Preoperative goal setting and perioperative communication in an academic training institution: Where do we stand?

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ABSTRACT

Background: We collected data regarding specific aspects of perioperative surgical education within our institution's Section of Surgical Sciences as a needs assessment.
Methods: Categorical general surgery residents and attending surgeons were queried regarding their perceptions of resident preoperative planning and perioperative communication.
Results: The overall response rate was 81%, with 35 resident and 54 faculty respondents. Residents reported selecting an operative learning objective a median of 50% (IQR 36–67) of the time, whereas attending surgeons perceived this to be the case a median of 26% (IQR 15–35) of the time (P < 0.001). The group reported median frequencies of 20% (IQR 9–31) for preoperative discussion of learning objectives, 12% (IQR 4–27) for preoperative discussion of competence and 27% (IQR 17–55) for postoperative debriefing.
Conclusions: This study demonstrates deficits in resident goal setting and perioperative communication within our program, which are targets for future intervention. We share these results as a potential tool for other programs.

Introduction

There is rising concern that today's surgical trainees are not fully competent to enter independent general surgery practice. Recent data demonstrate that trainees leave residency feeling unequipped,[1] and in accordance with this data, 21% of fellowship directors felt fellows were unprepared for the operating room in 2013.[2] A recent study by George et al. further emphasizes that general surgery residents in the United States are not universally prepared to perform core surgical procedures independently.[3]

Part of this issue may stem from the fact that perioperative education is currently at risk.[4,5] With duty hour restrictions for residents and financial pressures to be productive for faculty, both parties may be less willing to emphasize the educational aspects of an operation. A survey of residents from nearly 60% of ACGME-accredited general surgery residency programs revealed that only 18% of residents agreed that educational goals related to a procedure were discussed in the preoperative setting and only 37% of residents agreed that areas for improvement were discussed postoperatively.[5] Similarly, the reported rates of postoperative feedback were less than 50%. Possible causative factors include work-hour restrictions, medical-legal responsibilities, and increasing emphasis on cost-effectiveness and efficiency.

We collected data regarding the current status of preoperative planning, perioperative communication, and receipt of post-operative feedback from resident trainees and attending surgeons in an academic general surgery residency program as a means of needs assessment. The primary objective of this study was to determine if there were remediable deficiencies in surgical education that could subsequently set the stage for educational intervention.

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Material and methods

Survey participants

This study was reviewed and exempted by the Vanderbilt University Institutional Review Board (IRB #161623). Participants were recruited from the Section of Surgical Sciences at Vanderbilt University Medical Center, a major tertiary university-affiliated academic care center, in November of 2016. All categorical general surgery residents at and above the 2nd post-graduate year (PGY) (n = 45) and all clinically active surgical faculty who regularly interact with these residents (n = 65) were queried via a web-based survey.[6]

Survey design

Each survey contained five questions regarding participants' perceptions on resident preoperative preparation and perioperative communication, including postoperative debriefing (Fig. 1a and b). Instruments were developed by a surgical resident and faculty surgeon and vetted with a small group of surgical residents and a PhD educator as part of a surgical education research fellowship. Question verbiage was tailored to either the resident or the faculty with the principle aim of the question remaining uniform between survey tools. Responses were distributed on a scale that ranged from "Never" (0) to "All of the time" (100), requiring respondents to drag a slider bar to correlate with the frequency of the action. Participants were also asked what residents (or if a resident, what "you") could do to better prepare for operative cases with multiple-choice options as well as a choice of "Other" to allow for open-ended responses. Reference to the Zwisch scale of progressive autonomy was made in both surveys with an available explanatory table.[7] This validated tool for performance assessment[8] was already well-known to the department, as all participants had taken part in a separate training session as part of a separate multi-institutional trial.[9] Postoperative feedback was defined as any debriefing session, whether this involved using the smartphone application, SIMPL (System for Improving and Measuring Procedural Learning),[9] or general verbal feedback, in an attempt to capture all forms of postoperative debriefing and to not limit the study to just SIMPL users (which encompasses less than 50% of faculty and residents).

Statistical analysis

Descriptive statistics were compiled for all responses based on resident or attending surgeon status. Surveys were anonymous but completion data was available for all invited participants. For participants with incomplete responses, only answered questions were included in the analysis. Categorical variables were expressed in numerical figures and percentages and compared using the Fisher's exact or chi-square test, as appropriate. Continuous variables were expressed as the median (interquartile range [IQR]) and compared using the Mann-Whitney U test. All P values were two-sided and $P < 0.05$ was deemed statistically significant. All statistical analysis was performed using JMP Pro software (version 12; SAS Institute Inc., Cary, NC).

Results

Study participants

The overall response rate was 81%. Thirty-five out of 45 total residents responded (78%), and 54 out of 65 total attending surgeons responded (83%). Fourteen (40%) of responding residents were junior trainees (PGY2-3), 12 (34%) were in their dedicated professional development time, and 9 (26%) were senior residents (PGY4-5). Response rates based on PGY are as follows: 7/8 PGY2 (88%), 7/8 PGY3 (88%), 4/8 PGY4 (50%), 6/8 PGY5 (75%), and 11/13 residents in dedicated professional development time (85%). The majority of faculty respondents were from the Department of Surgery within the Section of Surgical Sciences (87%). The other respondents included members of the Departments of Pediatric and Thoracic Surgery (13%). Two attending surgeon surveys were incomplete: one survey with one unanswered question and the other survey with two unanswered questions. All other surveys were complete.

Perceptions on resident preoperative preparation

Residents reported coming to the operating room with a learning objective a median frequency of 50% of the time (IQR 36–67), whereas attendings perceived that residents came prepared with a learning objective 26% of the time (IQR 15–35; $P < 0.001$). When asked what he or she "most needs to improve on" in regards to case preparation, the majority of residents answered "breaking the operation down into key steps" (43%) or "identifying a learning objective" (29%). The majority of attending surgeon respondents also selected the aforementioned choices, however they answered "understanding more about the patient, disease process, or diagnosis" in 15% of cases ($P = 0.106$). Number and percentage of respondents for each choice are listed in Table 1. A breakdown of the responses is further shown in Fig. 2 with open-ended "Other" responses described in the footnotes.

Perceptions on perioperative communication

Three survey questions targeted perioperative communication. These results are also shown in Table 1. Residents indicated that they discussed learning objectives with the attending prior to an operation a median frequency of 25% of the time (IQR 15–33). Attending surgeons reported that residents discuss learning objectives with them a median frequency of 16% of the time (IQR 4–28; $P = 0.019$). The median frequency with which residents reported discussing their current level of competence with the attending before a case was 8% (IQR 1–19). Attending surgeons answered that residents discuss competence with them preoperatively a median frequency of 19% of the time (IQR 9–29; $P = 0.002$). Finally, residents and attendings reported participating in postoperative feedback with a median frequency of 25% (IQR 17–50) and 32% (IQR 12–67), respectively ($P = 0.473$).

Discussion

By analyzing the perceptions of both general surgery residents and faculty, this study highlights important deficits in specific areas of perioperative education at our institution. The first major area in need of attention is preoperative goal setting. We view every operative case as a learning opportunity; despite this, residents at our institution reported coming to the operating room with a learning objective only 50% of the time. In a recent survey reported by one academic general surgery program, residents prepared for cases by at least reviewing the patient's record 98% of the time, however, only 30% of residents felt "very prepared" for cases.[10] Accordingly, we feel that the surgical trainees in our analysis prepared for operative cases more than 50% of the time, but perhaps were not specifically choosing a learning objective for each procedure. Given the evidence that pure discovery learning is inefficient and not nearly as effective as guided learning, this presents a problem.[4,11–13] While some discovery is inevitable in operative procedures, *guided* discovery that includes a shared discussion of

a

Please answer the following questions regarding perioperative education to the best of your ability.

1   I come to the operating room with a specific learning objective in mind (i.e. - "I would like to focus on better utilization of my left hand on this lap chole"):

Never   Half of the time   All of the time

Indicate response by dragging the slider bar

2   I discuss a specific learning objective with the attending prior to starting the case:

Never   Half of the time   All of the time

Indicate response by dragging the slider bar

3   In order to better prepare for cases, I most need to improve on:

○ Breaking the operation down into key steps
○ Identifying a learning objective or area of focus for the operation
○ Reviewing the anatomy
○ Practicing surgical technique
○ Understanding more about the patient, disease process, or diagnosis
○ Other (different area than above)

Define "Other": _____

4   I discuss my current level of competence for a case (in general, or using the Zwisch scale*) with the attending prior to starting the case:

Never   Half of the time   All of the time

Indicate response by dragging the slider bar

5   I participate in a post-operative debriefing session with the attending (using the SIMPL app or verbal feedback):

Never   Half of the time   All of the time

Indicate response by dragging the slider bar

b

Please answer the following questions pertaining to categorical general surgery residents (R2-5) to the best of your ability.

1   Residents come to the operating room with a specific learning objective in mind (i.e. - "I would like to focus on better utilization of my left hand on this lap chole"):

Never   Half of the time   All of the time

Indicate response by dragging the slider bar

2   Residents discuss a specific learning objective with me prior to starting the case:

Never   Half of the time   All of the time

Indicate response by dragging the slider bar

3   In order to better prepare for cases, residents most need to improve on:

○ Breaking the operation down into key steps
○ Identifying a learning objective or area of focus for the operation
○ Reviewing the anatomy
○ Practicing surgical technique
○ Understanding more about the patient, disease process, or diagnosis
○ Other (different area than above)

Define "Other": _____

4   Residents discuss their current level of competence for a case (in general, or using the Zwisch scale*) with me prior to starting the case:

Never   Half of the time   All of the time

Indicate response by dragging the slider bar

5   I participate in post-operative debriefing sessions with residents (using the SIMPL app or provide verbal feedback):

Never   Half of the time   All of the time

Indicate response by dragging the slider bar

Fig. 1. (a): Resident survey assessment tool (*explanatory table available; SIMPL, System for Improving and Measuring Procedural Learning), **(b):** Attending surgeon survey assessment tool (R2-5, Residents in Clinical Years 2–5; SIMPL, System for Improving and Measuring Procedural Learning).

Table 1
Survey responses.

No. of respondents	Total	Resident	Attending	P^a
	89	35	54	
Resident Preoperative Preparation				
Residents come to the operating room with a learning objective[c]	34 (20—52)	50 (36—67)	26 (15—35)	<0.001
Area most needing improvement for resident case preparation, number of respondents (percentage)[d]				
Breaking the operation down into key steps	40 (45)	15 (43)	25 (46)	0.106[b]
Identifying a learning objective	23 (26)	10 (29)	13 (24)	
Reviewing the anatomy	6 (7)	4 (11)	2 (4)	
Practicing surgical technique	7 (8)	3 (9)	4 (7)	
Understanding more about the patient, disease, or diagnosis	8 (9)	0 (0)	8 (15)	
Other[d]	5 (6)	3 (9)	2 (4)	
Resident & Attending Perioperative Communication				
Residents discuss learning objectives with attending[e]	20 (9—31)	25 (15—33)	16 (4-28)	0.019
Residents discuss competence with attending	12 (4—27)	8 (1—19)	19 (9—29)	0.002
Residents participate in postoperative feedback	27 (17—55)	25 (17—50)	32 (12—67)	0.473

Values in table reported as median frequency (interquartile range) unless otherwise indicated.
  [a] Mann-Whitney U test unless indicated otherwise.
  [b] Fisher's Exact test.
 [c] Missing data for 2 attending respondents.
  [d] Responses are also shown in Fig. 2 with descriptions of open-ended "Other" responses.
  [e] Missing data for 1 attending respondent.

learning objectives aligns the goals for an operation.[14,15] Preoperative briefing with learner-centered goal setting, combined with structured training and deliberate practice of a specific task leads to superior results.[4,15—17] Our analysis revealed that 26% of all respondents felt that residents needed to focus more on "identifying a learning objective" and 45% felt "breaking the operation down into key steps" was most important. The concept of breaking an operation into steps is a recognized teaching strategy that allows trainees to focus on a specific operative step appropriate to their skill level without adding to the duration of a case.[18] Applicable to most procedures, this approach prioritizes patient safety and operative efficiency, while reinforcing the need for preoperative goal setting by the trainee.

The current literature supports our findings of disparities between resident and attending perceptions of resident preparation.[13,19] These discrepancies highlight a lack of overall communication. Perioperative communication has been demonstrated in the surgical literature to be a critical issue, often at the core of surgical errors and patient care-centered deficits.[20,21] In our analysis, trainees and faculty reported that preoperative discussion of learning objectives occurs approximately 20% of the time and preoperative discussion of resident competence levels occurs just
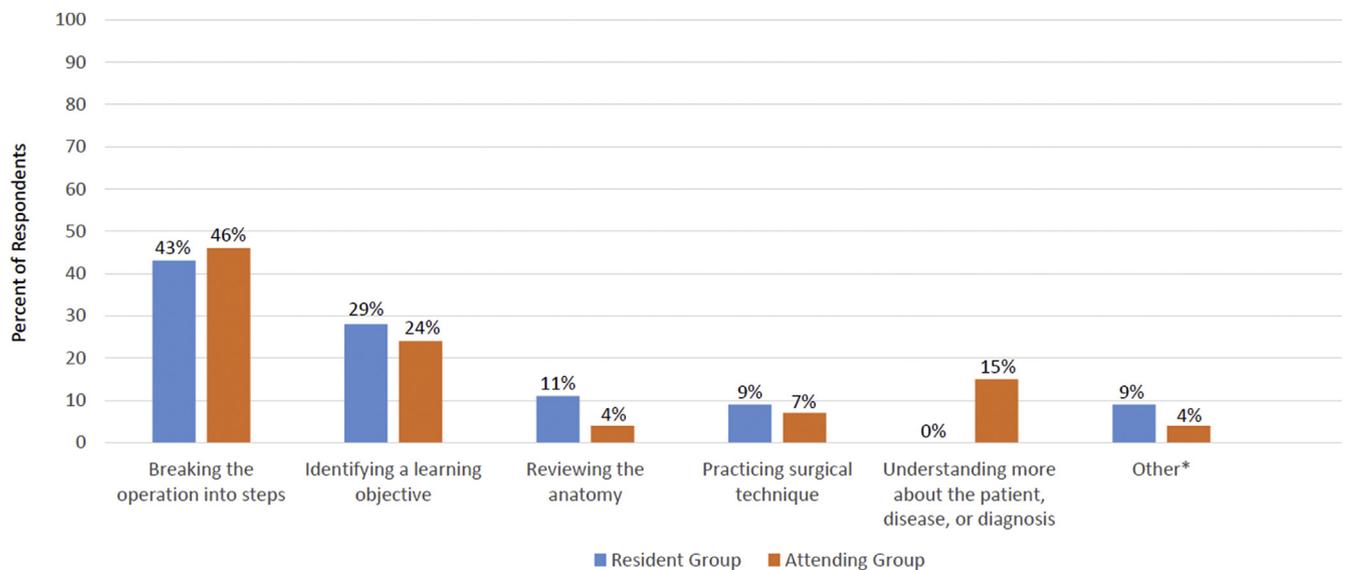
* **"Other" Responses, Resident Group:**
  "Improving my retraction and making operations more efficient."
  "Communicating needs to attending surgeons."
  One incomplete response

* **"Other" Responses, Attending Group:**
  "Moving more efficiently in routine portions of case (incision, closure) then getting more cautious or deliberate in more critical portions of the case."
  "Generally come prepared with patient and procedural understanding. I do not typically get information regarding weaknesses in their skill set that need to be addressed."

Fig. 2. Resident and attending surgeon perceptions on areas needing improvement in regards to resident case preparation.

12% of the time. Postoperative debriefing was reported to occur less than one-third of the time for both resident trainees and attending surgeons. This lack of communication creates significant educational barriers. When the attending surgeon is not aware of a resident's competence level with a procedure or the extent to which that resident has prepared, he or she will not know where to focus intraoperative instruction. In the previously mentioned survey analysis of one residency program, nearly 60% of residents did not feel comfortable telling their attending when they were not adequately prepared for an operative case.[10] Clearly, an initiative specifically focused in this area is warranted, as communication skills are not only required for effective surgical education, but are also essential to a surgeon's professional career.

An important limitation of this study is its subjective nature and single-center focus. Recall bias and response bias may have affected participant responses. For the question specifically addressing case preparation, there are known disparities between resident and attending perceptions as to what entails "case preparation" and what comprises of a "learning objective,"[13,22] but for the purpose of this study, we did not delve into this qualitatively. Finally, our survey did not ask for demographic information to allow for further sub-analysis. The main goal of the survey assessment tool used for this analysis was simply to identify specific areas requiring educational intervention in our surgical residency program. We determined these to be preoperative goal setting by residents and perioperative discussion between residents and faculty. One suggested approach focusing on perioperative communication is the 'BID Model' proposed by Roberts et al., which includes briefing, intraoperative teaching, and debriefing.[4] This method aligns with the natural progression of the perioperative experience and has been shown to improve faculty intraoperative instruction when employed in practice.[23] Similar constructs that employ briefing, active instruction, and debriefing in a stepwise manner have been shown to be useful techniques for training individuals in new procedural skills.[24] To specifically address the deficits identified in this study, the authors are currently developing an intervention that incorporates elements from pre-existing models, but also targets resident goal-oriented preparation. This intervention requires residents and faculty to perform a preoperative Educational Time-Out (ETO), preferably in conjunction with the required pre-procedure safety time-out, discussing the resident's procedural goals and current competence level. This automatically integrates communication, which is then brought full-circle with a required postoperative feedback session. Future studies will seek to determine the feasibility and efficacy of this intervention in practice.

Conclusions

A structured survey assessment tool administered at our institution demonstrated a lack of preoperative goal setting by residents and insufficient perioperative communication between residents and attending surgeons. This data may be generalizable to similar programs. Targeted interventions involving resident preparation and closed-loop communication between trainees and faculty have been implemented in order to make strides toward improving our perioperative educational experience.

Acknowledgements

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