Authors have nothing to disclose with regard to commercial support.

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WHEN AN ANALOGY HAS REACHED THE EXTENT OF ITS USEFULNESS

Reply to the Editor:

Zenati has suggested that the application of the lessons and techniques of aviation safety to the operating room has overlooked an important component of the safety culture in the airline industry, that of the role of air traffic management.[1] Although he is correct that this level of management was not discussed by Hickey and colleagues,[2] the notion that there is an operating room analogy for pilots being relieved of a critical task (managing the course of multiple aircraft within an assigned sector) is a stretch, unless Zenati is alluding to the situation in which a single surgeon is involved in multiple operations simultaneously. In contemplating the hundreds of steps of any cardiac surgical procedure, and the infinite anatomic variants that characterize surgical pediatric cardiac diagnoses in particular, it is difficult to think of an echelon of decision making that could be ''shed'' or assigned to someone other than the principal operator in real time. The situational awareness required in a pediatric cardiac surgical operating room has some similarities to that of a cockpit, but also critical differences. Although surgery task load evaluation is evolving and may lead to some helpful algorithms, virtually all the flow in the operating room must be planned and executed by the expert operating surgeon. One of the most important lessons imprinted by cardiac surgical mentors during the apprenticeship of congenital surgery fellowship is how to sequence surgery, creating a flow to the operation with natural phases, allowing intermittent pauses for rethinking and analyzing. Included in surgical flow is the concept that when there is an unexpected finding, a problem, or a challenge, a skilled surgeon must slow down and carefully analyze the situation, resisting an innate impulse to increase the speed of operating to solve the problem as quickly as possible. Although this may be an example of workload alteration to which Zenati was alluding, the more experienced the surgeon, the more he or she actually interacts with different components of the operative environment (looking at monitors, hearing alarms, reminding other team members of potential upcoming challenges or tasks). This is actually the inverse of the ''task shedding'' that has been suggested.

The preoperative planning process may be an area in which advance decision making can relieve the intraoperative mental workload somewhat. In an analogy with aviation, the surgeon could, in effect, file a flight plan. For example, in our program (as in most), preoperative planning includes a full presentation of the case in a multidisciplinary conference 1 week before the scheduled operation. This case presentation allows full review of the clinical presentation and preoperative imaging and workup and hearty team debate and discussion, resulting in consensus regarding operative goals and risks. We have also adopted a new practice of disseminating a preoperative e-mail that is composed by the attending surgeon and distributed to all health care providers in the heart program. The preoperative e-mail outlines the salient preoperative anatomy, physiology, and comorbidities, followed by a reasonably detailed review of the planned perfusion and operative strategies. This practice has been shown to reduce crossclamp times, even in the hands of surgeons with significant personal operating experience (J. S. Tweddell, personal communication, June 2017). suggesting that there has been some streamlining of intraoperative decision making afforded during the process of composing the preoperative email. Further discussion of mitigating threats or errors in the operative context might be more helpfully conducted without adding to the already complex analogy with the aviation industry model.

Camille Hancock Friesen, MD
R. D. B. Jaquiss, MD
Department of Thoracic and Cardiovascular Surgery
Children's Medical Center and UT Southwestern Medical Center, Dallas, Tex

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