

Comparison Of Vasopressin Versus Epinephrine Effects in Survival of Patients with Asystole: A Double-Blinded Randomized Clinical Trial Study

Dear Editor,

Cardiovascular-related diseases are the most common causes of cardiac arrest in adult population.¹ Reported survival of 2-24% is the outcome of this serious condition despite of rigorous attempts during cardiopulmonary resuscitation.² Because of poor clinical yield with epinephrine usage,³ studies focused on possible alternative pharmacological agents. Vasopressin was regarded as a remedy based on some observations implied high concentration of this endogenous medication during cardiac arrest.^{4,5} Several clinical trials were also performed in different settings with supportive and opposing results.⁶⁻⁸ Considering the diversities in previous studies that may arise from clinical expertise, out-of-hospital managements and other background problems, this double-blinded randomized controlled trial aimed to assess outcomes such as return of spontaneous circulation (ROSC), survival at 1 hour, 1 day and 1 month, and mean survival time, only in asystole patients, who were treated with either vasopressin or epinephrine.

Our study was performed in Emergency Department (ED) of a large teaching hospital affiliated to Tehran University of Medical Sciences. After confirming asystole in 2 of 3 limb leads in cardiac monitoring, the patients were assigned to receive vasopressin (intervention group) or epinephrine (control group) with block randomization. Individuals with pregnancy, age less than 8 years old, not to resuscitate order or condition, delayed resuscitation more than 20 minutes of cardiac arrest and hemorrhagic shock were excluded from the study. Twenty five patients were determined for each group. Sixty two patients were eligible for study but 7

of 62 patients were traumatic victims and in hemorrhagic shock, therefore were excluded. Four of 62 patients were in end stage of malignancy and resuscitation efforts were not started. One patient was excluded from the study because of delay in beginning of resuscitation more than 20 minutes. Finally, 50 patients were enrolled using a convenience sampling method. Recommended doses of epinephrine (1 mg, IV) or vasopressin (40 U, IV) were prepared in coded identical syringes blindly for resuscitation team members. Packages were randomly distributed based on a random digit table among cardiac arrest carts. If patients remained asystole after initial doses of either vasopressin or epinephrine, they would have received 1 mg of epinephrine for subsequent doses. Resuscitation team members were the same for all victims. Our primary outcome was restoring spontaneous carotid pulsation.

The study results were shown in the Table 1. Comparisons between groups were done using the student's t-test for continuous variables and the Chi-Square test for categorical variables.

Mean of survival time was calculated in each group except for one case of vasopressin group survived for one month who did not take into account. The medians of overall survival time were 8 hrs and 6 hrs in vasopressin and epinephrine groups, respectively. In this clinical trial with an acceptable power of 80%, we failed to show any improvement in vasopressin group for either short-term or long-term survival indices.

Another study investigated 200 patients with PEA, asystole, VT or VF randomized on the same protocol. They concluded no superiority for vasopressin over

Table 1: Demographic characteristics and survival outcomes for two study groups

Variable	Vasopressin group	Epinephrine group	P value
Mean of age	72.16±8.19	71.52±9.03	0.794
Sex (Men %)	11 (44)	12 (48)	-
Sex (women %)	14 (56)	13 (52)	-
Return of spontaneous circulation (%)	9 (36)	10 (40)	≈1.00
Survival in first hour (%)	7 (28)	7 (28)	1.00
Survival in first 24hr (%)	3 (12)	2 (8)	≈1.00
Median for overall survival time	8 hrs	6 hrs	≈1.00

epinephrine regarding in-hospital cardiac arrest.³ To explain the differences observed in various studies, including ours, some points should be considered such as time elapsed from cardiac events to start resuscitation, underlying condition (leading to acidosis, hypoxia, etc), type of cardiac event (VT, VF, asystole or ...) and in-hospital/out-of-hospital arrest. Several limitations of our study were considered such as small sample size in comparison to other studies and undifferentiated background diagnosis as a cause of asystole in the patients. We tried to control the confounding effects of these diversities with good randomization. Distribution of these confounders was not similar among conducted studies that, in turn, could have resulted in diverse results. This study showed that vasopressin could be used just once as alternative to epinephrine in

resuscitation of the patients with asystole.

Keywords: Asystole; Vasopressin; Epinephrine; Cardiac arrest

Conflict of interest: None declared.

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References

- 1 Roger VL, Go AS, Lloyd-Jones DM, Adams RJ, Berry JD, Brown TM, Carnethon MR, Dai S, de Simone G, Ford ES, Fox CS, Fullerton HJ, Gillespie C, Greenlund KJ, Haipern SM, Heit JA, Ho PM, Howard VJ, Kissela BM, Kittner SJ, Lackland DT, Lichtman JH, Lisabeth LD, Mackuc DM, Marcus GM, Marelli A, Matchar DB, McDermott MM, Meigs JB, Moy CS, Mozaffarian D, Mussolino ME, Nichol G, Paynter NP, Rosamond WD, Sorlie PD, Stafford RS, Turan TN, Turner MB, Wong ND, Wylie-Rosett J; American Heart Association Statistics Committee and Stroke Statistics Subcommittee. Heart disease and stroke statistics--2011 update: a report from the American Heart Association. *Circulation* 2011;**123**:e18-e209. [21 160056] [<http://dx.doi.org/10.1161/CIR.0b013e3182009701>]
- 2 Stiell IG, Wells GA, Field B, Spaite DW, Nesbitt LP, De Maio VJ, Nichol G, Cousineau D, Blackburn J, Munkley D, Luinstra-Toohey L, Campeau T, Dagnone E, Lyver M; Ontario Prehospital Advanced Life Support Study Group. Advanced cardiac life support in out-of-hospital cardiac arrest. *N Engl J Med* 2004;**351**:647-56. [15306666] [<http://dx.doi.org/10.1056/NEJMoa040325>]
- 3 Stiell IG, Hebert PC, Weitzman BN, Wells GA, Raman S, Stark RM, Higginson LA, Ahuja J, Dickinson GE. High-dose epinephrine in adult cardiac arrest. *N Engl J Med* 1992;**327**:1045-50. [152284] [<http://dx.doi.org/10.1056/NEJM199210083271502>]
- 4 Paradis NA, Rose MI, Garg U. The effect of global ischemia and reperfusion on the plasma levels of vasoactive peptides. The neuroendocrine response to cardiac arrest and resuscitation. *Resuscitation*. 1993;**26**:261-9. [813 4705] [[http://dx.doi.org/10.1016/0300-9572\(93\)90147-I](http://dx.doi.org/10.1016/0300-9572(93)90147-I)]
- 5 Lindner KH, Strohmenger HU, Ensinger H, Hetzel WD, Ahnefeld FW, Georgieff M. Stress hormone response during and after cardiopulmonary resuscitation. *Anesthesiology* 1992;**77**:662-8. [13295 79] [<http://dx.doi.org/10.1097/00000542-199210000-00008>]
- 6 Schmittinger CA, Astner S, Astner L, Kossler J, Wenzel V. Cardiopulmonary resuscitation with vasopressin in a dog. *Vet Anaesth Analg* 2005;**32**:112-4. [15762917] [<http://dx.doi.org/10.1111/j.1467-2995.2005.00229.x>]
- 7 Stiell IG, Hébert PC, Wells GA, Vandemheen KL, Tang AS, Higginson LA, Dreyer JF, Clement C, Batram E, Watpool I, Mason S, Klassen T, Weitzman BN. Vasopressin versus epinephrine for inhospital cardiac arrest: a randomised controlled trial. *Lancet* 2001; **358**:105-9. [11463411] [[http://dx.doi.org/10.1016/S0140-6736\(01\)05328-4](http://dx.doi.org/10.1016/S0140-6736(01)05328-4)]
- 8 Wenzel V, Krismer AC, Arntz HR, Sitter H, Stadlbauer KH, Lindner KH; European Resuscitation Council Vasopressor during Cardiopulmonary Resuscitation Study Group. A comparison of vasopressin and epinephrine for out-of-hospital cardiopulmonary resuscitation. *N Engl J Med* 2004;**350**:105-13. [14 711909] [<http://dx.doi.org/10.1056/NEJMoa025431>]