In summary, we think that it is an excellent initiative to develop a Korean guideline for the management of PONV and wish Dr Park wisdom and success in doing so. Once the guideline has been developed and implemented, it is even better to use automated reminders in supporting it.

Declaration of interest
None declared.

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Goal-directed therapy: each therapeutic regimen needs its indication

Editor—We read with great interest the article by Brandstrup and colleagues providing interesting data on a multi-centre study on goal-directed fluid therapy (GDT) vs a zero-balance regimen in patients undergoing colorectal surgery. During the last decades, numerous single-centre studies, the majority performed with oesophageal Doppler-guided treatment strategies, demonstrated a positive effect of GDT on length of hospital stay, patient morbidity, and mortality. In contrast to these studies, Brandstrup and colleagues found no significant difference in length of hospital stay or patient outcome. However, when looking in detail on the design of the study, these results are not very surprising, owing to two aspects: although patients with a preoperative risk score of up to ASA III were eligible for this study, 79% of patients were classified ASA I or II in the zero-balance group, and even 89% in the Doppler group. By definition, ASA I and II


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patients can be regarded as clinically fit. In other words, only very low risk, ‘fit’ patients were included in this study. Recently, Challand and colleagues showed that clinically fit patients do not benefit from GDT. More importantly, they even showed an association with detrimental effects to readiness for discharge and length of hospital stay for aerobically fit patients.\(^3\) Obviously, ASA I and II patients do not represent the target group for goal-directed therapy and should therefore not be the majority of subjects in a study investigating GDT. Secondly, it is a basic consideration of GDT that such a treatment strategy is only of great value, if significant fluid shift occurs during surgery, that is, that an imbalance of cardiovascular homeostasis is expected. This volume shifting might be due to excessive bleeding during surgery or due to other intravascular volume losses. In other words, if there is no potential deficit, there is no rationale to anticipate this with a straightforward volume therapy. In this trial, Brandstrup and colleagues investigated patients undergoing laparoscopic and open colectomy. However, 48% of patients in the zero-balance group and 45% of patients in the Doppler group underwent laparoscopic surgery. One characteristic and advantage of laparoscopic surgery is the decreased amount of blood loss compared with open surgery.\(^6\) Also, it can be suspected that fluid loss by perspiration of the wound is reduced because the abdomen remains closed in laparoscopic procedures. Further, the authors intended to have a zero-balance for their control group, replacing only fluids that were lost in the course of surgery. Unfortunately, neither in the manuscript nor in the supplemental appendix, can information on blood loss be found. Nevertheless, the average fluid substitution was 475 ml of a colloid solution in the zero-balance group. Without information on fluid or blood loss, the infusion of colloids does not represent ‘zero balance’. If there was no blood loss, there was even no indication for application of a synthetic colloid at all. So, what remains is from this study is only that in healthy patients undergoing minimally invasive surgery without blood loss, GDT does not seem to be necessary. However, this has never been the major target for perioperative GDT strategies.

**Declaration of interest**

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**Reply from the authors**

Editor—On behalf of my co-authors, I would like to thank Dr Salzwedel and Dr Reuter for their interest in our work, and for this opportunity to discuss the literature and give additional information on our trial. We conducted a trial of the effect of goal-directed therapy (GDT) on complications after elective colorectal surgery. The patients were included consecutively with 17% ASA grade III patients. In elective surgery, there is a possibility to optimize the co-existing diseases before operation, and hence ASA grade III patients should be few, and ASA grade IV should be absent. On this background, Dr Salzwedel and Dr Reuter conclude that ‘fit patients do not benefit from GDT’ and that the even result of our trial was therefore predictable. I will have to disagree with that point of view because the previous trials showing beneficial effects of GDT have included the same patient categories with similar ASA scores I–III.\(^1\)–\(^3\) On the other hand, the effect of GDT on high-risk ASA grade III–IV patients (acute surgical patients) has not been tested in randomized trials and has yet to be shown.

Dr Salzwedel and Dr Reuter write that an advantage of laparoscopic surgery is less intraoperative blood loss. I am cautious with that conclusion for a number of reasons: first, patients operated on laparoscopically are typically highly selected with tumours respecting the dissection planes, and therefore rarely comparable with those operated open. Secondly, the laparoscopic dissection is performed with different coagulative systems (ligasure\(^6\), ultrascision\(^5\)) causing less bleeding. Open surgeries could be performed with the same techniques, but are often not. Thirdly, patients converted from laparoscopic to open surgery are often excluded from the laparoscopic group in the different analysis (an obvious methodological flaw). If we look at the data from our trial, 93 patients were intended to be operated on laparoscopically, of these 23 were converted to open surgery. If we compare the blood loss between the open surgical patients and the patients intended to be operated on using the laparoscopic technique, the blood loss was a mean of 387 ml (so 441) (open) vs 308 ml (so 822) (laparoscopic), \(P=0.45\). If we compare the open surgeries...