Special Communication

Improving Safety and Quality of Care With Enhanced Teamwork Through Operating Room Briefings

Caitlin W. Hicks, MD, MS; Michael Rosen, PhD; Deborah B. Hobson, RN; Clifford Ko, MD, MS; Elizabeth C. Wick, MD

OBJECTIVES To describe the current state of the science for operating room (OR) briefings and debriefings, including an overview of key definitions, a review of the evidence of effectiveness, and a summary of our experiences as part of a comprehensive unit–based safety program.

OVERVIEW Use of preoperative briefings has been shown to improve team communication, decrease disruptions to surgical workflow, improve compliance with antibiotic and deep vein thrombosis prophylaxis, and improve overall perceptions about the safety climate in the OR. Studies have demonstrated that an effective briefing can be performed in less than 2 minutes and reduce delays by more than 80%. Effective implementation involves changing workflows and expectations of interaction among OR team members, including participation from leaders at all levels. Briefings and debriefings are a strategy for revealing defects and facilitating adaptive change in the OR.

CONCLUSIONS AND RELEVANCE Briefings and debriefings are a good method for improving teamwork and communication in the OR. Effective implementation may be associated with improved patient outcomes. Commitment by the participating providers is essential for effective briefings, which include discussion of relevant information pertaining to the procedure.

Author Affiliations: Department of Surgery, The Johns Hopkins University, Baltimore, Maryland (Hicks, Hobson, Wick); Armstrong Institute, The Johns Hopkins University, Baltimore, Maryland (Rosen, Hobson); Division of Research and Optimal Patient Care, American College of Surgeons, Chicago, Illinois (Ko).

Corresponding Author: Elizabeth C. Wick, MD, Department of Surgery, The Johns Hopkins University, 600 N Wolfe St, Blalock 658, Baltimore, MD 21287 (ewick1@jhmi.edu).

In the past 10 years, the importance of operating room (OR) teamwork and communication for optimizing workflow, preventing errors, improving safety climate, and achieving good patient outcomes has received significant attention.[1] Many hospitals have devoted significant time and resources to implementing team training and teamwork tools to improve the OR culture. Engagement of surgeons, anesthesiologists, nurses, and technicians is essential to improvement. Communication should be a give-and-take process that considers the needs of each team member. It is not uncommon for team members to have different expectations for communication and perceptions of the quality of teamwork within their OR teams. In a large quality improvement project in the Veterans Health Administration,[2] nurses defined collaboration as having their input respected, whereas surgeons defined collaboration as having nurses anticipate their needs and follow instructions. Nursing staff frequently describe worse communication in the OR compared with their anesthesia and surgery counterparts,[3] reportedly owing to a fear of speaking up.[2] Improvement requires improving the culture and empowering all health care professionals to feel engaged.

Team briefings and debriefings are one way to address OR communication failures. Structured briefings and debriefings encourage open discussion among the OR team and provide a systematic process to ensure critical information and defects are revealed and shared with all team members.[4] Routine implementation of preoperative briefings can be an efficient means to improve surgical workflow.[5,6] However, implementing effective briefings and debriefings can be more difficult than it sounds. In this article, we describe the current state of the science for briefings and debriefings, including an overview of key definitions, a review of the evidence of effectiveness, and a report of our experience implementing briefings and debriefings as part of a comprehensive unit–based safety program (CUSP). We also summarize the major challenges encountered, in our experience and in the broader literature. Institutional review board approval was not required, as this was a quality improvement initiative.

Defining a Briefing

Unlike the standard preoperative time-out that was developed by The Joint Commission as part of its Universal Protocol,[7] preoperative briefings rely on 3-way communication between the surgeons, nurses, and anesthesiologists participating in a surgical case. A time-out involves (1) confirmation of patient identity, (2) identification of the correct side and site that is to be operated on, and (3) agreement on the procedure to be done. In a briefing, team members introduce themselves by name and role; a traditional time-out is performed; and then a formal review by the anesthesiological, surgical, and nursing staff is performed (**Table 1**). Although the process sounds

extensive and time consuming, studies have demonstrated that an effective briefing can be performed in less than 2 minutes,[5] and that, after implementation, surgeon-reported delays are reduced by more than 80%.[6]

Existing Evidence of the Effectiveness of Briefings

A number of prospective studies have examined the effect of preoperative briefings on various measures of surgical efficiency (Table 2). In general, use of preoperative briefings improves team communication, decreases disruptions to surgical workflow, improves compliance with antibiotic and deep vein thrombosis prophylaxis, and improves overall perceptions about the safety climate in the OR. In addition, a handful of more recent studies have also demonstrated an improvement in patient outcomes with the use of formalized teamwork protocols. In an analysis of more than

180 000 surgical procedures performed at Veteran's Health Administration sites, sites that completed teamwork training had an 18% reduction in annual mortality rates compared with a 7% decrease among sites that did not undergo training.[16] Similarly positive outcomes associated with formalized team training are reported for intraoperative adverse events[13] and postoperative morbidity.[14]

Why Implementing Briefings and Debriefings Is Harder Than It Sounds

Briefings and debriefings are frequently thought of in terms of checklists. While these are critical components of the process, they are insufficient on their own. Implementing a briefing and debriefing process involves changing workflows and expectations of interaction among OR team members who are strongly rooted in tradition. First, the briefing protocol must fit the local workflows and constraints. For example, different local factors will determine which staff members are available at what times, among other factors. These need to be accounted for in developing a briefing and debriefing process that works in reality. Second, a large proportion of the gains in complication and mortality rates associated with checklists is correlated with preexisting safety culture.[17] Essentially, units with a high safety culture see a benefit, and those without do not. This indicates that, not surprisingly, the degree to which staff value and prioritize the briefing and debriefing process influences how effective it is. This also indicates that training and reinforcement of the value of briefings and debriefings are required to build a culture of safety if it does not already

Table 1. Components of a Preoperative Briefing

Step	Details
Introduction	Team members introduce themselves by name and role
Time-out	Patient identity is confirmed, the correct side and site that is to be operated on is identified, and the procedure to be done is agreed on
Anesthesia review	Airway concerns, allergies, special medications, and expectations for recovery are addressed
Surgical review	Procedural concerns and/or anticipated difficulties, expected duration of case, anticipated amount of blood loss, and need for nonstandard instruments and/or supplies are determined
Nursing review	Equipment and/or instrument concerns, plan for managing sharp instruments, and patient considerations are addressed

Table 2. Overview of Key Studies Evaluating Effects of Preoperative Briefings and Teamwork Training

Outcome Category	Source	Primary Outcome Metric	Effect of Preoperative Briefing
Attitudes	Allard et al,[8] 2011	Safety Attitude Questionnaires	Perception of better safety climate
	Bandari et al,[9] 2012	Perceived effectiveness in revealing surgical defects	Agreement of 87% that briefings were effective for identifying defects (most commonly instrument and communication defects)
Communication and surgical flow	Lingard et al,[10] 2008	No. of communication failures per procedure	Significant decrease in communication failures per procedure (3.95 before briefing vs 1.31 after)
	Nundy et al,[6] 2008	Percentage of unexpected delays and of communication breakdowns per procedure	Reduction of 31% for unexpected delays and 19% for communication breakdowns
	Henrickson et al,[5] 2009	No. of surgical flow disruptions per procedure	Significant decrease in surgical flow disruptions per procedure (5.4 before briefing vs 2.8 after)
	Ali et al,[11] 2011	Operating start times	No statistical difference in operating start time after introduction of preoperative briefings
Prophylaxis compliance	Lingard et al,[4] 2011	Prophylactic antibiotic administration timing	Improved physician compliance with antibiotic administration guidelines (77.6% before briefing vs 87.6% after)
	Paull et al,[12] 2010	Antibiotic and deep venous thrombosis prophylaxis compliance rates	Increased compliance rates for antibiotic (97% vs 92%) and deep venous thrombosis (96% vs 85%) prophylaxis
Morbidity and mortality	Neily et al,[13] 2011	No. of adverse events per mo	Adverse events decreased from 3.21 to 2.4 per month with use of medical team training
	Young-Xu et al,[14] 2011	Annual surgical morbidity rates	Annual surgical morbidity rates declined 20% more with team training vs without
	Mazzocco et al,[15] 2009	ASA-adjusted OR of complication or death	Increased teamwork (information sharing and briefing) reduced odds of complication or death (OR, 0.21)
	Neily et al,[16] 2010	Annual mortality rate	Risk-adjusted surgical mortality rate was reduced more in programs that used preoperative briefing (RR, 1.49)

Abbreviations: ASA, American Society of Anesthesiologists physical status classification; OR, odds ratio; RR, risk ratio.

Figure 1. Original Briefing and Debriefing Form

The Johns Hopkins Hospital
Operating Room Briefing/Debriefing Tool

Case #: _____

Briefing – **Before every procedure:** (Circulating Nurse to complete)		Yes	No	Comment
Nurse	• Have the team members been introduced with their first and last names and roles? *(Circulating Nurse writes names and roles on board)*			
	• Do the Patient ID band, Informed Consent, Site Marking, OR posting, verbalization of procedure (if patient is awake) and any other relevant documentation (H & P, clinic note) match?			
Anesthesia	• Have antibiotics been given, if indicated?			
	• What are the anticipated times of antibiotic redosing?			
	• Is there a need for glucose management? If so, what?			
	• Has the patient been positioned to minimize injury?			
	• Are warmers on the patient?			
Surgeon	• Have the goals and critical steps of the procedure been discussed?			
	• Has DVT prophylaxis been addressed?			
	• What is anticipated blood loss?			
	• Is the appropriate amount of blood available?			
	• Does the patient require special precautions? If so, what?			
	• Do the people operating the equipment know how to use it?			
	• Based on your most recent estimate of the needs, is the time allotted for this procedure an accurate estimate?			
	• Has Attending reviewed latest/final test results for lab and/or radiology?			
	• Are there any safety, equipment, instrument or implant concerns?			

_____   _____   _____
    Circulating Nurse   **Anesthesia Provider**   **Attending Surgeon**

Debriefing - **After every procedure:** (Anesthesia Provider to complete)		Yes	No	Comment
Nurse	• Is there anything that we could have done differently to make the case safer or more efficient?			
Anes.	• Is the OR portion of the SSI Data Collection Tool complete? (Only applicable to the Neuro and Cardiac Services at the present time)			
Surgeon	• Are the patient name and history number and the surgical specimen name and laterality on the paperwork? *(Paperwork and labeling to be independently verified by Surgeon)*			
	• Were all instruments available and useable?			
	• Plan for transition of care from OR to ICU/PACU/Inpatient Unit			
	• Fluid management/blood			
	• Antibiotics – continue post op *(dose/interval)*			
	• PACU Tests or Xrays			
	• Pain/PCA plan			
	• New meds needed *(immediate periop)*			
	• Beta blockers *(if needed)*			
	• Glucose Management *(if needed)*			
	• DVT Prophylaxis			

_____   _____   _____
    Circulating Nurse   **Anesthesia Provider**   **Attending Surgeon**
Additional comments may be written on the back

Original hospitalwide briefing and debriefing form. DVT indicates deep vein thrombosis; H & P, history and physical; ICU, intensive care unit; ID, identification; OR, operating room; PACU, post-anesthesia care unit; PCA, patient-controlled anesthesia; post op, postoperative; SSI, surgical site infections. Reproduced with permission from the authors.

Figure 2. Comprehensive Unit–Based Safety Program Debriefing Form

COLORECTAL CUSP SURGICAL SAFETY CHECKLIST (2 ED.)

JOHNS HOPKINS
MEDICINE

Before induction of anesthesia → *Before skin Incision* → *Before patient leaves OR*

Sign In	**Time Out**	**Sign Out**

● Patient has Confirmed:
• Identity (Name/DOB)
• site (along with markings)
• procedure
• consent
 	
● Does Patient have a:
• Known Allergy_____
 	
● Difficult Airway/Aspiration Risk?
 	
● Access Issues:_____
 	
● Pre-Op Concerns:_____
_____
_____
_____
	○ Introduction of Team
	
	○ Confirmation of:
	• Correct Patient
	• Site
	• Procedure
	• Opening Temp _____(in OR)
	
	○ Anticipated Critical Events
	• Surgeon Review:
	  • critical or unexpected steps, operative duration, anticipated blood loss?
	  • separation of clean and dirty instruments
	• Anesthesia Review:
	  • patient-specific concerns?
	• Circulating Review:
	  • Equipment availability, malfunctions, or concerns:
	
	○ Critical Issues:
	• DVT Prophylaxis
	  • SubQ Heparin Q8 (marked on board)
	  • SCDs
	• Steroid Coverage (50mg Hydro)
	  • Has a steroid taper
	• Abx
	  • selection
	  • dose
	  • redose (marked on board)
	• Starting Hgb_____
	  • Blood Available
	• Glycemic Control starting BG____
	  • BG <180 (plan)
	• Beta Blockade
		○ Nurse Verbally confirms with Team:
		• Count correct
		• Specimens labeled correctly
		• clean/dirty instrument separation
		• Equipment Issues/Review
		
		Operator error v. posting error:
		_____
		
		○ Team Review concerns:
		• Beta blockade
		• Blood
		• Glycemic Control (BG < 180)
		• Pain Management
		• DVT Prophylaxis
		  • Sub Q Heparin Q8
		  • SCDs
		  • can foley be d/c'd within 24hrs.

Addressograph

Case #
Surgeon:
Date:

COLORECTAL CUSP SURGICAL SAFETY CHECKLIST (2 ED.)

Items to be addressed: (please provide your comments and your contact information and we will follow-up personally on any issue you address:_____

● N/A: no comments--everything was great!!

● Attending surgeon:_____

● Anesthesia personnel: _____

● Circulating nurse:_____

Issues or comments:
_____
_____
_____
_____
_____
_____

contact information for response and/or follow-up:
_____

Minor Procedures
● Patient has Confirmed: • Identity (Name/DOB) • procedure • consent • Urine pregnancy test complete (if female)   ● ID Names/role of surgical team   ● Antibiotics given if appropriate?   ● Patient positioned to prevent injury   ● Potential problems of the case identified and discussed   ● All equipment available for case/ staff have working knowledge of equipment

Briefing and debriefing form developed by the comprehensive unit–based safety program team. Abx indicates antibiotics; BG, blood glucose; CUSP, comprehensive unit–based safety program; d/c'd, discontinued; DOB, date of birth; DVT, deep vein thrombosis; Hgb, hemoglobin; Hob, head of bed; Hydro, hydrocortisone; ID, identification; N/A, not applicable; OR, operating room; pre-op, preoperative; Q8, every 8; SCDs, sequential compression devices; SubQ, subcutaneous. Reproduced with permission from the authors.

exist. Third, the efficacy and long-term sustainment of preoperative briefings is dependent on facility leadership support.[18] Leaders at all levels must communicate and endorse the value of briefings and debriefings.

Building a Briefing Process and Supportive Culture

We recently described the implementation of an OR CUSP that was charged with reducing surgical site infections (SSI) and improving culture and teamwork in the colorectal OR.[19] Implementation of a CUSP has previously been associated with reduced health care–associated infections as well as cost savings in more than 100 intensive care units.[20] The goal of CUSPs is to educate providers on the science of safety and then empower, with the support of hospital leadership, frontline staff to identify and address preventable harm. At our institution, a group of frontline surgeons, anesthesiologists, nurses, and technicians worked with a hospital executive to implement evidence-based SSI prevention interventions and develop infrastructure for addressing regularly noted defects that affected patient safety. Operating room defects were identified through the redesign of the briefing and debriefing process in the colorectal ORs. In 1 year, we observed a 33% reduction in colorectal SSI and qualitative reports of improved OR culture.[19]

Before this project, a standard briefing and debriefing form was used in all inpatient ORs at The Johns Hopkins Hospital (**Figure 1**). Staff rarely used the form because it was cumbersome, points were frequently not applicable to cases, and there was no infrastructure for addressing concerns documented on the form. Instead, in most cases, a time-out limited to patient identifiers and antibiotic administration was done by the surgeon, anesthesiologists, and circulating nurse. The team realized that to implement specific SSI-related evidence-based practices with high fidelity and improve OR teamwork and culture, a new process was needed for briefing and debriefing. The CUSP team (nurses, technicians, certified registered nurse anesthetists, anesthesiologists, and surgeons) developed a briefing form with points relevant to patients receiving colorectal surgery (**Figure 2**). For example, in the briefings, focused questions relevant to colorectal surgery were added, such as, "Are perioperative steroids needed?" For debriefing, in addition to including a short list of housekeeping points for the conclusion of the case, the group focused on an unstructured feedback area to reveal process defects. As part of the debriefing, all providers were encouraged to document defects that affected the success of the case on the form. Before using the new briefing and debriefing forms, a system was put in place for addressing defects. Together with OR and hospital leadership, resources were secured for a frontline nurse, supported by the OR nurse manager and administrator, to spend 4 to 6 hours per week addressing defects revealed during briefings and debriefings and communicating system fixes to providers weekly. Examples of defects that were revealed and addressed through these debriefings are listed in **Table 3**.

Initial feedback after implementation of the briefing and debriefing protocol was positive, but certified registered nurse anesthetists, nurses, and technicians thought the effort was being led predominantly by the circulating nurse, and the team believed more surgeon engagement was needed for success and durability. To improve engagement, a brief presentation and discussion was held with

Table 3. Defects Identified by CUSP Debriefings from November 2011 to November 2012 (383 Cases)

Defects Identified	No.
Instruments/equipment/supplies	32
Posting errors	23
Preoperative nursing concerns	22
Communication/teamwork	12
Patient-related issues	7
Pharmacy	3
Other	2

Abbreviation: CUSP, comprehensive unit–based safety program.

the team surgeons. As a result of this discussion, the surgeons decided, for all briefings, to lead the team introductions and then discuss potential case hazards and alternatives. One of the SSI prevention interventions implemented by the team was isolation of dirty instruments used for bowel anastomosis. Nurses and technicians said this was difficult because the surgeons did not communicate when they were starting and ending the "dirty" portion of the procedure. With this feedback, the surgeons decided to include this point in the briefings as well. Defects continued to be revealed through debriefings and were addressed by the lead registered nurse, with support from the OR nurse manager and surgical administrators (Table 3).

The CUSP team, with the goal of integrating all aspects of the care of the surgical patient, has representation from the preoperative area, postoperative recovery unit, hospital ward, and surgical scheduling staff. Through the CUSP team, the lead registered nurse is able to connect with frontline providers from other aspects of surgical care to correct system defects. For example, although a system was in place to arrange for interpreters on the day of surgery for patients who did not speak English, it was common for this arrangement to fail, leading to significant delays. Through the debriefing process, we were able to change the location on the surgery schedule where patients were flagged who did not speak English, so the preoperative nurses could confirm the interpreter appointments the day before surgery.

Although it is labor intensive to engage frontline providers from multiple areas to address preoperative, perioperative, and postoperative defects, it is likely that solutions developed with this approach will be more sustainable and widely embraced than those developed with a top-down approach. Focused feedback, surgeon-identified modifications to the briefings and debriefings, and ongoing work to address continued OR process defects have improved compliance with the briefing and debriefing technique. However, it is an ongoing and iterative process to develop a high-fidelity system to promote teamwork and communication in the OR.

Conclusions

Briefings and debriefings are a good method for improving teamwork and communication in the OR, and effective implementation may be associated with improved patient outcomes. Commitment by the participating providers is essential for effective briefings, which include discussion of relevant information pertaining to the procedure.

REFERENCES

1. Wiegmann DA, ElBardissi AW, Dearani JA, Daly RC, Sundt TM III. Disruptions in surgical flow and their relationship to surgical errors: an exploratory investigation. *Surgery*. 2007;142(5):658-665.

2. Carney BT, West P, Neily J, Mills PD, Bagian JP. Differences in nurse and surgeon perceptions of teamwork: implications for use of a briefing checklist in the OR. *AORN J*. 2010;91(6):722-729.

3. Makary MA, Sexton JB, Freischlag JA, et al. Operating room teamwork among physicians and nurses: teamwork in the eye of the beholder. *J Am Coll Surg*. 2006;202(5):746-752.

4. Lingard L, Regehr G, Cartmill C, et al. Evaluation of a preoperative team briefing: a new communication routine results in improved clinical practice. *BMJ Qual Saf*. 2011;20(6):475-482.

5. Henrickson SE, Wadhera RK, Elbardissi AW, Wiegmann DA, Sundt TM III. Development and pilot evaluation of a preoperative briefing protocol for cardiovascular surgery. *J Am Coll Surg*. 2009;208 (6):1115-1123.

6. Nundy S, Mukherjee A, Sexton JB, et al. Impact of preoperative briefings on operating room delays: a preliminary report. *Arch Surg*. 2008;143(11): 1068-1072.

7. The Joint Commission. Universal Protocol. http: //www.jointcommission.org/standards _information/up.aspx. Accessed October 6, 2013.

8. Allard J, Bleakley A, Hobbs A, Coombes L. Pre-surgery briefings and safety climate in the operating theatre. *BMJ Qual Saf*. 2011;20(8):711-717.

9. Bandari J, Schumacher K, Simon M, et al. Surfacing safety hazards using standardized operating room briefings and debriefings at a large regional medical center. *Jt Comm J Qual Patient Saf*. 2012;38(4):154-160.

10. Lingard L, Regehr G, Orser B, et al. Evaluation of a preoperative checklist and team briefing among surgeons, nurses, and anesthesiologists to reduce failures in communication. *Arch Surg*. 2008;143(1): 12-18.

11. Ali M, Osborne A, Bethune R, Pullyblank A. Preoperative surgical briefings do not delay operating room start times and are popular with surgical team members. *J Patient Saf*. 2011;7(3):139-143.

12. Paull DE, Mazzia LM, Wood SD, et al. Briefing guide study: preoperative briefing and postoperative debriefing checklists in the Veterans Health Administration medical team training program. *Am J Surg*. 2010;200(5):620-623.

13. Neily J, Mills PD, Eldridge N, et al. Incorrect surgical procedures within and outside of the operating room: a follow-up report. *Arch Surg*. 2011; 146(11):1235-1239.

14. Young-Xu Y, Neily J, Mills PD, et al. Association between implementation of a medical team training program and surgical morbidity. *Arch Surg*. 2011;146 (12):1368-1373.

15. Mazzocco K, Petitti DB, Fong KT, et al. Surgical team behaviors and patient outcomes. *Am J Surg*. 2009;197(5):678-685.

16. Neily J, Mills PD, Young-Xu Y, et al. Association between implementation of a medical team training program and surgical mortality. *JAMA*. 2010;304 (15):1693-1700.

17. Haynes AB, Weiser TG, Berry WR, et al; Safe Surgery Saves Lives Study Group. Changes in safety attitude and relationship to decreased postoperative morbidity and mortality following implementation of a checklist-based surgical safety intervention. *BMJ Qual Saf*. 2011;20(1):102-107.

18. Paull DE, Mazzia LM, Izu BS, Neily J, Mills PD, Bagian JP. Predictors of successful implementation of preoperative briefings and postoperative debriefings after medical team training. *Am J Surg*. 2009;198(5):675-678.

19. Wick EC, Hobson DB, Bennett JL, et al. Implementation of a surgical comprehensive unit–based safety program to reduce surgical site infections. *J Am Coll Surg*. 2012;215(2):193-200.

20. Pronovost P, Needham D, Berenholtz S, et al. An intervention to decrease catheter-related bloodstream infections in the ICU. *N Engl J Med*. 2006;355(26):2725-2732.