

Letter to the Editor

Ascorbic acid in septic shock

Dear Editor,

Regarding our recent published article in Journal of Research in Pharmacy Practice (Hosseini Zabet M, *et al.* Effect of high-dose Ascorbic acid on vasopressor's requirement in septic shock. J Res Pharm Pract 2016; 5(2):94-100), I would like to explain some points:

Sepsis is a leading cause of mortality in critically ill patients. Most patients with severe sepsis or septic shock almost always require vasoactive agents to maintain vital organs perfusion.^[1] Reduced response to the available vasopressors has been proposed in these life-threatening conditions.^[2,3]

Potential benefits of Vitamin C as a potent antioxidant were evaluated in several populations of critically ill patients. In some of the studies, Vitamin C improved vasopressors responses.^[4-6] Carr *et al.* recently collected the available evidence and proposed ascorbate-dependent vasopressor synthesis as the main mechanism for Vitamin C in severe sepsis and septic shock. This review was published in November 2015 at Journal of "Critical Care."^[7]

Most available evidence regarding the role of Vitamin C in severe sepsis and septic shock came from nonsurgical critically ill populations.^[4-6] Evaluating the effect of high-dose Vitamin C in reducing vasopressor requirement in septic shock in surgical critically ill patients was registered as a Pharm D student thesis at November 17, 2014, in Faculty of Pharmacy, Tehran University of Medical Sciences, Tehran, Iran (ID: 93/d/230/4311). The results of this project were presented and approved on May 14, 2016 (ID registration: 5436). The results were also published in Journal of Research in Pharmacy Practice 2016.^[8]

In this study, high-dose Vitamin C significantly reduced vasopressor requirement in surgical critically ill patients. This study was a pilot clinical study. In the published article,^[8] authors mentioned mechanisms that have been proposed previously by Carr *et al.*^[7] and others^[4,6] for the probable role of Vitamin C in severe sepsis and septic shock, including antioxidant and anti-inflammatory properties of Vitamin C, cortisol sparing effect, inhibitory effect on nitric oxide synthase and

increasing catecholamines synthesis in the brain and adrenal medulla.

In drafting of our very recent article,^[8] related original articles were referred to, but the review article of Carr et al.^[7] was missed. This article also should have been cited for paragraph numbers 3, 4, 6, and 7 in our study.^[8] Hereby, we thank them for their comprehensive review article, which regrettably was missed to acknowledge properly in our article.

However, there are several gaps regarding the definite role of Vitamin C in severe sepsis and septic shock. The optimum time for adding Vitamin C, dose of Vitamin C, method of administration (bolus or continuous infusion), vasopressors' dependent response and different critically ill populations with severe sepsis and septic shock may be considered in future studies.

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Conflicts of interest

There are no conflicts of interest.

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