

Letter to The Editor**The Usability of IVC Diameter, IVC Collapsibility Index and Snuffbox Resistive Index in the Management of Sepsis and Septic Shock Patients in the Emergency Department**

Acil Serviste Sepsis ve Septik Şok Hastalarının Yönetiminde IVC Çapı, IVC Kollapsibilite İndeksi ve Enfiye Çukuru Rezistif İndeksinin Kullanılabilirliği

Serdar Özdemir^{1*} 

¹ Department of Emergency Medicine, University of Health Sciences Ümraniye Training and Research Hospital, Istanbul /TÜRKİYE

Dear Editor,

Hemodynamics is a science that studies the properties and rules of movement of blood and its components in the body. Oxygen delivery to tissues is an important component of peripheral and systemic circulatory hemodynamics. Peripheral and systemic circulation is the key point to achieve hemodynamic stability. Hemodynamic evaluation guides the admission of patients to the intensive care unit during the diagnosis and treatment process (1).

Early recognition of sepsis, which has high mortality and morbidity rates, and initiation of early treatment are vital. Adequate fluid resuscitation is essential in the treatment of sepsis. Most patients may require large amounts of fluid support depending on the hemodynamic response. Normalization of lactate levels can be used as a guide for adequate fluid resuscitation (2). Bedside cardiac ultrasonography and other techniques can be used to assess fluid response. According to recent studies on the physiopathology of sepsis, macro and microcirculation issues have gained great importance. With the development of ultrasound technology, the study of peripheral blood flow and the treatment and patient management of entities such as sepsis have focused on these areas (3). In the sepsis guideline, an important part of the treatment is to give the patient early intensive fluid therapy. Early intervention rather than interventions in treatment provides a reduction in mortality. Therefore, early aggressive fluid therapy has an important place in the follow-up of sepsis (2). IVC is a vessel with high compliance. Intrapleural pressure changes within the respiratory cycle and measurements of IVC diameter have been tried to be correlated with volume in many studies. Ultrasound evaluation of the inferior vena cava has been used for many years. The inferior vena cava collapsibility index is calculated by recording the diameters in the inspiration and expiration of the measurements. This measurement method has been found to be successful and effective in fluid resuscitation. The width and collapsibility of IVC diameter vary with total body fluid and respiratory pattern. Studies have shown that IVC diameter is related to intravascular volume rather than systolic blood pressure, and this has been used to determine fluid requirement and after shock (4,5). Nette et al. showed that systolic pressure increased but there was no significant change in IVC diameter in their study in patients receiving hemodialysis with low blood volume infused with norepinephrine. This suggested that IVC diameter measurements may be closely related to intravascular volume (6). Trivedi et al. reported that for the assessment of fluid status and fluid responsiveness in end-stage renal disease patients with maintenance hemodialysis, ultrasound assessment of IVC diameter and IVC collapsibility index are not routinely helpful in a review of 60 patients (7). A meta-analysis by İsmail et al. revealed that the IVC collapsibility index has a moderate level of evidence in the recognition of euvoletic and hypovolemic states (8).

The Resistive Index (RI) is a flow parameter calculated on USG, based on the minimum and maximum. Doppler measurement of a vessel within the heartbeat cycle. It can show collapsibility as well as resistance within the vessel. Formula of RI is (Peak Systolic Velocity- Peak End Diastolic Velocity) /Peak Systolic Velocity. As the vessel contracts, the resistance to the flow increases and RI increases. Since it is a multifactorial value, it can have different normal values in each organ and in each vein. In the

**Corresponding author: Dr. Serdar Özdemir, M.D.*

Adress: Department of Emergency Medicine, University of Health Sciences Ümraniye Training and Research Hospital, Istanbul /TÜRKİYE

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study of Ban et al. in 2005 published in circulation journal, correlation in the resistance of the peripheral circulation was investigated by using the resistive index of the upper extremity arteries in intensive care patients whose systemic vascular resistance was measured invasively. They reported a significant correlation in RI's showing this resistance (9). In the same study, measurements were made from the brachial, radial artery, and the radial artery passing through the snuffbox. Due to the narrow angle of ultrasound, it provides, the measurements in the snuff pit gave the best correlation. In another study conducted with the snuffbox resistive index (SBRI), it was shown that it is parallel to the change in lactate clearance and can be used in tissue perfusion and treatment, diagnosis, and follow-up in septic shock (10). In the light of current literature, SBRI could be another ultrasonographic useful parameter in diagnosis of sepsis and septic shock.

In conclusion, more blinded studies are needed to safely recommend SBRI, IVC diameter and IVC collapsibility index in the management of sepsis and septic shock patients in the emergency department. Researchers should be encouraged to study the usability of SBRI, IVC diameter and IVC collapsibility index in the management of sepsis and septic shock patients in the emergency department.

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