



"Fluid overload" - a poorly-defined term that should be avoided



Clinicians examining an oedematous patient are wont to say that the patient has “fluid overload” or “hypervolemia” or both and propose fluid restriction and/or diuretics as the logical strategy, when often during the acute phases of resuscitation from circulatory shock this approach may be inappropriate, says an editorial published in the journal *Critical Care*.

A fundamental determinant of cardiac output and its ability to vary in response to changing metabolic demands is the body’s effective circulating blood volume. Meanwhile, the stressed blood volume relative to the venous compliance defines the mean circulatory filling pressure, which is the back pressure to venous flow from the body back to the right ventricle.

The editorial cites that the primary reason for giving fluids during resuscitation is to increase the stressed circulatory blood volume, thus causing mean circulatory filling pressure to rise. "If the heart can handle this increased driving pressure, then venous return increases causing cardiac output to rise. If the effective circulating blood volume is low, then mean circulatory filling pressure is also low, and if the effective circulating blood volume is high, then mean circulatory filling pressure is also high," explains the editorial.

Hypervolemia refers to an excessive blood volume, wherein mean systemic circulatory pressure is high, causing a net fluid loss into the interstitium resulting in some oedema formation. Although hypervolemia is always associated with some oedema, the editorial says the reverse is not always true - i.e., oedema is not always associated with hypervolemia - particularly in acutely ill patients, especially those with sepsis or other types of intravascular inflammatory responses (e.g., pancreatitis, burns), who often have altered capillary permeability.

It should be noted that even when the capillaries are intact, an abrupt increase in hydrostatic pressures, related, for example, to acute heart failure or an acute adrenergic discharge, can result in oedema formation stemming from fluid extravasation from the intravascular compartment into the interstitium.

The editorial refers to a study (Da Luz et al.) done 40 years ago which measured plasma volume under those conditions and showed that it is typically reduced. Since then, a prudent fluid challenge has become part of the standard management of cardiogenic shock, because although hypervolemia is always associated with oedema, oedema can be associated with an increased, a normal, or a decreased blood volume and administering fluid can be harmful or beneficial depending on the underlying cause.

"Based on this construction, it should be clear that fluid overload is a poorly-defined term, often

confused with hypervolemia, but not synonymous. If, as is often the case, the term is used based solely on the presence of oedema, errors in management may occur, with fluids being withheld or diuretics administered just because the oedema is assumed to indicate the presence of excess fluid," according to the editorial written by Jean-Louis Vincent, MD, PhD, Department of Intensive Care, Erasme University Hospital (Brussels, Belgium) and Michael R. Pinsky, MD, Dr.hc, MCCM, Department of Critical Care Medicine, University of Pittsburgh (Pittsburgh, PA).

Once patients become stable following initial management for acute circulatory insufficiency, the editorialists note, diuretics should be administered to aid in fluid removal, "but only when there is actual hypervolemia." For those who have needed resuscitation, this strategy should be limited to the stabilisation or the de-escalation phase.

Drs. Vincent and Pinsky say it would be better if the term "fluid overload" were avoided completely within medical circles. The word "hypervolemia" is sufficient to indicate an excess in circulating blood volume and, if present, needs to be properly documented before a strategy of fluid restriction and/or diuretics is applied, according to the authors.

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