



13S2 - Goal-Directed Therapy (GDT) in non-cardiac surgery

Chair: Dr. Alexandre Joosten

Sunday 4th of June 2023

1. WHAT ARE THE EVIDENCE IN 2023?

Rupert Pearse, United Kingdom

Ideally, we should be able to answer the questions: What fluid, when should it be introduced, and in what quantity? Focusing on the **quantity**:

It is very important to distinguish what is **replacement fluid** and what is a **maintenance fluid**. **Maintenance** fluids should be calculated based on the body mass index of the patient, whereas **replacement** fluids depend on the losses, which are often hard to estimate. That is why we can sometimes choose between a **more liberal replacement and a more restrictive one**. Thus, in abdominal surgery, the latest trial compares the liberal therapy (6.1 L in 24 hours on average) vs. the restrictive therapy (3.7 L in 24 hours on average), proves that:

<p>Primary endpoint: No differences in mortality or disability one year after surgery</p>	<p>Secondary endpoints: Restrictive therapy was associated to a higher incidence of renal failure</p>
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The **effectiveness of the goal-directed therapy** in non-cardiac surgery has not yet been proven. This is probably due to the insufficient sample size in trials carried out so far. The latest most significant trials show:

<p>Pearse RM, et al² No differences in mortality or complications within 30 days after abdominal surgery</p>	<p>Gillies MA, et al³ No differences in the frequency of cardiac damage</p>	<p>Jessen MK et al⁴ Decrease in complications: Pneumonia, ARDS, or local infections</p>
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However, what is our understanding of a “**goal-directed hemodynamic therapy**”? It involves the implementation of treatment algorithms based on different hemodynamic monitored variables (systolic volume, central venous pressure, pulse pressure variation...), also with different predefined hemodynamic goals (average blood pressure, lactacidemia, central venous saturation...) among the existing trials. This is a too simplifying approach to group together complex—and significantly different—hemodynamic treatment strategies. That is why some authors believe this term should no longer be used⁵.

Conclusions:

<p>Being generous in resuscitation</p>	<p>Being restrictive during maintenance</p>	<p>Optimizing selected patients, considering potential damage</p>
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The results of the **latest trials** on the issue will be made public within 24 months:

OPTOMISE II: International multi-center TRIAL to determine whether fluid therapy guided by cardiac output, with low doses of inotropes, is clinically effective when compared with the usual treatment in patients who have undergone elective major gastrointestinal surgery



FLO-ELA (Fluid Optimisation in Emergency Laparotomy): Same as Optimise II, but in emergency abdominal surgery





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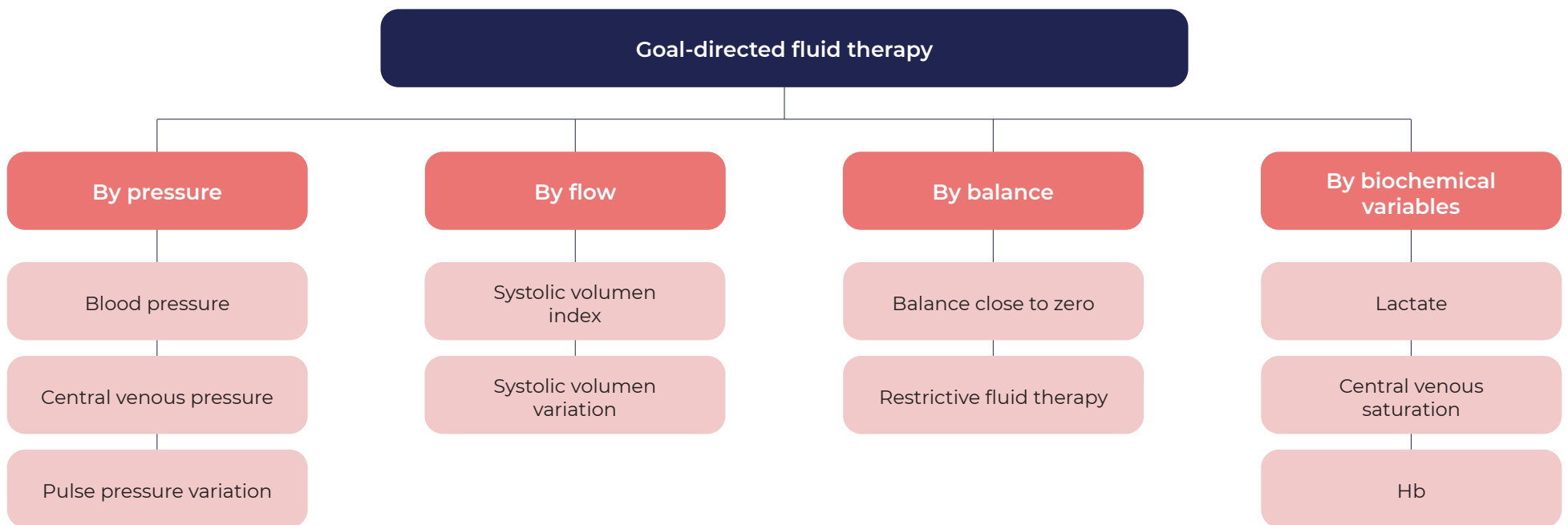
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2. GDT IN EMERGENCY ABDOMINAL SURGERY

Brigitte Brandstrup, Denmark

Goal-directed fluid therapy includes many different treatment strategies:



In patients who have undergone **elective abdominal surgery**, it has been proven that:

- A liberal fluid therapy, with a supply of up to 6 L within 24 hours, is associated to postoperative complications⁶:



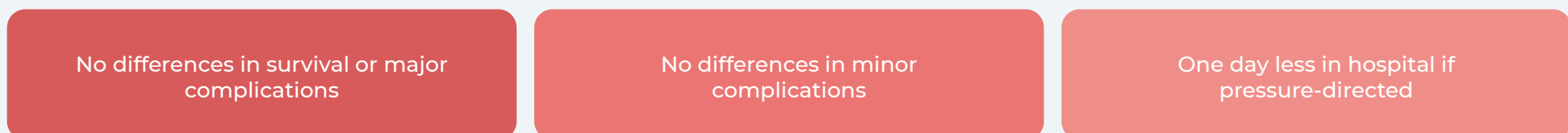
- An echo-guided fluid therapy supplying the maximum systolic volume adds no value to fluid therapy with a “near-zero” balance strategy⁷. Thus, a Cochrane systematic review did not find restrictive therapy to be restrictive vs. goal-directed therapy⁸.
- Too restrictive regimes can cause renal damage.
- Oliguria should be treated with fluid therapy.

In patients who have undergone **emergency abdominal surgery**, it has been proven that:

- A liberal fluid therapy, with a supply of up to 6 L within 24 hours, is associated to postoperative complications⁶:



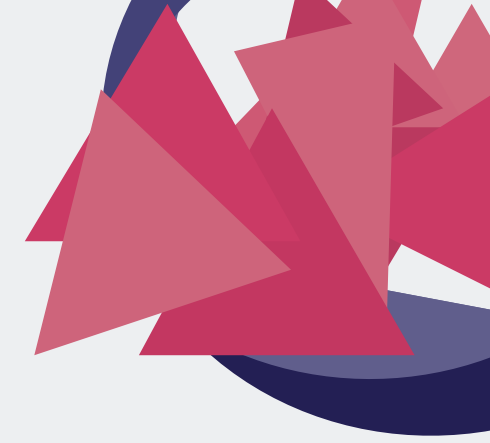
- Flow-guided fluid therapy (maximum systolic volume) is not superior to pressure- and balance-guided fluid therapy (central venous pressure)¹⁰.



In general, a fluid therapy is recommended that is guided by a combination of pressure variables, balance, and biochemical parameters.

Next results: FLO-ELA trial (Fluid Optimisation in Emergency Laparotomy Trial).

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3. PROTOCOLIZED OR INDIVIDUALIZED HAEMODYNAMIC APPROACH?

Bernd Saugel, Germany

Historically, in 1975, Shoemaker approached for the first time hemodynamic monitoring through protocols to prevent undesired outcomes, and he included in his protocol some key concept in the maintenance of homeostasis, such as oliguria, hypotension, organic dysfunction, or central venous pressure, among others. However, in 2011, according to a publication, only 30% of European anesthesiologists declared having protocols for the hemodynamic management of surgical patients in your work centers¹¹. In 2023 the situation is still similar, the percentage being 23%¹².

When implementing goal-directed therapy, one of the first questions that emerge is: **what goals have to be defined?**⁵

Pros and cons of protocolized individualized hemodynamic management:

Protocolized

Treatment standarization
Minimizing variability in care
Implementation in regular clinical practice

Personalized

Protocols do not reflect individual cardiovascular physiology
Interindividual variability
Need to cater for different hemodynamic profiles

Nevertheless, **protocols can be used and personalized** for each patient:

- The **individualization of systolic pressure** in high-risk major surgery patients decreases the incidence of systemic inflammatory response syndrome and the dysfunction of one or more organic systems, 7 days after surgery¹³. Currently, in this regard, the IMPROVE-multi trial is under way (Effect of personalized perioperative blood pressure management on postoperative complications and mortality in high-risk patients having major abdominal surgery)¹⁴.
- The **individualization of systolic volume and cardiac output** is associated to fewer postoperative complications and less mortality within 30 days of surgery in patients undergoing major gastrointestinal surgery^{2,15}. The PELICAN trial (Personalized Hemodynamic Management in High- risk Mayor Abdominal Surgery) will produce results on the maintenance of the cardiac index or, at least, on the baseline values for each patient before surgery.

Recommendations for the implementation of a goal-directed fluid therapy (**5-Ts**)¹⁶:

- **Target population:** Selecting the right patients (high risk).
- **Timing:** Early start of the intervention.
- **Type of intervention:** Combination of fluids, vasopressors, and inotropes based on the pathogenesis of the hemodynamic issue.
- **Target variable:** selecting the variable on which we want to intervene and monitoring it.
- **Target value:** setting and personalizing the values we want to approach.

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