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doi:10.1093/bja/aev022

An additional mechanism of visual loss

Editor—I would like to thank Mongardon and colleagues¹ for submitting a very interesting case report on a devastating (and, fortunately, rather uncommon) complication after cardiac surgery.

In addition to the two mechanisms of visual loss proposed by the authors (hypotension coupled with increased pressure in the venous drainage system of the eye), I think that the administration of norepinephrine through the central venous catheter in the right internal jugular could have led to extremely high concentrations of the vasoconstrictor in the upper body venous system, particularly after the clamping of the superior vena cava in order to facilitate the surgical repair. It is not unreasonable to assume that a venoconstrictive effect could have further aggravated the impaired venous drainage from the orbital cavities and, thus, could have contributed to the reduced perfusion and the visual loss.

Regarding the authors' proposal of securing additional venous access through the inferior vena cava territories, although it should be assessed on an individual basis, it could reduce the possibility of deleterious concentrations of vasoactive drugs in the upper body compartment, apart from providing an additional route of fluid and drug administration in an urgent situation.

Declaration of interest

None declared.

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- 1 Mongardon N, Zraier S, Haouache H, et al. Postoperative visual loss due to complicated mediastinal dissection and haemorrhagic shock treatment during cardiac surgery. *Br J Anaesth* 2014; **112**: 832–4

doi:10.1093/bja/aev015

Reply from the authors

Another hypothesis for postoperative visual loss after cardiac surgery

Editor—We thank Dr Chamos for his valuable comment on our article.¹ The hypothesis of an extremely high concentration of

norepinephrine in the superior vena cava territory, and thus, the accumulation of this vasoconstrictor agent in the venous drainage from the orbital cavities, is very likely to be a supplementary explanation for the clinical feature of the patient. Conversely, it explains plausible low concentrations of norepinephrine in the rest of the vascular system, and thus, systemic hypoperfusion contributing to the postcardiotomy shock we observed in the intensive care unit. This possibility calls for discussion of a second central venous access in inferior vena cava territory in potentially complex cardiac surgery.

Declaration of interest

None declared.

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- 1 Mongardon N, Zraier S, Haouache H, et al. Postoperative visual loss due to complicated mediastinal dissection and haemorrhagic shock treatment during cardiac surgery. *Br J Anaesth* 2014; **112**: 832–4

doi:10.1093/bja/aev023

Simulation-based training in anaesthesia: have we been training non-technical skills?

Editor—We read with interest the recent article by Lorello and colleagues,¹ in which they performed a meta-analysis regarding the evidence for the effectiveness of simulation-based anaesthesia training. They concluded that simulation training is at least as good as non-simulator training, and is certainly better than no intervention.

They identified 17 studies comparing alternative simulation-based training interventions. They divided these studies into three categories to facilitate the analysis: simulation modality (e.g. box-trainer, mannikin, virtual reality); information sources during debriefing (e.g. video, instructor); and addition of non-technical skills (NTS) training.

Specifically, in the third group, they compared 'routine' simulation-based training (defined as training in medical management) against interventions with non-technical skills training (e.g. incorporating live interactive actors or including broad 'human factors' training). Surprisingly, their search strategy found only four studies; three of them showed a negligible effect for skill outcomes, one study showed a negligible effect for knowledge, and one study showed a large and statistically significant effect for satisfaction. Among these three studies assessing skills, the interventions described were a psychological intensive briefing, a crew resource management (CRM) training, which contains psychological teaching, and an extensive debriefing of NTS. The three studies compared these interventions against a simpler debriefing that focused solely on medical management.

What does this lack of evidence when comparing interventions with NTS training against 'routine' training alone really reflect? Does this mean that teaching non-technical skills is a 'forgotten topic' in anaesthesia education literature? Not necessarily; it is noteworthy that there was a large number of publications where the main topic was CRM training in anaesthesia (32 of 77). In order to mention some examples, we can cite other articles,^{2–6} which describe training with the aim of improving participants' non-technical skills, such as improving communication skills, cognitive and behavioural skills, calling for help early, and distributing tasks.

The *Operator's Guide to Human Factors in Aviation* describes that, in fact, the generic term 'non-technical skill' does comprise all CRM skills [http://www.skybrary.aero/index.php/Assessment_and_Feedback_of_Non-Technical_Skills_(OGHFA_BN)]. To train the anaesthetists' NTS, a CRM approach was adopted, using both classroom and simulator sessions.⁷ Anaesthesia crisis resource management (ACRM) training has been defined by Gaba⁸ as the articulation of principles of individual and crew behaviour that focuses on skills of dynamic decision-making, interpersonal behaviour, and team management. Actually, in 1989 Gaba and colleagues⁹ began to develop a simulation-based curriculum, structured in part on CRM in aviation and its key principles. In this context, while performing ACRM courses, we have been truly training non-technical skills in anaesthesia for years.

Does this mean that there is abundant literature evaluating the effectiveness of simulation as a tool to teach non-technical skills under a different name (anaesthesia crisis resource management training)? Unfortunately, the answer is 'no'. From our point of view, what we are facing here is a gap between what the experts in medical education using simulation tools have been training and what the research has been capable of demonstrating as 'strong' evidence. We totally agree with the lack of evidence comparing interventions with NTS training against 'routine' training alone. Nevertheless, we have evidence to affirm that simulation-based training improves participant's non-technical skills in simulated crisis management.¹⁰

As the evidence increases, we should focus our efforts to describe better how we are doing our training. Do we incorporate psychological teaching, human factors training, or live interactive actors? Do we focus on medical management only? Finally, use of the proper assessment tools, in accordance with our training, will help us to demonstrate the usefulness of this amazing learning tool.

Declaration of interest

None declared.

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doi:10.1093/bja/aev017

Pre-ictal bispectral index values; are they accurate?

Editor—We read with great interest the study by Soehle and colleagues¹ concerning the use of bispectral index monitoring during electroconvulsive therapy (ECT). As the authors note, knowledge of pre-ictal anaesthetic depth is essential for balancing optimal anaesthetic depth to avoid awareness without impeding therapeutic seizure induction and duration.² When anaesthesia is too 'light', the patient risks recall of the electrical stimulus;^{3–5} therefore, the application of bispectral index technology to monitor anaesthetic depth during ECT seems logical to avoid these undesirable extremes.

In our experience, targeted pre-ictal unilateral BIS values did not always accurately reflect the patient's true anaesthetic depth. Our anaesthetic induction technique for the application of ECT mirrors that of Soehle and colleagues,¹ with one exception. Following i.v. induction, circulatory isolation of the foot, and the administration of succinylcholine, we ask the patient to move the toes on the isolated foot immediately prior to ECT stimulation. If the patient responds purposefully, additional i.v. anaesthetic is administered. During our evaluation of pre-ictal BIS assessment of anaesthetic depth, two bilateral temporal ECT patients in a series of 25 responded purposefully to verbal commands after i.v. induction even though the pre-ictal BIS values reflected recommended ranges (40–60) sufficient for general anaesthesia. The BIS values (42 and 40) were further validated using the manufacturer's recommended EMG (48 and 29, respectively) and signal quality