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Letter to the Editor

Emergency department crowding might not strongly associated with higher incidence of in-hospital cardiac arrest

Sir,

With great interest, we read the study by Chang et al.,[1] which demonstrated the association between emergency department (ED) crowding and in-hospital cardiac arrest (IHCA) incidence. We appreciated the author's efforts, but we noticed that the incidence rates of IHCA between groups were not calculated. Given that the increased the ED bed occupancy rate (EDBOR) means more boarding patients, the incidence rates of IHCA might be a more convincing parameter. In addition, the association between overcrowding and outcomes of IHCA was not shown. Therefore, we conducted a retrospective study to investigate the two questions above.

The study was conducted in the emergency department of West China Hospital. This hospital is the largest medical center in Southwest China with about 4300 beds. A considerable number of critical ill patients are transferred from other hospitals to our department every day. Therefore, there are as much as approximately 550 ED visits per day. The ED has 47 beds in the rescue unit and 16 beds in the emergency intensive care unit (EICU). Adult patients with IHCA from January 1, 2017 to December 31, 2017 were recruited. The number of boarding patients, IHCA events and outcomes per day were collected and the EDBOR per day was calculated as described by Chang et al.[1] According to the interquartile range of EDBOR, the patients were divided into three groups.

Total of 45,908 boarding patients were included. There were 87, 182, and 96 days for EDBOR levels of <250%, 250–285% and >285%. We found no significant difference of IHCA events per day ($p = 0.292$) and incidence rates per day ($p = 0.124$) among three groups. Meanwhile, the return of spontaneous circulation (ROSC) rates were not associated with EDBORs ($p = 0.957$) (Table1). When stratified by months, no relationship between EDBOR and IHCA incidence rates was found. Notably, the higher EDBORs were related to the lower IHCA incidence rates in October, November and December (Fig. 1).

Despite the adverse effects of ED overcrowding have been concerned,[2,3] we demonstrated no strong association between increased ED crowding and higher IHCA incidence rate or the deterioration of resuscitation efficacy. Many other factors such as the number and capability of duty ED physicians and the proportion of critically ill patients might have affected as well. The disease prevalence variations in different months might be another factor. More patients with respiratory diseases attended the ED in October, November and December due to the weather changing. For these patients, timely oxygen therapy and mechanical ventilation is effective on prevention of the IHCA occurrence.

The following resolutions may be helpful to promote medical care quality under the overcrowding conditions. First, optimal triage

Table 1 – Data of ED boarding patients and IHCA events stratified by EDBOR[a] in rescue room.

Variables		<250%	250–285%	>285%	p Value
Number of days (n, %)	365(100)	87(23.84)	182(49.86)	96(26.30)	–
Total patients (n)	45,908	9541	22,897	13,470	–
Boarding patients per day	125.78 ± 12.36	109.67 ± 8.76	125.81 ± 4.29	140.31 ± 5.40	**<0.001**
Patients to EICU[b] per day	3.93 ± 1.68	3.67 ± 1.78	3.99 ± 1.65	4.06 ± 1.61	0.222
IHCA[c] patients (n, %)	444(0.95)	89(0.93)	228(0.99)	127(0.94)	0.820
IHCA patients per day (IQR[d])	1.00(0.00,2.00)	1.00(0.00,2.00)	1.00(0.00,2.00)	1.00(0.25,2.00)	0.292
IHCA incidence rates per day (IQR, %)	0.79(0.00,1.54)	0.88(0.00,1.75)	0.79(0.00,1.56)	0.72(0.16,1.45)	0.124
ROSC[e] (n, %)	320(72.07)	65(73.03)	163(71.49)	92(72.44)	0.957

Definitions of abbreviations: [a]EDBOR: emergency department bed occupancy rate; [b] EICU: emergency department intensive care unit; [c]IHCA: in-hospital cardiac arrest; [d]IQR: interquartile range; [e]ROSC: return of spontaneous circulation.

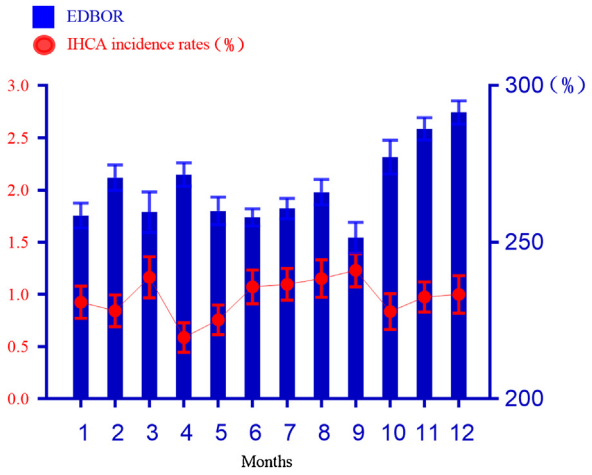

Fig. 1 – Incidence rates of in-hospital cardiac arrest and EDBOR in different months.

algorithms have been proved to improve medical care. The effective triage process enables early identification of critically ill patients and implement timely resuscitation procedure without delay.[3] The adequate experienced ED physicians is another factor which guarantees the high-quality treatment administration in overcrowding settings. In addition, the medical care resource allocation in emergency department is essential as well, especially in resource-limiting settings.[4]

Conflict of interest

None.

Acknowledgement

None.

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Received 10 April 2019

http://dx.doi.org/10.1016/j.resuscitation.2019.04.026