2014, (2): 190-193
- Yang Xue-feng, Yu Hai-chao. Development of Emergency Chest Pain Center in China [J]. Progress in cardiovascular disease, 2014, (2): 190-193
- [26] 薛军, 韩占红, 王明晓, 等. 北京市急诊胸痛的病因学调查分析[J]. 中国综合临床, 2012, (10): 1042-1046
- Xue Jun, Han Zhan-hong, Wang Ming-xiao. Main etiologies for patients presented to ER with chest pain or chest pain equivalent [J]. China comprehensive clinic, 2012, (10): 1042-1046
- [27] 文新强, 郑冰, 唐映利. 不同性别急诊非创伤性胸痛患者的临床特点及病因分析[J]. 中国全科医学, 2016, (29): 3607-3610
- Wen Xin-qiang, Zheng Bing, Tang Ying-li. Clinical Characteristics and Pathogenesis of Acute Non-traumatic Chest Pain in Different Gender [J]. Chinese general medicine, 2016, (29): 3607-3610

- [13] Liu Z P, Zhang Y, Bian H, et al. Clinical application of rapid B-line score with lung ultrasonography in differentiating between pulmonary infection and pulmonary infection with acute left ventricular heart failure [J]. American Journal of Emergency Medicine, 2016, 34(2): 278-281
- [14] Soza A, Labbé P, Arrese M, et al. Mycobacterium abscessus pulmonary infection during hepatitis C treatment with telaprevir, peginterferon and ribavirin[J]. Annals of Hepatology, 2015, 14(1): 132-136
- [15] Sharma A, Wu W, Sung B, et al. Respiratory Syncytial Virus (RSV) Pulmonary Infection in Humanized Mice Induces Human Anti-RSV Immune Responses and Pathology [J]. Journal of Virology, 2016, 90(10): 5068
- [16] Caron E, Desseyn J, Sergent L, et al. Impact of fish oils on the outcomes of a mouse model of acute Pseudomonas aeruginosa pulmonary infection[J]. British Journal of Nutrition, 2015, 113(2): 1-9
- [17] Chen H, Li F, Zhan Y, et al. Circulating cytokine portraits can differentiate between allograft rejection and pulmonary infection in cardiac transplant rats [J]. Interactive Cardiovascular & Thoracic Surgery, 2016, 23(1): 118
- [18] Yamazaki H, Sakai R, Koike R, et al. Assessment of Risks of Pulmonary Infection During 12 Months Following Immunosuppressive Treatment for Active Connective Tissue Diseases: A Large-scale Prospective Cohort Study [J]. Journal of Rheumatology, 2015, 42(4): 614
- [19] Sik K W, Jong-Seok K, Bin C S, et al. Virulence-Dependent Alterations in the Kinetics of Immune Cells during Pulmonary Infection by Mycobacterium tuberculosis[J]. Plos One, 2015, 10(12): e0145234
- [20] Carral N, Lukas J C, Oteo I, et al. Impact of poor compliance with levofloxacin and moxifloxacin on respiratory tract infection antimicrobial efficacy: a pharmacokinetic/pharmacodynamic simulation study [J]. International Journal of Antimicrobial Agents, 2015, 45(1): 79-83
- [21] Zhang B, Huang X, Fan H, et al. Pharmacokinetics of intravenous moxifloxacin in the cerebrospinal fluid of a patient with central nervous system shunt infection[J]. Diagnostic Microbiology & Infectious Disease, 2016, 84(3): 249
- [22] Ito F, Ohno Y, Toyoshi S, et al. Pharmacokinetics of consecutive oral moxifloxacin (400 mg/day) in patients with respiratory tract infection [J]. Therapeutic Advances in Respiratory Disease, 2016, 10(1): 34
- [23] Kontos F, Mavromanolakis D N, Zande M C, et al. Isolation of Mycobacterium kumamotonense from a patient with pulmonary infection and latent tuberculosis [J]. Indian Journal of Medical Microbiology, 2016, 34(2): 241
- [24] Ahmed M M, Elmaraghy A A, Andrawas E W. Study of prescription patterns of antibiotics in treating lower respiratory tract infections at Sohag Chest Hospital [J]. Egyptian Journal of Chest Diseases & Tuberculosis, 2016, 65(1): 143-155
- [25] Barrera C M, Mykietiak A, Metev H, et al. Efficacy and safety of oral solithromycin versus oral moxifloxacin for treatment of community-acquired bacterial pneumonia: a global, double-blind, multicentre, randomised, active-controlled, non-inferiority trial (SOLITAIRE-ORAL)[J]. Lancet Infectious Diseases, 2016, 16(4): 421
- [26] Fong S W, Ling L F, Wei C S T, et al. Systemic and coronary levels of CRP, MPO, sCD40L and PIGF in patients with coronary artery disease[J]. BMC Research Notes, 2015, 8(1): 679
- [27] Yang A P, Liu J, Yue L H, et al. Neutrophil CD64 combined with PCT, CRP and WBC improves the sensitivity for the early diagnosis of neonatal sepsis [J]. Clinical Chemistry & Laboratory Medicine, 2016, 54(2): 345
- [28] Beavers K M, Beavers D P, Newman J J, et al. Effects of total and regional fat loss on plasma CRP and IL-6 in overweight and obese, older adults with knee osteoarthritis[J]. Osteoarthritis & Cartilage, 2015, 23(2): 249-256
- [29] Uyanik V, Tuglu C, Gorgulu Y, et al. Assessment of cytokine levels and hs-CRP in bipolar I disorder before and after treatment[J]. Psychiatry Research, 2015, 228(3): 386
- [30] Karadeniz M, Duran M, Akyel A, et al. High Sensitive CRP Level Is Associated With Intermediate and High Syntax Score in Patients With Acute Coronary Syndrome [J]. International Heart Journal, 2015, 56(4): 377-380

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- [28] 蒋伟,朱聚.急诊科分级分区管理模式在胸痛患者分流中的应用研究[J].实用临床医药杂志, 2017, (14): 173-175
- Jiang Wei, Zhu Jun. Study on the application of the graded partition management model of emergency department in patients with chest pain[J]. Journal of practical clinical medicine, 2017, (14): 173-175
- [29] 张国新,李长顺,李恒涛,等.区域性胸痛中心建设对 ST 段抬高型心肌梗死治疗的影响[J].中国急救复苏与灾害医学杂志, 2017, (10): 944-947
- Zhang Guo-xin, Li Chang-shun, Li Heng-tao, et al. Effects of establishment of a regional chest pain center on the treatment of patients with ST-segment elevated myocardial infarction[J]. China first aid recovery and disaster medicine journal, 2017, (10): 944-947
- [30] 林松梅,韩贤珍,王宝磊,等.改良 HEART 评分法指导急诊胸痛患者分层治疗的应用价值[J].疑难病杂志, 2016, 15(6): 575-578, 583
- Lin Song-mei, Han Xian-zhen, Wang Bao-lei, et al. Application value of modified HEART score in guiding the treatment of emergency patients with chest pain [J]. Journal of the problem, 2016, 15 (6): 575-578, 583