Improving Satisfaction With Operating Room Feedback: An Effective, Low-Profile, No-Cost Intervention

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OBJECTIVE: The objective of this study was to develop and implement an effective and minimally invasive tool to enhance formative and goal specific feedback for general surgery residents in the operating room.

DESIGN: Placards reminding surgical faculty and residents to engage in goal directed feedback were installed at scrub sinks outside of every operating room. The purpose was to encourage both residents and faculty to agree on a learning goal before the case, teach and learn that goal during the case, and discuss progress and next steps after the case. Preintervention and postintervention questionnaires were administered via Qualtrics Online Survey Software to all general surgery residents and core faculty members.

SETTING: Placards were installed at every scrub sink across all 4 hospitals associated with Yale School of Medicine General Surgery Residency over a 6-month time period.

PARTICIPANTS: Respondents included general surgery residents and core surgical faculty of the Yale School of Medicine General Surgery Residency.

RESULTS: Following the intervention, residents reported a statistically significant increase in preoperative discussion of learning goals, debriefing about specific learning goals postoperatively, and overall satisfaction with feedback ($p < 0.01$). Conversely, faculty perception of feedback did not change as a result of the intervention with faculty consistently reporting higher rates of preoperative learning goal discussions, providing goal specific feedback intraoperatively, and debriefing postoperatively when compared to residents ($p < 0.01$).

CONCLUSIONS: Formative feedback reminder placards placed near operating rooms serve as a low-profile, no-cost intervention to improve general surgery resident satisfaction with operative feedback and increase the perceived rate of goal specific feedback discussions both pre- and postoperatively. (J Surg Ed 76:e138−e145. © 2019 Published by Elsevier Inc. on behalf of Association of Program Directors in Surgery.)

KEY WORDS: feedback barriers, formative feedback, operating room, sign-posting, surgical education

COMPETENCIES: Professionalism, Interpersonal and Communication Skills, Practice-Based Learning and Improvement

INTRODUCTION

Formative feedback plays an integral role in the development of operative skills and decision making for general surgery residents. However, residents consistently report dissatisfaction with feedback.[1,2] Additionally, a well-known disparity exists between resident and faculty perceptions of operating room (OR) feedback, perhaps exacerbating the dissatisfaction.[3-5] Although many innovative feedback tools, cards, and curricula have been implemented, they are often cumbersome, time consuming, expensive, or require training.[3-7] Given this, we set out to establish an effective, no-cost tool to improve feedback in the OR.

While feedback remains an essential component of learning and teaching, considerable barriers prevent its proper use and delivery in surgical training. One of the most consistently cited barriers is time, particularly in the era of restricted duty hours.[7,8] Thus, interventions designed to engage both residents and faculty in quality feedback must be practical, brief, and flexible to a

This research did not receive any specific grant from funding agencies in the public, commercial, or not-for-profit sectors.

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1931-7204/$30.00
https://doi.org/10.1016/j.jsurg.2019.10.002

variety of learning environments. Roberts et al. proposed such an approach, which encourages the practice of preoperative briefing, intraoperative teaching, and postoperative debriefing (BID).[9] This process, which begins at the scrub sink, allows teachers and learners to engage in high quality feedback in any time sensitive scenario. A foundation of the model relies upon equal engagement between learner and teacher with both sharing an understanding of the purpose of the education, thus focusing the learning objective when time is limited. Such a model encourages learner mindfulness when receiving feedback, which when utilized properly, can enhance the effectiveness of feedback practices.[10,11]

Our aim was to develop and implement an effective and minimally invasive tool to enhance formative and goal specific feedback for general surgery residents in the OR. Thus, we created a formative feedback placard (Fig. 1) to be installed at scrubs sinks outside of every OR at our institution and affiliated training hospitals. The placards encouraged both residents and faculty to do the following: before the case, agree on a learning goal; during the case, explicitly teach and learn the goal; and after the case, discuss progress and next steps. The placards reinforce a continuous BID model of teaching with the additional component of active learning. We hypothesized that the installation of operative feedback placards would increase the quality, quantity, and satisfaction associated with OR feedback.

MATERIALS AND METHODS

Intervention

Feedback placards were installed at scrub sinks outside of every OR across 4 hospitals associated with a single residency program over a 6-month time period. Placards encouraged adherence with structured goal setting, teaching and debriefing (Fig. 1). The placards were introduced to the faculty and residents at the beginning of Grand Rounds to familiarize participants with the cards and their purpose. The introduction consisted of a teaching session for both residents and faculty on effective methods of formative feedback, an introduction to the BID model of feedback, and information on where to find the placards. Additionally, residents participated in a guided group teaching exercise to become familiarized with BID methodology. Faculty all underwent directed professional development sessions having to do with the BID model as well as formal sign-posting of feedback. As part of this effort, the faculty was specifically educated to use the word "feedback" to alert trainees that formative feedback was taking place. The faculty was reminded to apply the BID model through biweekly emails and monthly reminders at faculty meetings. The house staff was similarly reminded through biweekly emails. This study was deemed exempt by the local Institutional Review Board.

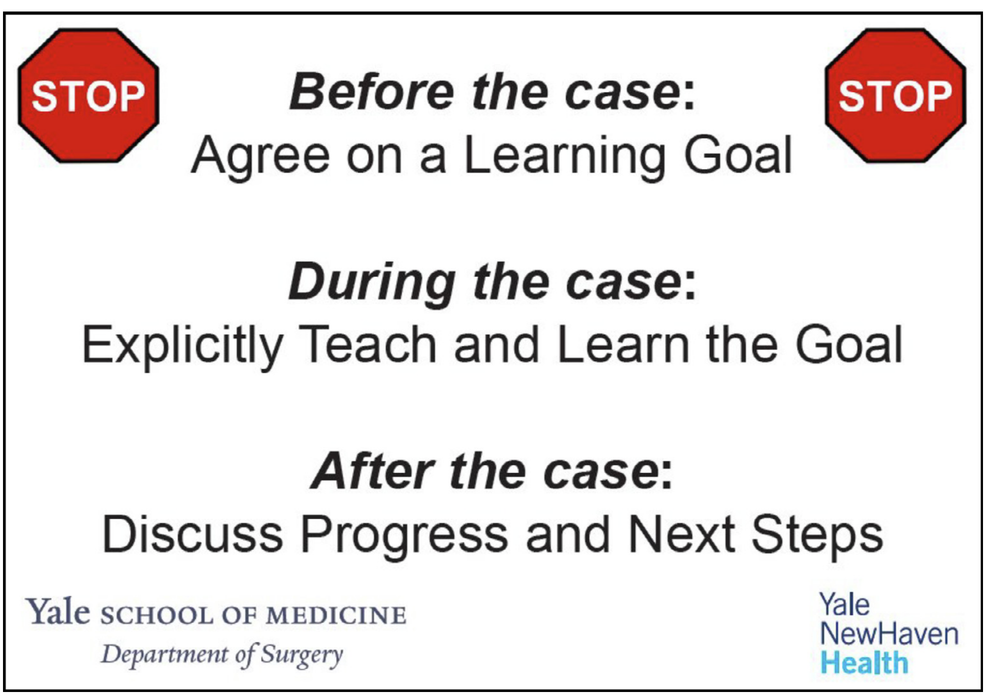

FIGURE 1. Formative feedback placards installed at operating room scrub sinks.

Survey

Prior to our educational intervention, a needs assessment survey was administered to all general surgery residents and core members of the general surgery faculty. Questions were designed to gauge both resident and faculty perception of OR feedback at our institution (Supplemental Table 1). Answer selections were based on a standard 5-point Likert scale, ranging from 1: Never to 5: Always. After a 6-month study period, a postintervention survey was administered to the same study population (Supplemental Table 2). This survey was identical to the preintervention survey with additional questions designed to reveal any barriers that might exist to providing or actively engaging in feedback at our institution. The survey was administered via an anonymous link and participants were only able to answer once. A total of 3 separate reminder emails were sent to the residents and faculty over a 2-week time interval in order to increase response rates.

Statistical Analysis

Preintervention and postintervention questionnaires were administered via Qualtrics Online Survey Software. Data were analyzed within SPSS Version 24.0 and GraphPad Prism Version 7.0a for MAC OS X. Survey responses were averaged and mean values[12] compared using Student's *t*-test or chi-squared when determining independence between categorical variables with significance assumed for $p < 0.05$.

RESULTS

Preintervention Survey

The preintervention survey response rates were 66% (48 of 73) of general surgery residents and 75% (57 of 76) of core faculty. The composition of resident respondents included 21% (10 of 48) postgraduate year 1 (PGY1), 17% (8 of 48) PGY2, 13% (6 of 48) PGY3, 10% (5 of 48) PGY4, 6% (3 of 48) PGY5, 4% (2 of 48) PGY6, and 29% (14 of 48) residents in professional development years. The composition of faculty respondents included 33% (19 of 57) with 5 or less years in practice, 18% (10 of 57) with 5 to 10 years in practice, and 47% (27 of 57) with more than 10 years in practice, with one person who did not answer 2% (1 of 57). On average, residents reported that feedback was obtained in real time "about half of the time," whereas discussion of a learning goal at the start of the case and debriefing at the end of the case only occurred "sometimes." Comparison between faculty and resident responses revealed statistically significant differences between resident and faculty perception of OR feedback across all categories: discussion of a "learning goal" at the start of the case ($\mu = 1.67 \pm 0.09$ vs 3.04 ± 0.16, $p < 0.01$), giving/receiving real-time feedback in the OR ($\mu = 3.06 \pm 0.13$ vs 4.21 ± 0.11, $p < 0.01$), debriefing at the end of the case ($\mu = 2.15 \pm 0.10$ vs 3.27 ± 0.14, $p < 0.01$), debriefing about a specific learning goal at the end of the case ($\mu = 1.52 \pm 0.08$ vs 2.55 ± 0.14, $p < 0.01$; Table 1).

Postintervention Survey

Postintervention survey response rates were 77% (56 of 73) of general surgery residents and 47% (36 of 76) of core faculty. The composition of resident respondents included 24% (13 of 53) PGY1, 19% (10 of 53) PGY2, 17% (9 of 53) PGY3, 11% (6 of 53) PGY4, 8% (4 of 53) PGY5, and 21% (11 of 53) residents in professional development years. The composition of faculty respondents included 25% (9 of 36) with 5 or less years in practice, 31% (11 of 36) with 5 to 10 years in practice, and 44% (16 of 36) with more than 10 years in practice, with 78% (28 of 36) reporting

TABLE 1. Disparity Between Resident and Faculty Perceptions of Feedback

Prompt	Preintervention Survey			Postintervention Survey		
	Resident Response*	Faculty Response*	p Value	Resident Response*	Faculty Response*	p Value
I discuss a "learning goal" preoperatively	1.67 ± 0.09	3.04 ± 0.16	<0.01	2.02 ± -0.09	2.91 ± 0.19	<0.01
I give/receive real time feedback in the OR	3.06 ± 0.13	4.21 ± 0.11	<0.01	3.08 ± 0.13	4.23 ± 0.16	<0.01
We debrief postoperatively	2.15 ± 0.10	3.27 ± 0.14	<0.01	2.11 ± 0.10	3.23 ± 0.16	<0.01
We debrief about a specific "learning goal" postoperatively	1.52 ± 0.08	2.55 ± 0.14	<0.01	2.02 ± 0.11	2.80 ± 0.18	<0.01

* Responses reported as mean value ± SEM. Values derived from a likert Scale of 1: Never, 2: Sometimes, 3: About half of the time, 4: Most of the time, 5: Always.

TABLE 2. Evaluating Intervention Effectiveness Amongst Residents

Prompt	Preintervention Response*	Postintervention Response*	p Value
I come up with a "learning goal" preoperatively	2.79 ± 0.15	2.60 ± 0.11	0.31
We discuss a "learning goal" preoperatively	1.69 ± 0.09	2.02 ± 0.09	<0.01
I receive real time feedback in the OR	3.06 ± 0.13	3.08 ± 0.13	0.94
We debrief postoperatively	2.15 ± 0.10	2.11 ± 0.10	0.82
We debrief about a specific "learning goal" postoperatively	1.52 ± 0.08	2.02 ± 0.11	<0.01
Overall satisfaction with feedback†	2.55 ± 0.12	3.12 ± 0.12	<0.01

*Responses reported as mean value ± SEM. Values derived from a Likert Scale of 1: Never, 2: Sometimes, 3: About half of the time, 4: Most of the time, 5: Always.

†Likert scale adjusted to 1: Very dissatisfied, 2: Dissatisfied, 3: Neither satisfied nor dissatisfied, 4: Satisfied, 5: Very Satisfied.

operating primarily at our main academic hospital. Faculty responses demonstrated no statistically significant changes in comparison to preintervention survey ($p > 0.05$). Following the intervention, residents reported a statistically significant increase in preoperative discussion of a learning goal (pre $\mu = 1.69$, post $\mu = 2.02$; $p < 0.01$), debriefing about specific learning goals postoperatively (pre $\mu = 1.52$, post $\mu = 2.02$; $p < 0.01$), and overall resident satisfaction with feedback (pre $\mu = 2.55$, post $\mu = 3.12$; $p < 0.01$), though no detectable change was noted in the amount of real-time feedback provided (Table 2). The disparity between faculty and resident perceptions of feedback remained consistent across all categories after the intervention (Table 1, $p < 0.01$ for all values). A subgroup analysis was performed in order to compare clinical residents by level, thus comparing chief residents (PGY3-5) to junior residents (PGY1-2). This analysis excluded the professional development year residents, who likely experienced less exposure to the intervention. Junior residents reported a significant increase in the rate of preoperative discussion of a learning goal (pre $\mu = 1.44$, post $\mu = 1.87$; $p < 0.05$) and an improvement in overall satisfaction (pre $\mu = 2.67$, post $\mu = 3.26$; $p < 0.05$; Table 3). Chief resident responses, similar to faculty, appeared to be less effected by the intervention with no significant changes in perception noted after the intervention.

Barriers

When asked what significant barriers existed to providing or receiving adequate feedback, 40% of resident responses included "limited time" compared to 6.1% of faculty responses (Table 4, $p < 0.01$); whereas 11.5% of residents reported "no barriers" compared to 30.6% of faculty ($p < 0.01$). There were no significant differences between resident and faculty perceptions of barriers with regard to "OR environment (12.6% vs 8.2%, $p > 0.05$), disengaged other party (17.2% vs 12.2%, $p > 0.05$), and fear of retribution (8% vs 16.3%, $p > 0.05$)." Both groups were queried if there were any other potential barriers not addressed within the questionnaire. Common resident responses included exposure to multiple different attending surgeons without ability to establish consistent rapport, uneasy feeling of pressuring the faculty member into feedback, and the feeling of limitations with goal specific feedback inhibiting overall procedural performance. Faculty identified the following as additional barriers to consistent feedback: inconsistencies in resident involvement in procedures and defensive residents.

DISCUSSION

In the era of resident duty hour restriction and exceedingly costly medical education, extensive effort has been dedicated toward efficient and effective models of surgical education.[13-15] The present study demonstrates the value of a simple, cost-effective intervention aimed at improving resident and faculty satisfaction with OR feedback. After only a 6-month study period, residents reported statistically significant improvements in their ability to focus on and discuss a specific learning goal preoperatively and then subsequently debrief with a faculty member on that specific goal after the case. These subtle changes were reflected in an overall improvement in perceived resident satisfaction with OR feedback after the intervention. Importantly, there was no category in which the intervention was found to be less effective for the residents when compared to preintervention responses. Although the improvements demonstrated were subtle, which may be attributed to the abbreviated study period, the effect does not go unnoticed. Improvements in goal oriented feedback, coupled with improvements in satisfaction are reason enough to pursue this educational model moving forward.

While the intervention proved effective for the resident population, faculty feedback patterns were steadfast and seemingly less amenable to change. There were no perceived differences, either positively or negatively, observed amongst faculty responses after the intervention. This likely contributed to the considerable contrast between faculty and resident responses after the intervention, thus adding

TABLE 3. Evaluating Intervention Effectiveness Amongst Chief Residents and Junior Residents

Prompt	Junior Residents			Chief Residents		
	Preinitiative Response* (n = 18)	Postinitiative Response* (n = 23)	p Value	Preinitiative Response* (n = 16)	Postinitiative Response* (n = 19)	p Value
I come up with a "learning goal" preoperatively	2.78 ± 0.27	2.74 ± 0.21	0.91	2.56 ± 0.22	2.52 ± 0.18	0.90
We discuss a "learning goal" preoperatively	1.44 ± 0.12	1.87 ± 0.16	0.047	1.81 ± 0.11	2.0 ± 0.10	0.22
I receive real time feedback in the OR	2.94 ± 0.21	2.87 ± 0.19	0.79	3.31 ± 0.22	3.26 ± 0.23	0.88
We debrief postoperatively	1.83 ± 0.15	1.89 ± 0.18	0.78	2.56 ± 0.18	2.37 ± 0.17	0.45
We debrief about a specific "learning goal" postoperatively	1.39 ± 0.14	1.78 ± 0.18	0.10	1.75 ± 0.11	2.16 ± 0.18	0.07
Overall satisfaction with feedback†	2.67 ± 0.19	3.26 ± 0.14	0.02	2.88 ± 0.20	3.21 ± 0.26	0.33

*Responses reported as mean value ± SEM. Values derived from a Likert Scale of 1: Never, 2: Sometimes, 3: About half of the time, 4: Most of the time, 5: Always.
†Likert scale adjusted to 1: Very dissatisfied, 2: Dissatisfied, 3: Neither satisfied nor dissatisfied, 4: Satisfied, 5: Very Satisfied.

to the existing literature on the unwavering gap between faculty and resident perceptions on feedback.[4,5] This well-documented disparity can be viewed through 2 different lenses—the resident view or the faculty view. In the case of the residents, it can be perceived that faculty does not provide adequate feedback opportunities. Whereas, in the case of the faculty, it can be perceived that residents are not aware of their ongoing feedback efforts in real time. Our intervention primarily aimed to address the latter stance. By focusing feedback patterns around specific learning goals, we hoped our residents would become more cognizant of the feedback provided by the faculty. The data demonstrate that this was perceived to be true, as residents reported an increase in preoperative and postoperative discussions about a specific learning goal with no similar observable differences noted amongst faculty. Thus, the beneficial effects of our intervention are likely two-fold with residents perceiving an increase of BID methodology in a goal-oriented fashion, while also becoming more cognizant and mindful of pre-existing faculty efforts.

In order to evaluate which group of residents benefited most from the intervention, we performed a subgroup analysis by resident level. The analysis revealed that junior residents were more responsive to the intervention when compared to chief residents. Residents participating in professional development years were excluded from the subgroup analysis, given their relatively limited exposure to the operating room environment and infrequent opportunities for operative feedback experiences. Regardless, the subgroup analysis offers an interesting perspective on the utility of our feedback intervention. The effect appears to be more

TABLE 4. Comparing Resident and Faculty Perceptions of Barriers to Routine Feedback

Component	Resident Responses n = 87 (%)*	Faculty Responses n = 49 (%)*	p Value
Time	35 (40)	3 (6.1)	<0.01
OR environment	11 (12.6)	4 (8.2)	0.64
Disengaged other party	15 (17.2)	6 (12.2)	0.60
Fear of retribution	7 (8)	8 (16.3)	0.14
No barriers	10 (11.5)	15 (30.6)	<0.01
Other	5 (5.7)	13 (26.5)	N/A

% = percentage within groups.
*Respondents were instructed to select all that apply.

potent when applied to the junior residents, who likely have less experience with the formative feedback process, familiarity with the faculty, and comfort in the perioperative setting. For these residents, we presume the placards serve as an invitation to begin the feedback conversation and begin to engage in goal specific learning.

We must acknowledge that regardless of resident level, there remains a significant gap between resident and faculty perceptions of feedback. Although we identify subtle improvements in overall satisfaction with feedback, resident perceptions of feedback still remain only slightly better than neutral with a mean score falling incrementally above "neither satisfied nor dissatisfied." Overall, we find this improvement in feedback satisfaction to be promising, though acknowledge the need for continued improvement.

As with any new intervention, we anticipated a number of potential barriers to successful implementation and thus queried our cohort to delineate any outstanding barriers after the intervention. Not surprisingly, residents noted a considerable degree of barriers to engaging in routine feedback. Interestingly, the focus of the barriers was notably different between groups, with residents reporting "time" as the most consistent barrier to feedback, whereas the most frequent faculty response was "no barriers." Other studies demonstrate the high frequency in which time has been implicated as a barrier to routine feedback, however, these studies typically report similar time constraints between residents and faculty.[8] The findings demonstrate that even when an intervention is designed to be efficient and minimally invasive, residents may continue to perceive a lack of time for engagement in routine feedback. It is encouraging, however, that faculty did not report similar time constraints to residents, and in fact the reported rate of time as a limitation (only 6% of faculty responses) is much lower than cited in the literature,[6,16] suggesting our intervention may in fact be perceived by faculty to be more time efficient than other strategies. Surgical faculty are constantly challenged with longer operative times as a result of teaching surgical trainees,[17,18] thus a timely model for feedback in the OR is vital.

A critical component to any feedback intervention relies on both resident and faculty participation, particularly when utilizing the BID model. There is an increasing body of knowledge to suggest that high quality instructional activity relies upon reciprocity between learners and teachers.[19] By utilizing the BID model, learners and teachers are encouraged to share an understanding of the educational focus, thus allowing teachers and learners to agree on common objectives and learning goals.[9] Unfortunately, our study identified a persistence of certain significant barriers amongst surgical residents and faculty in that both groups reported similar rates (12%-18%) of "feeling the other party was disengaged." Moreover, both groups reported similarly concerning rates of "fear of retribution (9%-16%)." When combined, these represent critical barriers to the development of our intervention and must be addressed in order for BID model success, as the model fundamentally relies upon teacher and learner engagement and a shared focus on educational advancement. When asked about other possible barriers that might exist, one particular resident reported a specific barrier worthy of mention: "When focused on one smaller goal, the attending may ignore performance about the rest of the procedure." When the OR placards were introduced at grand rounds, it was emphasized that learning happens throughout the entire case with an additional component of explicit focus on the portion of the case that represents the learning goal. However, this resident comment addresses a salient point and draws attention to the fact that our intervention should not stand alone as the only educational tool utilized in the OR, but rather one of an arsenal of tools. Although our particular placard intervention was originally designed to address multiple barriers inherent to an OR environment, particularly the lack of time, more emphasis must be placed on correcting the outstanding barriers. It is crucial to understand what barriers are perceived to exist for any effective intervention to be instituted, and further study is warranted to address the levels of disengagement and fear of retribution when providing or receiving surgical feedback.

Our study is not without limitation, particularly those limitations inherent to the use of a survey that has not been previously validated. As is the case with many survey-based studies, recall bias cannot be entirely accounted for, especially with regard to our preintervention study where recall may not be limited to a 6-month time interval. At this particular institution, residents spend 2 years after PGY2 pursuing professional development opportunities (~20% of the study cohort), thus slightly limiting their exposure to the OR environment over that time period. Though our interventions were administered across 4 hospitals, all hospitals are affiliated with the same general surgery residency program, thus limiting the generalizability of this data. We also acknowledge that even with satisfactory survey response rates, our study is not exempt from the limitations of selection bias. Additionally, our intervention was conducted over a 6-month study period and more data are needed to assess the long-term effectiveness of the placards. Future direction can be aimed at examining the sustainability of our intervention by assessing responses after time intervals of a longer duration. This will also allow for an opportunity to evaluate the impact of the feedback placards on the various surgical specialties inadvertently exposed to the feedback placards as a result of shared operative space. Ideally, we would hope to gauge the effectiveness of our intervention as a method capable of changing behavior over time, resulting in enhanced feedback experiences, and perhaps even improving surgical performance. However, although the BID model is efficient and effective, long-term success requires longitudinal and occasionally sequential learner-teacher relationships, which can often be difficult to assess at a large institution with hundreds of teachers and multiple learning environments.

CONCLUSIONS

Formative feedback reminder placards placed near operating rooms serve as a low-profile, no-cost intervention to improve general surgery resident satisfaction with operative feedback and increase the perceived rate of goal specific feedback discussions both pre- and postoperatively amongst residents. Although this project represents an effective strategy to improve resident satisfaction with feedback, there remain significant barriers to effective feedback conversations between faculty and residents, including lack of engagement in the conversation and fear of retribution.

ACKNOWLEDGMENTS

The authors would like to thank the general surgery faculty of the Yale School of Medicine, Department of Surgery for their countless hours of teaching and dedication to resident surgical education.

AUTHOR CONTRIBUTIONS

MS, SA, PY Contributed to the design and implementation of the research, the acquisition of experimental data, the analysis and interpretation of the data, and the drafting and critical revisions of the manuscript.

SA and PY Conceived of the presented idea.

KO and WL Contributed to the study conception and design, and the critical revisions of the manuscript.

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SUPPLEMENTARY INFORMATION

Supplementary material associated with this article can be found in the online version at doi:10.1016/j.jsurg.2019.10.002.