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Short Communication

Time to Change the Objectives Hemodynamic to Guide the Perioperative Fluid Management?

Short Communication

Major surgery is a considerable physiologic insult that can be associated with significant morbidity and mortality. The prevention of perioperative morbidity is a determining factor in providing high-quality in health care, since the occurrence of postoperative complications adversely affects postoperative survival and increase healthcare costs [1].

The fluids are intravenous drugs most commonly used by anesthesiologist during the perioperative period. Incorrect used contributes greatly to the increased morbidity, thus fluid management influences significantly in patients outcomes. The perioperative fluid therapy and hemodynamic management, is one of the cornerstones of the medical care of surgical patients.

However, and unlike other therapeutics practices, there is no uniformity in dosage and timing of administering intravenous fluid. There is considerable variability in fluid administration among specialist, the volume of fluid administered depends to a large extent on the individual practitioner, and the most use clinical end points such as urine output, mean arterial blood pressure, or central venous pressure that have little to do with the hemodynamic goals of fluid administration, at this time.

It is not easy to determine the volume of fluid administered during the perioperative period and parameters to be used to guide the extra administration.

The historical evolution in the managements of fluids has evolved from use a liberal fluid therapy to chase the maintenance of euvolemia. The finding of increased morbidity and mortality associated with positive water balance forced to reduce the quantity of intravenous fluids.

The update in our physiological knowledge, has been mainstay to understand the benefits in this change of attitude. It is that by basic concept errors, we were managing many more fluids than necessary [2].

Listed below several factors who have contributed to explain why it has gone from using a liberal fluid therapy to recommend a restrictive fluid therapy:

- The reduced need for hours of fasting prior of administration of anesthesia : Research has shown that fasting from solid food for 6 hours and fluid for 2 hours prior to surgery is safe and improves outcomes compared with longer fasting periods [3].
- The majority of the patients presents with a minor functional intravascular deficit before surgery that is unlikely to have a clinical significance. Besides is the sympathetic blockade produced during neuraxial anesthesia that can lead to hypotension, thus is unnecessary and ineffective administration of fluids before anesthesia locorregional [4]. And the other hand, sometimes the hypotension observed during the procedure is due to over dosage intravenous and / or inhaled drugs, and this is not treated with extra intravenous fluids [2].
- Recent evidence does not support the existence of a third-space nonfunctional [5].
- Demonstration of reduced losses by evaporation of the surgical fields [2].
- The discovery of the existence of glycocalyx, endovascular membrane endotelial physiologically active and whose integrity is essential to ensure proper kinetics of fluids [6]. The release Del Atrial Natriuretic Peptide (ANP), produced by excessive intake of intravenous fluids, is one of the causes damage the glycocalix.

As it discussed above, physiological reasoning as we were using excess fluids and testing that is was associated with increased morbidity and mortality, forced the decrease in the administration of intravenous fluids and therefore it began to use the term restrictive fluid therapy, but fluid restrictive terms defined zero -balanced fluid approach. It is when, a zero balance is achieved when reduced complications and improve prognosis. Euvolemia, therefore, it is a much more accurate expression.

The anesthesiologist should have an individual perioperative fluid optimization and hemodynamic monitoring plan for each surgical patients based in the patient status and surgical risk [7].

Only, in the clinical context of ambulatory surgery, a liberal fluid strategy may be beneficial (20 ml/kg/h of crystalloid infusion), as reduces postoperative dizziness, nausea, vomiting and hospital length of stay [8].

In other surgical procedures, which benefit from maintaining euvolemia, we must differentiate according to risk.

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In low-risk surgical patients, a zero-balance fluid approach may be achieved with a background infusion of a balanced crystalloid at 2-3 ml/kg/h based on ideal body weight. In this patients, the usual hemodynamic parameters (blood pressure, heart rate) provided by standard monitors, are considered sufficient, to ensure appropriate health care for the patient [7-9].

In patients with medium-high risk, either by patient characteristics or characteristics of the surgery, has been shown that the use of the Goal-directed Therapy also called Perioperative Hemodynamic Optimization reduces complications and length of hospital stay of high-risk patients [10,11].

Goal-directed Therapy / Perioperative Hemodynamic Optimization, involves the administration of fluids "chasing" flow targets as cardiac output, stroke volume and cardiac index [12]. The philosophy of Perioperative Hemodynamic Optimization is to avoid both, hypovolemia /hypo perfusion, such as hypervolemia, since both contribute to worsen the prognosis.

In high-risk patients, the use of traditional parameters such as blood pressure, cannot reflect on time states of hypo perfusion that could affect the clinical status of the patient, having consequently increased morbidities such as renal failure, infections, wound dehiscence, increased length of stay and thereby contributing to a worse clinical perioperative outcome and increased health care costs [7].

On the other hand, if a few years ago, we were worth values like Central Venous Pressure [13] and diuresis to guide us in the need to administer extra fluids, demonstrating the lack of precision in ensuring a correct response to the volume, it has made that hemodynamic parameters dependence preloading, as stroke volume variation and variation in pulse pressure are considered much better indicators of the proper administration of fluids, to better ensure a more favorable response to these. The significant limitations on the use of these parameters as the need for Controlled Mechanical Ventilation and sinus rhythm, among others, makes that maneuvers like passive leg raising (taking into account its difficult application in the operating room) or fluid challenge gain strength [14]. It is essential to remember that you only have to administer extra fluids to responders, and check, that this action benefits the patient, improving stroke volume.

The implementation in clinical practice of these hemodynamic parameters would not have been possible without the technological developments in monitoring: from the invasiveness of catheter Pulmonary Artery with iatrogenic this may lead, to the current monitoring minimally invasive such as monitors based on arterial pressure waveform and esophageal Doppler, and even non-invasive monitors as the finger-cuff-based technologies [15].

Both esophageal Doppler as monitors based on arterial pressure waveform has been proven as useful to guide fluid applying optimization hemodynamics. While with both monitors it has been shown decreased complications and length of stay, it is also true that both of them have their limitation.

Esophageal Doppler need extensive learning curve, and it should be recalled inter observer variability and cannot be applied consistently.

The values obtained with the arterial pressure waveform are derived values, this subtracts reliability that and makes these monitors are not useful in high-risk patients such as severe cardiac patients and as occurs in critically ill patients. It should be remembered that under theses circumstances, the more higher reliability is required and this leads to greater invasiveness [10,14,15].

The choice of monitor depends on our knowledge regarding handling and the severity of the patient and / or surgery. Always considering that is the correct interpretation of hemodynamic data obtained and accordingly an optimal therapeutic action which improves the prognosis of patients [8,10].

The debate between supporters and opponents of the use of the Perioperative Goal-Directed Fluid Therapy Objectives is in full today [16-18].

The different factors that are measured are: the objective parameters to be used, the haemodynamic choose protocol and patients who indicated. These factors are widely discussed in the literature, and today, the existence of the wide "gap" between the level of evidence and clinical practice may be more due to the need for a major change in our daily routine performed for decades. The absence of perception in the lower incidence of complications such as kidney failure, wound dehiscence, infection, length of stay, because in most cases are seen in the late postoperative period, could explain the "resistance" to changing attitudes referred .

On the other hand , cannot ignore the fact that at the time of Enhanced Recovery Program , various perioperative factors are included to improve the prognosis of patients, so is difficult to know the specific weight of each element [19,20]. Based on the evidence available, it should be noted that the recommendation grade of the Perioperative Haemodynamic Optimization (within the program Enhanced Recovery After Surgery (ERAS) is strong in high risk patients [21].

Medicine, and within the anesthesia, has evolved thanks to the implementation of changes in our routine clinical practice and respecting ethics and level of evidence, are these changes that can help us improve the prognosis of our patients.

Over the past decades, there has been considerable progress in the field of less invasive haemodynamic monitoring technologies, which reduce the risk for the patient compared to more invasive monitors.

Substantial evidence has accumulated, which supports the continuous measurements and optimization on flow–based variables such as stroke volume, in order to prevent occult hypo perfusion and consequently to improve patients outcome in the perioperative setting. Determining fluid responsiveness also is fundamental when making fluid therapy decisions to avoid unjustified fluid administration.

It is crucial to remind that fluids should be treated as any other intravenous drug therapy, thus, careful consideration of its timing and dose is fundamental for patient's outcomes.

One of the cornerstones of modern medicine is to increase quality of care. In order to maximize this quality, is time updating the objectives hemodynamic to guide the perioperative fluid management.

The Goal-directed Therapy should be implanted in high risk patients, intravascular volume optimization should be in accordance with the response of the preload-reserve, goals should be individualized and the selection of the monitor device should rely on clinical needs , invasiveness, accuracy and, experience of the anesthesiologist.

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