Commentary: More than just the tube

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Interest in enhanced recovery programs (ERPs) has grown rapidly within the cardiac surgery community, demonstrated by several new publications on North American results and a recent evidence-based consensus document.^{1,2} Grant and colleagues³ show that compliance with a multi-faceted intraoperative protocol resulted in improved extubation metrics as well as in reduced hospital length of stay (LOS). The link between intraoperative extubation and LOS may provide a glimpse into the potential background mechanisms that are the foundation of enhanced recovery. Perhaps there is a deeper meaning in these results—we must not focus solely on the tube.

The high-compliance group had a median reduction in intubation time of 3 hours. If patients subsequently continued down their recovery pathway in an unaltered manner, we should expect the same 3-hour reduction in hospital LOS, rather than the reported 20 hours. How can we explain those additional hours? Certainly, there could be health care provider bias that is not captured, despite the rigorous propensity matching performed by the authors. But there are also plausible alternative explanations that deserve consideration.

Incremental marginal gains revealing themselves downstream is a pillar of the ERP movement.⁴ Individual small interventions may not be impactful on their own, but when combined and applied consistently may add up to results greater than the parts. The intraoperative protocol applied by Grant and colleagues³ included interventions aimed toward improved analgesia, opioid use reduction, and lung protection. Although they did not report any outcomes specific to those aims, based on existing literature it is reasonable to hypothesize that improvements would have been found had they been measured. The detrimental physiologic effects of pain and atelectasis, in addition to the various opioid-related side effects, have been well described. Certainly, optimizing those clinical parameters facilitated the successful intraoperative extubation achieved in the high-compliance group. However, there may have

Can removing an endotracheal tube 3 hours earlier save a day in hospital?

Central Message

Optimizing for extubation may benefit patients beyond simply removing the endotracheal tube. Understanding mechanisms behind cumulative downstream effects are important to enhanced recovery programs.

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been unmeasured improvements in postoperative cognition, gut function and nutrition, pulmonary rehabilitation, and mobilization compared with their low-compliance counterparts.

ERPs can seem like an assembly line, with care bundles applied in a predictable and consistent manner. But, in fact, they are still principally delivered by people and thus are subject to the effects of human factors. The fast-paced, chaotic nature of medicine lends itself to health care providers relying on the status quo. The effect of organizational culture and structure on extubation was demonstrated by the fast-track experts from Leipzig, Germany.⁵ Probst and colleagues⁵ randomized identical groups of fast-track-eligible patients to their usual location (a specialized nonintensive care postanesthesia care unit) or intensive care unit. Despite no patient-specific reasons that they could not be extubated at the same rates, the postanesthesia care unit group was extubated significantly sooner (90 minutes vs 478 minutes) as a result of their different location—culture matters.⁵

Extubation is an important quality-of-care metric. Grant and colleagues³ should be congratulated on developing an intraoperative protocol that, when adhered to, results in successful intraoperative extubation. Implementation scientists recommend that we rigorously evaluate our outcomes to determine their true nature, thus increasing the knowledge gained.⁶ If we look beyond the actions directly in front of us, like pulling a tube, we may find that our current

outcomes are also useful for evaluation of indirectly related process measures, human factors, and the deeper understanding of gains from cardiac ERPs, as opposed to being simply the root cause itself.

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