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Editorial: Hemodynamic management and fluid therapy in the perioperative setting

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Editorial on the Research Topic
Hemodynamic management and fluid therapy in the perioperative setting

Hemodynamic monitoring and fluid therapy are areas of medicine that are increasingly integrated when the management of surgical patients is discussed. However, guiding the fluid therapy based on hemodynamic measurements, or even on the hemodynamic response to fluid, is a more complex task today than ever before. Therefore, studies of hemodynamics and fluids, and how they are inter-related, continue to be important.

Healthy humans have physiological reserves that may allow non-optimal treatment with fluids and drugs, while this is not the case in debilitated patients. Everyone working in the operating room knows that outstanding knowledge about hemodynamics and fluid therapy is required and might determine whether the postoperative period will be free from complications or be spent in the intensive care unit. Taking such patients through major surgery challenges the skills of the anesthetist. Expectations on the healthcare system have also increased over time. Most hospitals compete by performing more surgeries on an out-patient basis, which reduces the tolerance for prolonged postoperative care.

Both hemodynamic monitoring and fluid therapy have undergone rapid progress in the past decades. Fifty years ago, the hemodynamic equipment in the operating room usually consisted in only a blood pressure cuff. Invasive methods were rare. By contrast, anesthetists of today can choose from a long array of invasive and noninvasive devices for monitoring the circulation. Several new variables have also been developed that tell much more about the circulatory status than was possible in the past.

Fluid therapy has developed from only worrying about hypovolemia to the understanding that both too much and too little fluid promotes complications. Fluid-related complications appear to be much more common than previously believed. Knowledge about how administered volumes behave in the human body have also added pharmacological aspects of infusion fluids, which is even widely acknowledged to be drugs.

Frontiers in Anesthesiology acknowledges the dynamic development of these two areas by publishing a special Research Topic issue entitled *Hemodynamic Management and Fluid Therapy in the Perioperative Setting*. It contains six carefully selected articles.

The first of them is a review dealing with fluid responsiveness in pediatrics. Guiding fluid therapy by assessing fluid responsiveness has long been recommended for adults undergoing major surgery, while the usefulness is more unclear in children. The current evaluation points out that experiences from adults should not be uncritically extrapolated to the pediatric population Escribá Alepuz et al.

Two articles discuss and evaluate the Hypotension Prediction Index (HPI) which is a relatively new hemodynamic variable that calculates the likelihood of arterial hypotension developing before it occurs Valbuena-Bueno et al., Ripollés-Melchor et al.

A contribution on the hemodynamic frontline describes the "pressure field model" which holds that the hemodynamic elastance, i.e., the resistance to dilatation, might allow better management of major hemorrhage than the traditional approaches do Woodford et al.

The fifth article measured two forms of angiotensin II during major abdominal surgery. It is known that general anesthesia activates the renin-angiotensin system but the pattern over time is poorly known Krenn et al.

The last contribution describes subtypes of arterial hypotension during major surgery. Hypotension was quite common (83%) during general anesthesia and of longer duration when associated with a decrease of cardiac output Zhao et al.

Frontiers in Anesthesiology hopes that you will find reading these articles informative and helpful in your daily work. We also hope to inspire future discussions in these areas of medicine.

Author contributions

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Conflict of interest

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The author(s) declare that no Generative AI was used in the creation of this manuscript.

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