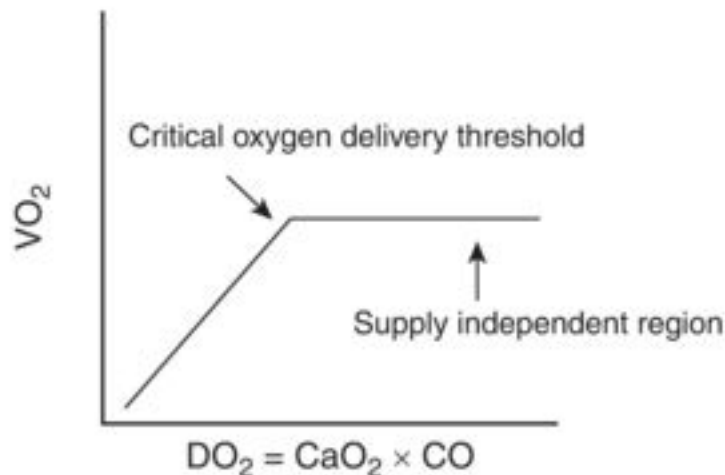


Beta Blockers in Septic Shock

The use of beta blockers for patients in refractory septic shock could prove a novel therapy in the near future. Two recently published studies demonstrated improvements in cardiac output, markers of perfusion, and decreased heart rate. A phase 2 study published in JAMA in 2013 also showed a secondary outcome of decreased 28-day mortality.

The idea of using beta blockers in septic shock appears to be counterintuitive to the initial goals in resuscitation of the patient in septic shock. The initial physiologic tachycardia experienced by patients in septic shock is necessary to maintain delivery of oxygen. However, **following appropriate volume resuscitation, the ability to reduce tachycardia with beta blockers could possibly improve cardiac output and enhance oxygen delivery.** It is known that excessive tachycardia can cause myocardial depression. Tachycardia causes decreased ventricular filling time, decreased ventricular filling, synchrony of ventricular contractions, increased myocardial oxygen demand, and decreased cardiac perfusion pressures. Thus, a decrease in DO_2 occurs. It is in this physiologic milieu seen in sepsis patients where beta blocker therapy may prove appropriate. If one can enhance cardiac output and myocardial perfusion and thus increase DO_2 , the body will better be able to supply the tissues with needed O_2 .



A trial of esmolol was used in septic shock patients receiving Levophed at a single center in Italy. All patients were appropriately resuscitated and mechanically ventilated and after 24 hours, 154 were randomized to an open label trial of esmolol vs usual care. Goal heart rate was 80-94 beats/minute. The primary end point was the ability of esmolol to titrate heart rates to the above goal. However, secondary outcomes demonstrated a 40% reduction in mortality at 28 days. Despite this obviously impressive secondary outcome, the study occurred at a single center and had a very high mortality in the control group. In addition, a previously executed pilot study of metoprolol demonstrated improvements of cardiac output in septic shock patients.

The outcomes of these two trials warrant further exploration of the use of beta blockers in septic shock patients following appropriate resuscitation. We need a randomized, double blinded trial. This could be an option for those boarded patients in septic shock in the ED.

References / Further Reading:

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