The Gross-to-Scope Program for Gross Room Personnel: An Innovative Initiative for Providing Case Follow-Up and Education to “Close the Pathology Loop”

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Abstract
Gross room personnel (GRP) work alongside pathologists in grossing, frozen section, and autopsy. We observed that gross room personnel desire follow-up and feedback on the specimens they gross or autopsies they perform. Our goal was to create a sustainable educational program for gross room personnel. Our primary focus was to impact team dynamic, morale, and fulfillment. We assessed the need for an educational program through a preprogram survey, which contained 11 subjective statements scored on a scale from 1 to 10 (1—strongly disagree and 10—strongly agree). These statements assessed topics of current follow-up and team dynamic (core statements), perceived effect of current follow-up, and prospective impact of case follow-up. Core statements received relatively low scores (ie, the perception of being “an integral part in making a diagnosis” received only a mean score of 6.7). In response, we established the Gross-to-Scope educational program hosted by pathology trainees and attendings. This program is comprised of monthly one-hour conferences to discuss/review cases and highlight special topics of interest (ie, “What is a radial margin anyway?”). We distributed the same surveys after the first and fourth conferences and found a statistically significant increase in the mean responses to core statements after the first conference (P = .041). The trend is similar after four conferences. Overall our program addresses various needs by providing educational opportunities for gross room personnel, which strengthens morale and recognizes hard work, and by fostering a working relationship between gross room personnel and pathologists.

Keywords
conference, education, feedback, gross room, grossing, Gross-to-Scope, pathologists’ assistant, pathology

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outcome of the specimens they gross or autopsies they perform and are interested in reviewing the histology of the case and how these microscopic findings correlate with the gross pathology, patient outcome, and other clinical features. We identified that providing case follow-up is significant in quality improvement in the gross room, and our plan was to initiate an innovative approach to provide case follow-up in a richly informative and interactive forum. Making a diagnosis is a collaborative effort, and we call the process of providing case follow-up to affirm and fortify the teamwork involved: “closing the pathology loop.” We established the Gross-to-Scope educational program for GRP, which is comprised of monthly conferences to discuss and review cases. The conferences are hosted by pathology residents, fellows, and attendings. Not only does “closing the pathology loop” have potential benefits in improvement in future grossing and technical skills but also we recognize that equally important is the impact in areas of team dynamic, morale, and fulfillment, which is our primary focus. We also discuss how we continued the education and modified our conferences to maintain social distancing during COVID-19 pandemic.

Materials and Methods

Assessing the Need for the Gross-to-Scope Program: The Preprogram Survey

The study commenced with survey distribution to assess the need for our program. The sample population included 13 GRP employed at the Hospital of the University of Pennsylvania. Two of the GRP were pathologist technicians/technologists and 11 were PAs. We created a survey containing 11 statements (Table 1), which were scored on a scale from 1 to 10, with 1 being “strongly disagree” and 10 being “strongly agree.” The survey statements were intentionally subjective in nature in order to gauge the current atmosphere in the gross room. Statements 1 to 5 assessed topics of current follow-up and team dynamic, statements 6 and 7 assessed perceived effect of current follow-up, and statements 8 to 11 assessed the prospective impact of case follow-up. The surveys were anonymous, but unique identifiers were created for future pairing of data to evaluate statistical changes. Unique identifiers were created as four digits, with the first two digits being date of birth and the last two digits being the last two digits of their phone number.

To assess initial needs for the Gross-to-Scope program, we distributed the survey to all GRP in August 2019 before starting our monthly conferences. Nine of the GRP completed our preprogram survey (9/13, 69.2%; Table 1). The same survey was then distributed after the first and fourth conferences resulting in 6 available paired surveys (6/13, 46.2%). We decided to resurvey after the first conference in an attempt to gain quick feedback as to whether our program was effectively improving the perception of receiving follow-up on cases or if this perception remained the same. We could then modify our program quickly in real time. A second resurvey was arbitrarily chosen after the fourth conference because this provided a longer time frame to reevaluate changes in the perception of feedback and follow-up.

Our Gross-to-Scope program identified and is currently addressing a significant need for follow-up and feedback for GRP. The preprogram surveys demonstrated that case follow-up and feedback is strongly perceived to promote improvement and contribute positively to motivation, team dynamic, skills, and overall experience. Additionally, limited access to histologic findings or other interesting aspects of a case likely impacts the perceptions of feeling like “an integral part in making the final diagnosis.”

Table 1. Mean Responses to the Preprogram Survey From 9 Gross Room Personnel.

| Survey statements                                                                 | Preprogram mean responses |
|----------------------------------------------------------------------------------|---------------------------|
| Current follow-up and team dynamic                                               |                           |
| *1. I receive positive feedback on my cases                                     | 6.1                       |
| *2. I receive negative feedback on my cases                                     | 3.6                       |
| *3. I consistently learn new things in my field.                                | 7.6                       |
| *4. I receive follow-up regarding my cases (ie, tumor type, interesting findings, final diagnosis, etc) | 3.8                       |
| *5. I feel that I am integral part in making a diagnosis                        | 6.7                       |
| Perceived effect of current follow-up                                           |                           |
| *6. The feedback and follow-up that I receive on my cases helps me improve      | 8.4                       |
| 7. The feedback and follow-up I receive on my cases helps to expand my knowledge in my field | 8.3                       |
| Prospective impact of follow-up                                                 |                           |
| 8. Having follow-up on my cases would improve my motivation                     | 9.4                       |
| 9. Having follow-up on my cases would improve my technical skills               | 9.2                       |
| 10. Having follow-up on my cases would contribute positively to the overall team/work dynamic | 9.4                       |
| 11. Having follow-up on my cases would contribute positively to my overall experience | 9.6                       |

* Indicates core statements which regarded current follow-up and team dynamic.
### Gross-to-Scope Program

The Gross-to-Scope program is a monthly one-hour educational conference for GRP led by a resident, fellow, and attending. These conferences do not interfere with GRP work duties as these hour-long conferences are conducted during previously scheduled GRP meetings. The conference is guided by specific questions submitted by the GRP regarding cases they have grossed or have been involved in peripherally. These specific questions are then submitted on a confidential (Health Insurance Portability Accountability Act of 1996 (HIPAA) compliant) document where they provide the case number, tissue block/slide number(s), question, and associated gross photo (Figure 1). The original conference format is in a hybrid PowerPoint/glass slide format around a multi-headed microscope. Television screens in the room allow us to project the glass slide on one screen and a companion PowerPoint presentation on the other. Our companion PowerPoint allows us to present all aspects of the case work-up including clinical history, gross findings/description, normal histology, normal physiology, microscopic findings, pathophysiology, and clinical and pathologic pearls (Figure 2). For each conference, we select five specimens to present including surgical pathology cases from a variety of subspecialties and autopsy cases. In these conferences, we incorporate the review of various specimens ranging from small resections (eg, gallbladders, appendices, products of conception, etc) to complex specimens and

| Case Number | Block Number/s | Question | Pictures (insert gross photo or indicate photo location) |
|-------------|----------------|----------|---------------------------------------------------------|
| HS-XX-XXX   | All blocks     | Is this a renal oncycytoma? | |

**Figure 1.** Example of a question submission by gross room personnel.

**Figure 2.** Examples of material included in the companion PowerPoint.

*Initiating Our Innovative Program to “Close the Pathology Loop:” The Gross-to-Scope Program*

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autopsy cases. This is because all specimens, ranging from small specimens to large complex resections, have educational value for all GRP, trainees, attendings, and rotating students. In addition to reviewing cases, we also include special topics to highlight various grossing areas of interest (eg, “What is a radial margin anyway?” and “How to remember the segments of the liver forever”; Figure 3). One conference on average takes about five to seven hours to prepare. The preparation of additional special topic content and/or lecture material is variable and depends on the subject matter, and this additional educational material is made available to GRP to refer to as needed for daily work and in their gross room mentoring of trainees.

Gross-to-Scope Program and Social Distancing: How We Continued Education During COVID-19 Pandemic

As previously described, the Gross-to-Scope program was initiated before the COVID-19 outbreak in the United States. During these conferences, we gathered together in a room around a multi-headed microscope. With the implementation of social distancing, we modified our conferences and host the educational sessions in virtual meetings with live streaming audio and visual feed. Capabilities to “share” computer screens allow the view of PowerPoint presentations, still images of histology, live slide review using microscope cameras, and scanned slides.

Results

Data analysis began in August 2019 by assessing the initial need for the Gross-to-Scope program through a preprogram survey. In this survey, statements assessing current follow-up and team dynamic received relatively low mean scores (see Table 1). For instance, the mean response for receiving follow-up regarding cases only received a score of 3.8 and perception of being “an integral part in making a diagnosis” received only a score of 6.7. In addition, survey statements assessing the perceived effect of current follow-up including “the feedback and follow-up I receive on my cases helps me improve and helps to expand my knowledge in the field” received relatively higher scores (mean: 8.3-8.4). The survey statements assessing the prospective impact of follow-up including “follow-up would improve skills and contribute positively to team work and overall experience” received mean scores ranging from 9.2 to 9.6. Our survey ended with the question “Would you be interested in attending periodic educational sessions during work hours?” and all nine GRP answered “yes.”

The same surveys were distributed after the first and fourth conferences to evaluate for differences. We analyzed differences in 6 statements we deemed as core statements, which regarded current follow-up and team dynamic (see Table 1 with *). Using Student $t$ test, we analyzed the data of the 6 available paired surveys, which showed a statistically significant difference (increase) in the mean responses to all the core statements when comparing the preprogram survey results to the survey results after one conference ($P = .041$, Figure 4). (A power test was performed on this available data set and indicated that the given sample size was sufficient for statistical analysis.) For example, the statement “I receive case follow-up and feedback” received a mean score 3.3 points higher and “I receive positive feedback” received a mean score 2.7 points higher. Notably, the mean score for “I am an integral part in making a diagnosis” received a score 1.5 points higher. The mean responses from the available paired surveys after four conferences was also plotted (Figure 5), and the trend is similar to the one month post conference results.

Discussion

Gross room personnel desire continued educational learning opportunities and appreciate relationships with pathologists. In a study analyzing 341 questionnaires completed by PAs, working in an environment with continued exposure to medical basic sciences (anatomy, physiology, pathology, and pathophysiology) was among the top three factors contributing to profession and job satisfaction. In addition, having a relationship...
with pathologists was also indicated as one of the most important factors for personal job satisfaction. Another important component to personal and professional job satisfaction is having high morale. An article addressing morale in clinical laboratory workers describes that high workplace morale promotes productivity, job satisfaction, and patient safety, as employees are less likely to make mistakes. The article suggested various ways to boost workplace morale, including sharing patient case presentations to highlight how laboratory workers make a difference in the care of a patient, which promotes a sense of purpose. In addition, providing positive feedback and planning interdepartmental events to illustrate their

Figure 4. Graph showing the difference between mean survey responses before program initiation (pre-) and after (post-) first conference. *P < .05.

Figure 5. Graph showing the difference between mean survey responses before program initiation (pre-) and after (post-) first and fourth conferences.
important role in the organization’s culture were other suggestions to promote morale. Interacting as an equal to other professionals is also closely connected to morale, especially when these relationships contribute to continued learning.

Our Gross-to-Scope program identified and is currently addressing a significant need for follow-up and feedback for GRP. The preprogram surveys demonstrated that case follow-up and feedback is strongly perceived to promote improvement and contribute positively to motivation, team dynamic, skills, and overall experience. Additionally, limited access to histologic findings or other interesting aspects of a case likely impacts the perceptions of feeling like “an integral part in making the final diagnosis.” After one Gross-to-Scope educational conference, our surveys indicated that GRP are receiving more case follow-up, learning new things, and felt more integral to making the final diagnosis. After four conferences, this positive response was sustained with continued higher survey responses.

Our surveys were intentionally subjective with the statements being open for interpretation. The purpose of this was to spark a dialogue and gauge the overall current state of the gross room and perceptions. One of the most discussion-provoking statements was regarding “negative feedback.” Interestingly, the mean response for receiving negative feedback increased (preprogram: 3.8, 1 month post: 4.8, 4 month post: 5.3). After discussion with GRP, this statement was scored higher because they perceived the statement “I receive negative feedback” as receiving constructive feedback and reported that involvement in the Gross-to-Scope conferences was a valuable method of receiving constructive feedback through review of cases.

In addition to aforementioned goals for GRP improvement, the Gross-to-Scope program provides opportunities for improvement in other areas including GRP and pathology trainee teaching. This opportunity for continual learning through feedback and follow-up will provide GRP with new and/or refreshed knowledge when teaching residents. According to a study at Rosalind Franklin University of Medicine and Science, 83.7% of PAs were involved in training/teaching of residents in academic settings. Additionally, through this program and under the guidance of the attending pathologist, pathology trainees (residents and fellows) are provided with a unique teaching experience to review and discuss cases with GRP. In addition, the pathology trainees have the opportunity to hone their skills in “driving” slides and utilizing pathology language to describe histologic and gross findings.

The goal was to create a sustainable educational program for GRP, which has been successful to date. The sustainability of the Gross-to-Scope program is maintained in part by the constantly evolving nature of content presented. In other words, the conferences are designed to provide GRP learning material based on educational needs. For example, the incorporated special topics segments in the conference are a direct response to GRP feedback. Another component that has promoted the sustainability of the program is the ability to adapt the program and continue. One of the challenges that we faced was the sudden outbreak of COVID-19 in the United States and the implementation of social distancing. In our original conference structure, we gathered in a room around a multi-headed microscope. The purpose of this venue was not only to review and discuss histologic slides but also foster an atmosphere of teamwork and comradery. We modified our conferences to a virtual format with live streaming of audio and visual feed. Our virtual format also provided an opportunity to invite GRP from affiliated hospitals to participate. The Gross-to-Scope program is still successful in the virtual venue, and the new format has offered new opportunities to “close the pathology loop.” Future areas to expand on our work include, but are not limited to, offering Continuing Medical Education (CME) credits for conference attendees (which will be soon available at the upcoming conferences). Overall, our program addresses various needs by providing monthly educational opportunities for GRP, which strengthens morale and recognizes hard work, as well as fostering a working relationship between GRP and pathologists.

Conclusion

In pathology, the most impactful learning experiences are derived from our direct involvement in patient care through cases in real-time allowing for continuing education. This concept is also applicable to GRP and having case follow-up, including final diagnosis, interesting findings, and so on, plays a significant role in lifelong learning. Additionally, having lectures and special topics discussions provides a continual source of educational material for GRP. Our surveys confirmed that case follow-up and feedback is highly sought by GRP. Our Gross-to-Scope program identified an opportunity for quality improvement by providing case follow-up to GRP. Our major motivations were focused on improvement in areas of team dynamic, morale, and fulfillment, which are key to maintaining a motivated and engaged environment. After instituting our conferences, our survey results demonstrated significant and sustained positive changes in receiving follow-up and team dynamic and will continue to have effects extending beyond the gross bench and autopsy suite. In “closing the pathology loop,” our Gross-to-Scope program fosters continued learning and team-building while emphasizing the notion that making a diagnosis is a collaborative effort.

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