Optimizing timing of completion of the Surgical Safety Checklist to account for emergence from anesthesia

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As part of the "Safe Surgery Saves Lives" initiative, the World Health Organization (WHO) launched the Surgical Safety Checklist (SSC) in 2008, aiming to address important surgical safety issues and poor communication among operative team members.[1] In 2009, the Canadian Patient Safety Institute (CPSI) used the WHO SSC as a basis for its own 19-item SSC that would best fit Canadian standards of care and lay the groundwork for local practices[2] (available at https://www.patientsafetyinstitute.ca/en/toolsResources/pages/surgicalsafety-checklist-resources.aspx). Between January and June 2021, 98.5% of surgeries in Ontario reported having completed the checklist.[3] While surgical checklists have undoubtedly improved the safety of surgeries, the SSC misses a key component of the surgical continuum because it is completed before the patient leaves the operating room. We propose an additional checklist item to cover emergence from anesthesia and further increase patient safety.

The SSC was adapted from checklists used in the airline industry. Pilots complete a series of checklists throughout several phases of a flight, including preflight, take-off, approach and landing. These phases are analogous to the phases set out in the SSC. Similar to the preflight phase, the "sign-in" or "briefing" checklist is completed when the patient enters the operating room before induction of anesthesia, where the patient's identity, surgical procedure and site of incision are confirmed. The "time-out" phase occurs immediately before the incision is made and is analogous to the taxiing and take-off phase in a flight checklist, as it is the final opportunity to review the site and planned procedure and anticipate critical events. The final phase, "sign-out" or "debriefing," corresponds to the landing phase of a flight, occurring when or before the patient leaves the operating room.[1] The sign-out stage comprises a review of the procedure, important intraoperative events, fluid management, instrument counts, specimen labelling and management, and recovery plans, including postoperative ventilation, pain management and temperature.[2] This phase includes 3 final questions: "Changes to the postoperative destination?," "What are the key concerns for this patient's recovery and management?" and "Could anything have been done to make this case safer or more efficient?."[2]

Key points

- The World Health Organization introduced the Surgical Safety Checklist (SSC) in 2008 to improve the safety of surgical and anesthetic care, and the Canadian Patient Safety Institute has adapted it for Canadian practice.
- The SSC comprises 3 phases, "sign-in," "time-out" and "sign-out," each designed to represent important stages of the surgical operation.
- Although the sign-in and time-out phases are anchored to an appropriate clinical moment in time, the timing of the sign-out phase is ambiguous and its completion variable.
- The sign-out phase in the current SSC model fails to evaluate the safety of patient emergence, which is the most critical stage of anesthesia.
- We propose enhancing the surgical safety checklist to adequately account for patient emergence from anesthesia.

The sign-out phase should be completed "before the patient leaves the operating room."[1,2] Unlike the sign-in and time-out phases, where the timing of completion is clear, definitive and anchored to a specific clinical moment in time, sign-out can be completed any time before the patient leaves the operating room — even before emergence from anesthesia. This creates the potential for poor communication of critical events during a patient's emergence from anesthesia.

The risks of anesthetic complications are greatest at the final phase of anesthesia.[4,5] Signing out before the patient fully emerges from anesthesia is akin to reporting a safe landing while the airplane is still making its final approach. If the sign-out phase is to review the safety of the patient's entire intraoperative journey from inbound to outbound, then asking whether "anything could have been done to make this case safer or more efficient"[2] before the patient has awakened from anesthesia does not make sense.

Quality improvement work has shown that compliance with SSC debriefing is also the lowest among the 3 phases of the SSC.[6,7] Personnel are often unsure of when and where the debrief should be performed and frequently have competing clinical priorities.[6,7]

In an effort to address compliance, reliability and ambiguity in timing of the sign-out phase, the University Health Network in Toronto — Canada's largest health care research organization and teaching hospital network — recently implemented changes to its local SSC. Rather than specifying that sign-out be completed before the patient leaves the operating room, the new checklist defines the clinical moment for when sign-out is to be completed; that is, before skin closure. However, this change falls short of capturing any adverse events related to emergence from anesthesia, thereby compromising the utility of the SSC to act as a tool to systematically capture and communicate critical information over the entire course of a patient's surgical journey.

To capture data related to anesthetic emergence, we suggest 2 possible modifications to the SSC. The first is to expand the current SSC to include a fourth and final phase, the "sign-off" phase, to be completed after anesthetic emergence, at which time the intraoperative surgical, anesthesia and nursing care teams can evaluate the safety of the surgical procedure in its entirety. Questions related to emergence and overall procedure safety can then be answered reliably and accurately. Adding a fourth phase to the checklist would increase complexity by introducing another commitment, and operating room personnel may view the addition as a time-consuming increase in workload, which may undermine engagement and compliance.[6,8] The addition of this fourth phase — characterized by the surgeon, scrub nurse and anesthesiologist debriefing in the postanesthesia care unit — has, however, been associated with improvements in compliance, team member presence and active participation.[9] To mitigate any perceived burden, the questions asked during the sign-off phase could be simplified. Open-ended questions require qualitative information gathered through focused discussion, which can reduce team member engagement.[10] Questions such as "What are the key concerns for this patient's recovery and management?" might be replaced with "Are there any concerns for recovery?," which elicits a yes or no response but still captures the important safety data.

The second option is to anchor the sign-out to a specific event. Several different clinical anchors for sign-out have been discussed and investigated, including the completion of the first swab and instrument count,[11] during or immediately after skin closure,[12] before final suturing[13] or after patient transfer from the operating table to the transport trolley.[9] However, anchoring sign-out to anesthetic emergence has not been studied. Although we recognize that delaying sign-out until after anesthetic emergence may limit the ability of the surgeon to depart the operating room to speak with a patient's family members, sufficient turnover time often exists between the end of one operation and the beginning of the next to complete this and other tasks.

Multiple factors, including organizational context, culture and community, will ultimately dictate how the SSC is implemented and the level of provider compliance. Adding a sign-off phase, anchoring sign-out to anesthetic emergence, or some other organic approach that best fits local practice can improve overall safety. Only then can the success of the operation be reliably and accurately evaluated, and SSC-driven safety data considered truly valid.

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