A Cognitive "Safe Zone Rule" to Protect Situation Awareness and Improve Communication in Surgery

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Objective: Team members in the OR are constantly exposed to considerable distractions. Commercial aviation has instituted the sterile cockpit rule to protect situation awareness during critical phases of aircraft operations or emergency situations. Currently, there is no universally accepted definition of a "safe zone rule" (SZR) in surgery. SZR should explicitly prohibit nonessential activities from all team members when task with high risk of negative consequence are being performed. SZR should be public, explicit, formalized, flexible.

Methods: We performed cognitive task analysis (CTA) interviews with cardiac surgery team members at a tertiary referral hospital. The protocol was approved by the IRB and all individuals provided informed consent.

Results: Based on CTA interviews with team members, common phases of cardiac surgery that are associated with high risk of complications were identified (Figure 1).

Conclusion: Based on our results, we propose to formally institute SZR during: (a) Initial Safety pause (b) Pre incision-briefing (c) Heparinization (d) cannulation (c) performance of distal CABG anastomoses (d) Weaning from CPB (e) Needle and sharp counting (f) Debriefing. In addition, an emergency SZR can be called by any team members in case of an emergency.

Fig. 1. Cognitive Demand at Individual and Team Levels for each Surgical Step during CABG

	1. Pre-Induction	2. Induction	3. Sterile Prepping	4. Pre-Incision Time Out	5. Sternotomy	6. Vessel Harvesting	7. Heparinization	8. Cannulation	9. Initiate CPB	10. Clamp Aorta and Deliver Cardioplegia	11. Anastomoses	12. Separate from Bypass	13. Sternal Closure	14. Post-Operative Debriefing
Anesthesiologist	50	73	38	57	53	40	42	82	47	55	43	93	57	43
Perfusionist	27	29	34	35	22	19	45	45	65	73	62	60	34	23
Surgeon	33	12	15	15	18	37	28	53	45	50	87	75	35	32
TEAM	37	38	29	36	31	32	38	60	52	59	64	76	42	33

Cognitive Demand (average)
0 100