

Using GoPro to Give Video-Assisted Operative Feedback for Surgery Residents: A Feasibility and Utility Assessment

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OBJECTIVE: As an adjunct to simulation-based teaching, laparoscopic video-based surgical coaching has been an effective tool to augment surgical education. However, the wide use of video review in open surgery has been limited primarily due to technological and logistical challenges. The aims of our study were to (1) evaluate perceptions of general surgery (GS) residents on video-assisted operative instruction and (2) conduct a pilot study using a head-mounted GoPro in conjunction with the operative performance rating system to assess feasibility of providing video review to enhance operative feedback during open procedures.

DESIGN: GS residents were anonymously surveyed to evaluate their perceptions of oral and written operative feedback and use of video-based operative resources. We then conducted a pilot study of 10 GS residents to assess the utility and feasibility of using a GoPro to record resident performance of an arteriovenous fistula creation with an attending surgeon. Categorical variables were analyzed using the chi-square test.

SETTING: Academic, tertiary medical center.

PARTICIPANTS: GS residents and faculty.

RESULTS: A total of 59 GS residents were anonymously surveyed (response rate = 65.5%). A total of 40% ($n = 24$) of residents reported that structured evaluations rarely or never provided meaningful feedback. When feedback was received, 55% ($n = 32$) residents reported that it was only rarely or sometimes in regard to their operative skills. There was no significant difference in surveyed responses among junior postgraduate year (PGY 1-2), senior (PGY 3-4), or

chief residents (PGY-5). A total of 80% ($n = 8$) of residents found the use of GoPro video review very or extremely useful for education; they also deemed video review more useful for operative feedback than written or communicative feedback. An overwhelming majority (90%, $n = 9$) felt that video review would lead to improved technical skills, wanted to review the video with the attending surgeon for further feedback, and desired expansion of this tool to include additional procedures.

CONCLUSIONS: Although there has been progress toward improving operative feedback, room for further improvement remains. The use of a head-mounted GoPro is a dynamic tool that provides high-quality video for operative review and has the potential to augment the training experience of GS residents. Future studies exploring a wide array of open procedures involving a greater number of trainees will be needed to further define the use of this resource. (J Surg Ed ■■■■-■■■. ©2017 Published by Elsevier Inc. on behalf of the Association of Program Directors in Surgery)

KEY WORDS: video-assisted, operative, feedback, residents, surgery

COMPETENCY: Practice-Based Learning and Improvement

INTRODUCTION

Mastery of surgery requires extensive training with the goal of acquiring sufficient knowledge and skill to achieve high-level performance. In the era of limited work hours, studies have suggested a decrease in the quantity and quality of the operative experience and the overall operative competency of trainees.¹⁻³ Surgical simulation has been suggested as a way to mitigate these effects and enhancing residents'

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technical skills. However, there is conflicting evidence regarding transferability of simulation skills to the operating room (OR).^{4,5} As an adjunct to simulation-based teaching, video-based surgical coaching has been an effective educational tool to foster the development of key technical skills.⁶⁻⁸ While video recording of laparoscopic surgery is relatively straightforward, open surgery poses unique technical and logistical challenges that limits its widespread use. Therefore, although there is a preponderance of literature for simulation and coaching in laparoscopic surgery, there is a dearth of such literature for open surgery.

Another proposed method for improving general surgery (GS) residents' operative skills is integration of structured feedback into operative patterns.⁹ Studies show perceptions of operative feedback from GS residents often differs from faculty members.^{9,10} Specifically, GS residents are often less satisfied with the feedback they receive, whereas the associated faculty are more content with the delivered feedback.⁹ Quality feedback is necessary for the trainee to grow and reflect, thus it is important to gauge perceptions of feedback in GS residency programs.

The aims of our study were to (1) evaluate perceptions of GS residents on video-assisted operative instruction and (2) conduct a pilot study using GoPro (GoPro Inc, San Mateo, CA) in conjunction with the validated operative performance rating system (OPRS) to assess feasibility of providing operative feedback during open arteriovenous fistula (AVF) procedures. We hypothesize that the GS residents will find video-assisted operative instruction to be useful in their training. Additionally, we hypothesize that the use of GoPro as a platform for recording of AVF procedure will be feasible and a novel effective way to provide operative feedback.

METHODS

Participant Recruitment and Data Collection

This study was approved by the Institutional Review Board (IRB) and the anonymously surveyed residents had IRB approved waived consent. The residents involved in the pilot study provided written informed consent and the attending surgeons provided verbal consent. Additionally, the patients had to sign consent to allow recording. GS residents postgraduate year 1 (PGY-1) to PGY-5 were anonymously surveyed to evaluate their perceptions of oral and written operative feedback and use of video-based operative resources between 2014 and 2016. Using a 5-point Likert Scale (1 = never, 2 = rarely, 3 = sometimes, 4 = most of the time/frequently, and 5 = always), we evaluated GS residents perceptions of current practices of monthly attending evaluations, intraoperative communicate feedback, and use of video technology.

After informed consent was obtained, we then conducted a pilot study of 10 GS residents (PGY 2-4) to assess the utility and feasibility of using a head-mounted GoPro to record resident performance of an AVF creation with an attending surgeon. For our pilot study, exclusion criteria included GS residents performing other operations other than AVF creation. Additionally, we chose PGY-2 to PGY-4 residents as those are the residents who typically perform AVF procedures in our program.

The head-mounted GoPro was placed on the resident by a study coordinator (M.D.M., J.S.A., and P.O.) before the start of incision. The operative field was appropriately focused and the recording of the GoPro was started by a study coordinator using a secure tablet device iPad (Apple, Cupertino, CA) with the GoPro application. Following the procedure, a trained audio-visual specialist (I.B.) edited the video to condense for review. The attending surgeon completed the validated OPRS assessment,¹¹ which was provided to the resident immediately following the surgery. The video was provided to the resident within one week following surgery, thus allowing correlation with the written evaluation. At the conclusion of the video review, the resident completed an assessment of the video-assisted feedback. Again, using the 5-point Likert Scale (1 = not useful, 2 = minimally useful, 3 = moderately useful, 4 = very useful, and 5 = extremely useful), GS residents were surveyed on their perceptions of video-assisted feedback and review. Our surveys were designed ad hoc.

Statistical Analysis

Statistical analysis was performed using SPSS v24 (IBM, IL). Categorical variables were analyzed using the chi-square test. Statistical significance was defined as $p < 0.05$. Subgroup analysis by PGY was not conducted because of the inherently small sample size in each cohort, thus residents were grouped by junior (PGY 1-2), senior (PGY 3-4), or chief residents (PGY-5). A formal sample size calculation was not conducted since this was a pilot study.

RESULTS

A total of 59 out of 90 GS residents were anonymously surveyed (response rate = 65.5%). Among them 9 were PGY-1, 18 were PGY-2, 17 were PGY-3, 4 were PGY-4, and 11 were PGY-5 (Table 1). When grouped by resident level, there was no significant difference in the surveyed responses between junior (PGY 1-2), senior (PGY 3-4), or chief residents (PGY-5) ($p = 0.32$). The minority of residents (40%) reported that current structured evaluations rarely or never provided meaningful feedback. When feedback was received, 55% residents stated that it was only rarely or sometimes in regard to their operative skills. If

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