Improving Perioperative Communication During the COVID-19 Pandemic

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ABSTRACT

Perioperative communication can be ineffective and result in delays or adverse events. Coronavirus disease 2019 (COVID-19) has placed demands on health care leaders and personnel to integrate information quickly and accurately. When caring for patients diagnosed with COVID-19 or whose infection status was unknown, perioperative personnel at one facility discovered communication gaps associated with the environmental cleaning process and hand-over reports. A project team comprising perioperative nurses created five tools to provide critical information to help diverse team members share the same mental model. The project team created one tool in English and Spanish to meet the needs of environmental services personnel whose primary language was Spanish. The team created another tool to support communication with central processing department personnel and facilitate prioritization of case cart cleaning when needed. The development and implementation of the communication tools helped to provide a safe working environment during the COVID-19 pandemic.

Key words: coronavirus disease 2019 (COVID-19), environmental cleaning, personal protective equipment (PPE), shared mental model, perioperative communication tools.

Approximately 30% of perioperative communication is ineffective and can result in delays, workarounds, wasted resources, patient inconvenience, and tension among team members. Distractions, language barriers, or education deficits may affect communication, which is a contributing factor for development of adverse events (eg, retained surgical items).

During the coronavirus disease 2019 (COVID-19) pandemic, maintaining safety of patients and personnel necessitated improving the effectiveness of communication. The frequent reports of the disease transmission levels and associated mortality rates caused anxiety for health care workers and leaders, and some information was contradictory and inconsistent. Leaders received updated information daily, and it was difficult to distinguish scientific data from media speculation.

Regardless of the subject, effective communication involves routinely sharing accurate information with personnel in a structured and consistent manner. This article describes perioperative considerations related to the COVID-19 pandemic, associated communication concerns, and the strategies that leaders at one organization used to address the concerns.

BACKGROUND

Coronaviruses are enveloped RNA viruses that usually lead to upper respiratory tract infections, such as the common cold. Transmission of COVID-19 can occur when infected individuals (who may be asymptomatic) release the virus into the air during exhalation, such as when talking, breathing, or sneezing. Virus particles may be coated with mucus or saliva, which may affect particle size and subsequent transmission.

The World Health Organization and the US Centers for Disease Control and Prevention (CDC) identify particles greater than 5 µm in diameter as droplets and particles less than 5 µm in diameter as aerosols. The size of the
SARS-CoV-2 particles that cause the COVID-19 infection varies; some particles containing the virus are fine (ie, less than 2.5 µm in diameter) and some are large (ie, greater than 10 µm in diameter).9 The World Health Organization continues to indicate that transmission of the COVID-19 virus primarily occurs through droplet and contact routes, but acknowledges that airborne transmission may be possible.10 However, the CDC recognizes three principal routes of transmission: inhalation of fine droplets and aerosols, deposition of virus droplets and particles on mucus membranes, and contamination of mucus membranes by virus-laden hands.11 Therefore, based on the concept of aerosolized transmission, the CDC provides detailed guidance on the donning and doffing of required personal protective equipment (PPE) that personnel wear when caring for a patient diagnosed with COVID-19.12

**PATIENT CARE DURING THE PANDEMIC**

The COVID-19 pandemic has placed unprecedented demands on health care organization leaders and personnel,13 notably related to the use of PPE and environmental cleaning. Recommendations to facilitate patient safety when caring for the anticipated influx of infected patients included protecting and supporting frontline caregivers, limiting the number of personnel providing direct patient care, and communicating openly with personnel.14

Recommended guidance for donning and doffing PPE correctly to prevent COVID-19 transmission is different from the traditional process that personnel had been using in perioperative environments.12 Therefore, leaders and educators needed to clearly communicate requirements for donning and doffing PPE safely, and personnel needed to participate in education activities and practice the skills to prevent inadvertent contamination when caring for patients.

Personnel also needed to learn different environmental cleaning processes to prevent the spread of COVID-19 to patients and personnel. Many perioperative departments may not have the capability to convert ORs from positive pressure (ie, pushing air out) to negative pressure (ie, pulling air in). Therefore, procedures for postoperative cleaning in a positive-pressure environment after possible aerosolized contamination in the OR became critically important.

**COMMUNICATION CHALLENGES**

Failures can occur when the communicator provides the message on the wrong occasion, includes insufficient or inaccurate content, addresses the incorrect audience, or has an unclear purpose.1 In some facilities, perioperative personnel may speak different languages and the styles of communication may vary depending on the staff member’s role. Transcribing verbal information into a written format can lead to medical errors resulting from different dialects and pronunciation, background noises, and distractions.15 Each team member may have a unique perspective or mental model of a situation and its related tasks; lack of a shared understanding can contribute to avoidable adverse perioperative events,16 ineffective communication,16,17 and decreased teamwork.16 In addition, perioperative miscommunication can result in teamwork failures and also lead to adverse events for patients.1,2 Team members who are not familiar with each other also may contribute to ineffective communication. Results from an observational study involving 10 open procedures showed that team members did not compensate for unfamiliarity when communicating; however, familiarity among team members also did not prevent ineffective communication.18

**STRATEGIES TO IMPROVE COMMUNICATION**

Understanding diverse educational backgrounds, recognizing primary languages, and acknowledging cultural sensitivity may be useful when organization leaders provide education activities for a diverse workforce. The US Department of Health and Human Services recommends that health care organization leaders recruit, develop, educate, and retain a diversified workforce to support the population that the organization serves.19 The National Center for Cultural Competence recognizes that cultural awareness is an integral component of cultural competence for health planning and policy.20 Diversity of the health care workforce
has increased since 1987. When clinicians acknowledge cultural diversity, team interactions may be more successful than when they do not.\textsuperscript{20}

**Shared Mental Model**

Perioperative environments are complex and require interdisciplinary teamwork. An organized method to share knowledge that permits the team members to describe, explain, and predict events and interact with their environment is a shared mental model.\textsuperscript{21} Team members can manage difficult and changing situations and decide which action to take when they use multiple types of mental models, including

- the knowledge a team member requires to operate the technology or equipment to complete tasks;
- the shared understanding of how to perform the procedure using the technology or equipment;
- an understanding of the shared ideas of the roles and responsibilities of the team members; and
- the idea that each person is part of a team, with the requirements to meet the expectations of team membership.\textsuperscript{22}

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The shared mental model incorporates both the knowledge required for performance and the relationships among team members to organize their work. Therefore, creating a shared mental model that allows all team members to understand and adapt to unfamiliar situations may help improve communication.

**PANDEMIC EFFECTS ON PERIOPERATIVE COMMUNICATION**

In March 2020, during the early stages of the COVID-19 pandemic, perioperative personnel at Hackensack University Medical Center in New Jersey were required to learn a large amount of information quickly. The perioperative team for the 24 ORs in the department comprises surgical technologists, environmental service aides (ESAs), equipment technicians, and patient transporters. Perioperative personnel expressed difficulty staying informed on pandemic information and the frequently revised policies and protocols. In addition, the perioperative team members identified a lack of communication among personnel assigned to different shifts regarding the status of the OR, supplies, equipment, and patient care related to COVID-19. Personnel frequently used small note papers and surgical gown tags to share information with each other.

We (an extant project team of perioperative nurses) noticed the communication challenges related to the frequently changing information that affected perioperative processes and decided to prepare formal signage to promote a shared mental model for optimal communication. Although facility leaders expect all personnel to be able to communicate in English, the primary language of many ESAs is Spanish, and we identified a need to provide information on COVID-19 processes in both English and Spanish. To optimize efficiency, we also explored the importance of clearly defining the staff members’ roles and responsibilities. We recognized that communication may be challenging when it does not include an individual’s preferred language and that he or she may be excluded from the shared mental model. Based on this information, we opted to create an English and Spanish communication tool to provide information on the changing processes. We decided that it might be helpful to provide educational tools in languages other than Spanish (eg, Ukrainian, Albanian), but time pressures to deliver the information as quickly as possible and reach as many personnel as possible prevented inclusion of additional languages. We therefore undertook the creation of bilingual communication tools for perioperative personnel to ensure that they would be able to practice safely and provide a consistent approach to intraoperative activities during the pandemic.

**Opportunities to Improve Perioperative Communication**

We identified three areas requiring improvement in communication clarity. The first area involved enhanced team communication for cleaning the OR, equipment, and supplies after perioperative personnel transported the patient to the postoperative area. It was critical that all perioperative personnel possess the same information
regarding the process for environmental cleaning after the completion of a surgical procedure for a patient diagnosed with COVID-19 or whose infection status was unknown.

Before the pandemic, ESAs wore standard surgical attire with surgical masks, eye protection, and unsterile gloves to perform perioperative environmental cleaning immediately after the RN circulator and anesthesia professional transferred the patient to the postanesthesia care unit. The ambiguous and ever-changing information on disease transmission necessitated a change in the protocol for surgical attire during room cleaning and additional education and simulation to practice new skills. After leaders revised the surgical attire protocol, the perioperative education specialist conducted education sessions for groups of two staff members in a small conference room located near the OR. The private learning environment provided an opportunity for questions and hands-on practice and allowed the personnel to adhere to the social distancing requirements.

In accordance with design recommendations for surgical suites, most of the ORs at our facility are configured as positive-pressure environments with at least 15 air exchanges per hour, three of which include outdoor air. In accordance with AORN recommendations related to airborne disease transmission, we placed one high-efficiency particulate air (HEPA) filter next to the anesthesia professional for intubation and extubation and a second HEPA filter near the door immediately inside the OR. After the pandemic declaration, perioperative leaders initially recommended that ORs remain vacant for two hours after personnel transferred the patient to the nursing unit. However, after reviewing information from the CDC and consulting with facilities personnel, leaders realized that the positive-pressure ORs needed to remain vacant for only 28 minutes to remove 99.9% of airborne contaminants with 15 air exchanges per hour. Therefore, the leaders decreased the vacant room requirement to 30 minutes.

After the pandemic declaration, postanesthesia care unit (PACU) nurses entered the OR after procedure completion to provide the immediate postoperative nursing care. When the patient met the PACU discharge criteria, the nurse transferred the patient to an inpatient nursing unit and timing for air contaminant removal commenced. While waiting the required amount of time, ESAs began donning PPE in preparation for cleaning. Personnel donned PPE in the following order:

1. N95 respirators,
2. surgical masks,
3. face shields,
4. isolation gowns,
5. two pairs of unsterile gloves, and
6. disposable knee-length shoe covers.

Because the ESAs required additional time to don PPE and perform cleaning, they voiced concerns regarding the exact time of patient transport from the OR, how to identify used HEPA filters, and the time required for ultraviolet light disinfection. We included this information in our improvement project.

**COMMUNICATION TOOL DEVELOPMENT**

Effective teamwork with comprehensive communication strategies was key to providing care during the pandemic and addressing the staff members’ concerns. We realized that the OR cleaning information needed to be complete and easy to understand because often there was only a small window of opportunity to complete the cleaning tasks before preparing for another procedure or communicating with personnel who were providing relief at the beginning of the next shift.

We developed a detailed room cleaning tool (ie, a sign) in both English and Spanish to facilitate accurate communication and meet the needs of the perioperative and environmental services personnel (Supplementary Figure 1). To convey the necessary information to individuals entering the room, personnel placed the sign on the OR door at the end of a procedure involving a patient diagnosed with COVID-19 or whose infection status was unknown. The bilingual document listed the required steps for room cleaning and provided a space next to each step for the
time of completion and the initials of the staff member completing the cleaning. A second room cleaning sign included a red stop sign to indicate that the cleaning process had not yet been finished. At the completion of the process, the ESA turned the sign over so an image of a green "go" light informed personnel that it was safe to enter the room (Figure 1).

Case Cart Processing Tools
Next, we focused on shared communication when transferring the surgical case cart from the OR to the central processing department (CPD). Before the development of appropriate signage, CPD personnel placed used case carts in a line for processing without prioritization related to possible infections. Although the scrub person applied an instrument precleaning solution to instruments, some instruments became dry and debris became aerosolized, which was a concern during the pandemic.

We created a sign for the scrub person to place on the top of the case cart to identify that the cart contained items associated with a patient who tested positive for COVID-19 or whose infection status was unknown (Figure 2). Because this sign contained minimal information, we only provided it in English. The scrub person was responsible for phoning a CPD staff member to provide information on the impending arrival of the case cart and completing the sign with the date, time, signature, and name of the CPD contact person.

Adding the case cart sign closed a gap in the cart transfer process and clearly informed the CPD personnel to prioritize case carts when necessary. Carts associated with patients who tested negative for COVID-19 did not have...
a sign. The use of the case cart sign has facilitated the movement of appropriate carts to the front of the line for priority processing.

Hand-Over Communication
The final area that we identified for improvement addressed the sharing of detailed information during hand-over communication when caring for a patient who tested positive for COVID-19 or whose infection status was unknown. We created two documentation tools for this purpose.

The room tracker tool lists each step in the perioperative care of the patient—from OR preparation through procedure completion and patient transfer from the OR—and includes the status of HEPA filters (Supplementary Figure 2). To complete the tool, personnel fill in the date, the time, and their initials for each listed activity. There also is a section at the bottom of the tool for an additional description of events, responsible personnel, and follow-up activities.

Perioperative leaders assigned two RN circulators to procedures involving patients who tested positive for COVID-19 or whose infection status was unknown. One RN circulator remained outside the OR to retrieve and deliver any supplies or items required intraoperatively and also was responsible for completing the documentation on the room tracker tool.

The shift summary report tool provides personnel a place to describe all activities related to COVID-19 that occurred on the unit during the shift (Supplementary Figure 3). Because the number of patients undergoing surgery or other invasive procedures who had been diagnosed with COVID-19 or whose infection status was unknown was increasing, it was important to track the status of each OR. The shift summary tool provided a concise overview of the ORs that ESAs had cleaned and those in which the cleaning process was incomplete.

After completing the room tracker and shift summary report tools, nurses placed the documents in a notebook at the OR desk for leader (eg, charge nurse, environmental services supervisor, nurse manager) and staff member access. Personnel reviewed the completed tools during the hand-over report at the end of scheduled shifts, which improved the shared mental model among all team members.

PERSONNEL ENGAGEMENT
Personnel assigned to all shifts recognized that the development of the communication tools was important, so there was wide acceptance as the project advanced. They were eager to replace the note papers and gown tags and provided positive feedback on this structured process of communication. In addition, personnel incorporated the communication tools into standardized OR

Key Takeaways
- The coronavirus disease 2019 (COVID-19) pandemic has placed unprecedented demands on health care organization leaders and personnel. Recommendations to facilitate patient safety include protecting and supporting frontline caregivers, limiting the number of personnel providing direct patient care, and communicating openly with personnel.
- Barriers to effective perioperative communication include primary language and style differences, diverse educational backgrounds, difficulty converting verbal information to a written format, and lack of a shared mental model.
- A perioperative project team developed five easy-to-use communication tools to improve communication during the short period of time available for environmental cleaning and completion of hand-over reports after care of a patient diagnosed with COVID-19 or whose infection status was unknown.
- The team developed one tool in English and Spanish to meet the diverse needs of personnel, and created additional tools (ie, case cart sign, hand-over report) that personnel could easily complete to provide even more information. Perioperative personnel were engaged during tool implementation and continue to use the tools to maintain a safe environment during the ongoing COVID-19 pandemic.
Workflow processes soon after we created them. Because of the immediate need for clarity and consistency, a trial was not indicated; however, we recognized that the tools would likely need to be improved and modified in the future in accordance with additional information on COVID-19 and personnel feedback. After developing the tools, we educated the remaining personnel on tool use during the designated weekly staff meetings, perioperative leaders reinforced the education at change-of-shift huddles, and personnel had the opportunity to ask questions in small groups.

To foster engagement after the initial development of these tools, we designated a mobile cart to store supplies and frequently needed items outside the individual ORs during procedures for patients who have been diagnosed with COVID-19 or whose infection status is unknown. We placed multiple copies of these tools in a drawer of this cart for easy access, and leaders consistently reinforced the value of continuing to use these tools as needed. By the end of 2021, these tools and the mobile COVID-19 cart had become integrated as routine components of OR patient care.

CONCLUSION

The potential for transmission of COVID-19 via aerosolized particles necessitated practice changes in perioperative environments. Rapidly changing information related to PPE use and environmental cleaning was confusing to personnel at our facility and there was a need to communicate accurately and efficiently. Perioperative and environmental services personnel expressed concern regarding the need for consistent information on environmental cleaning and disposition of supplies, instruments, and equipment, especially when transferring care during a hand-over report. We developed communication tools based on shared mental models and cultural awareness to facilitate education on the rapidly changing processes. Personnel (eg, RNs, surgical technologists, ESAs, CPD technicians) appreciated the new tools and used them during procedures involving patients diagnosed with COVID-19 and whose infection status was unknown. The tools are stored on a mobile cart and leaders continue to support tool use to facilitate communication and maintain a safe work environment.

SUPPORTING INFORMATION

Additional information may be found online in the supporting information tab for this article.

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