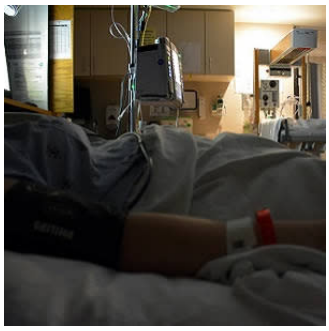
ICU
MANAGEMENT & PRACTICE

Central venous oxygen desaturation during early sepsis linked to higher mortality



In the ALBIOS trial, persistence of low (<70%) central venous oxygen saturation (ScvO2) during early sepsis was associated with higher 90-day mortality, possibly because it reflected underlying cardiac dysfunction, according to an analysis published online in the journal CHEST. Subjects with ScvO2 <70% may benefit most from individually tailored interventions aimed at normalising the balance between systemic oxygen delivery and consumption, researchers say.

Central venous oxygen desaturation (ScvO2 <70%) signals a mismatch between oxygen delivery and consumption in the upper, and possibly even in the lower, part of the human body. If severe or prolonged enough, inadequate oxygen supply will limit cellular aerobic energy production and cause cellular dysfunction or death. Previous studies showed that prompt reversal of ScvO2 <70% can reduce in-hospital mortality of subjects with systemic inflammatory response to infection and either hypotension or blood lactate concentration of ≥4 mmol/L.

However, more recent trials (ProCESS, ARISE and ProMISe) have questioned the relevance of low ScvO2 <70% during early sepsis. According to results of the three multicentre randomised controlled trials, targeting ScvO2 during early management of sepsis did not reduce 60-day or 90-day mortality.

As authors of the new CHEST study point out, subjects included in those trials had ScvO2 at enrolment as high as 71±13%, 73±11% and 70±12%. "It seems that harms of ScvO2 <70%, when cellular aerobic energy production is limited by (inadequate) supply, become clear only if initial ScvO2 is really <70%," the authors say. Based on this hypothesis, the authors investigated the incidence, risk factors, and association with 90-day mortality of ScvO2 <70% during the first six hours of treatment in subjects included in the Albumin Italian Outcome Sepsis (ALBIOS) trial. Using multivariable logistic regression analyses, investigators tested the association between ScvO2 <70% at six hours and 90-day mortality in those with initial ScvO2 <70% (n=514) or ≥70% (n=961).

The authors found that ScvO2 <70% at six hours was independently associated with higher 90-day mortality in subjects with initial ScvO2 <70% (OR 1•84, 95%-CI 1•19-2•85; p=0•007), but not in those with initial ScvO2 ≥70% (OR 1•25, 95%-CI 0•79-1•95; p=0•357). ScvO2 <70% at study enrolment and at six hours was associated with history and/or signs of cardiac dysfunction but not with greater severity of disease or more aggressive resuscitation (required per protocol).

"Our study is novel in that it examines the prognostic value and the underlying reasons for persistence of low ScvO2 in 1,475 subjects, including 514 with initial ScvO2 <70%, with severe sepsis or septic shock, all treated with early goal-directed therapy," the authors write. "In the three most recent trials, ScvO2 was not recorded in controls. Therefore, these studies do not provide any evidence for or against early-goal directed therapy in subjects presenting with ScvO2 <70%."

The current study has several limitations, including its retrospective design so investigators did not assess benefits or harms of targeting ScvO2 during the early phase of sepsis. "Causality cannot be established by statistics alone; it should be tested in prospective trials enrolling subjects with initial ScvO2 <70%," the authors note. Additionally, arterial lactate was not measured at six hours; therefore, the authors cannot establish whether normalisation (or decrease) of lactate is a better initial endpoint than normalisation of ScvO2.

Source: CHEST
Image Credit: Public domain pictures

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