

Bedside Rounds in Intensive Care Units during the COVID-19 Pandemic and Beyond

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Abstract

A survey-based pilot study was performed to examine the feasibility of videoconferencing to facilitate multidisciplinary rounds following the initiation of strict isolation and social distancing policies in a pediatric intensive care unit (PICU). The use of a mobile workstation was implemented as the central hub for rounding at the bedside by the attending physicians, while other members of the multidisciplinary and multi-specialty team joined rounds from other locations with maintaining appropriate social distance. Fifty-eight staff members who participated in videoconferencing rounds completed the postimplementation survey. Eighty-eight per cent of staff agreed that the use of videoconferencing to facilitate rounds was an effective strategy to maintain social distancing between team members during the pandemic. Sixty-four percent of staff agreed that the use of videoconferencing improved participation of the PICU team and consultants by increasing access to rounds. Over 50% of staff agreed that the use of videoconferencing improved the efficiency of rounds and team productivity. Only 4% of staff responded that videoconferencing increased the duration of rounds and 37% responded that it decreased resident and team education. Fifty-five percent of staff agreed that videoconferencing was used to promote parental participation during this pandemic month. Videoconferencing was found to be a feasible solution to safely conduct multidisciplinary rounds while maintaining social distancing, and participants found it effective without interfering with normal workflow. Incorporating videoconferencing into traditional rounding practices may be advantageous following the pandemic to improve team and family access to rounds and workflow efficiency and rounding structure.

Keywords

- ▶ videoconferencing
- ▶ telerrounds
- ▶ multidisciplinary rounds
- ▶ social distancing
- ▶ intensive care units

Introduction

Bedside rounds in the intensive care units (ICUs) serve multiple purposes including development of the patient care plan for the day, updating patient and/or their family, performing safety checklists, teaching of trainees, and ensuring that all members of the care team have the same mental model of the patient.¹ As critical care has evolved with more complex decisions, new equipment,

pharmacologic treatment and social dynamics, and determinants of health, the ICU rounding team in many institutions has also expanded to include a respiratory therapist, pharmacist, social worker, case manager, child life specialist, clinical nutritionist, as well as the provider, and nursing teams. This multidisciplinary team can comprise of 15 to 20 people, when consultants are also involved. The use of a computer on wheels to access the electronic health record further limits available space

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for bedside rounds in hallways and outside of patient rooms.

The novel coronavirus disease 2019 (COVID-19) pandemic has led to guidelines on social distancing by the World Health Organization and the Centers for Disease Control and Prevention^{2,3} that have been widely adopted. The implementation of these guidelines in the hospital setting, especially during bedside rounds, makes the previous model of large group rounds untenable.

In an effort to appropriately maintain distance and hence minimize the chances of the spread of severe acute respiratory syndrome-coronavirus-2 (SARS-CoV-2) during bedside rounds, we have started utilizing available videoconferencing technology. This article describes the feasibility of the use of a mobile rounding cart to allow members of the team to round from conference rooms while maintaining appropriate social distance and have a small part of the team at the bedside.

Materials and Methods

Setting

The project was conducted in the Pediatric Intensive Care Unit (PICU) at the University of Maryland Medical Center. The PICU is a 19-bed mixed medical/surgical and cardiac surgery ICU.

Design

This was a pilot study to examine the use of videoconferencing to facilitate multidisciplinary rounds following the initiation of strict isolation and social distancing policies in the setting of a pandemic.

Equipment

In 2018, our unit purchased mobile workstations that were equipped with a high-resolution camera, targeted microphone and speaker system, a monitor, and basic computer. Utilizing secure ZOOM software platform (ZOOM Video Communications, Inc.; San Jose, CA), families and consultants were enabled to use mobile devices to round at the bedside with the team. With the onset of COVID-19 in 2020 and the need for social distancing during rounds, we were able to repurpose this mobile workstation as the central hub for rounding at the bedside by the attending physicians. Residents and nurse practitioners preredound on their patients prior to formal bedside rounds and then joined other members of the multidisciplinary and multispecialty team from conference rooms and other locations while maintaining appropriate social distancing using the same videoconferencing application on tablets, phones, and personal computers.

Staff

There are two PICU rounding teams during weekdays and one on the weekends. Provider teams consist of critical care attendings, fellows, nurse practitioners, and residents. The cardiac provider team includes two cardiothoracic nurse practitioners, a critical care attending, cardiothoracic surgeon, and cardiologist. The medical provider team includes a critical care attending, fellow, nurse practitioner, and three residents.



Fig. 1 ZOOM social distancing multidisciplinary rounds with a mobile cart at bedside.

The critical care attending, subspecialist (if necessary), nurse, and parent round at the bedside with the use of a mobile workstation equipped with improved technology (→ **Fig. 1**). The attending physician and subspecialist examine the patient and then rounds were conducted directly outside the patient's room during the pandemic. Other essential team members (i.e., residents, fellow, nurse practitioners, and respiratory therapist) participate in rounds from conference rooms and workstations (→ **Fig. 2**). Fellows, nurse practitioners, and residents examine patients prior to rounds unless the patient is COVID-19 positive or under investigation. For these patients only senior members of the team perform clinical assessments to minimize team exposure. Other team members participate from home or office (i.e., nutritionist, case manager, and pharmacist). Patients' families are always invited to participate on rounds with their mobile device from inside the patient room or remotely. The medical and cardiac teams round simultaneously and the presentation structure and flow remain unchanged. Workflow duties are assigned at the beginning of rounds (i.e., displaying patient data, entering orders, and reviewing safety checklists).



Fig. 2 ZOOM social distancing multidisciplinary rounds with staff remotely.

Survey

We conducted a survey at the end of April 2020 to assess the feasibility and participant attitudes regarding the use of a mobile cart as the central hub for multidisciplinary rounding with other members of the team using mobile devices, 1 month after implementation.

The project was reviewed and approved as nonhuman subject research by the University of Maryland institutional review board and exempted from further review.

Results

Overall Satisfaction/Feasibility Survey Results

Fifty-eight multidisciplinary staff members who participated in videoconferencing rounds completed the survey. Respondents included intensivists, fellows, nurse practitioners, residents, nurses, respiratory therapists, pharmacist, nutritionist, and multispecialty team members (►Fig. 3). All PICU providers (attending physicians, fellows, nurse practitioners, and residents) who participated in multidisciplinary rounds during the study period completed the survey. Thirty-seven percent of nurses (22 of 59) and 43% of respiratory therapists (3 of 7) completed the survey. The results of the entire survey are presented in ►Table 1. Overall 88% of staff agreed that the use of videoconferencing to facilitate multidisciplinary rounds was an effective strategy to maintain social distancing between team members during the pandemic. Sixty-four percent of staff agreed that the use of videoconferencing improved participation of the PICU team and consultants by increasing access to multidisciplinary rounds. Fifty percent of staff agreed that the use of videoconferencing improved the efficiency of multidisciplinary rounds including improved timeliness of order entry and completion of standard practices (i.e., nurses summarizing plan of care and completion of daily safety checklists). Only 3.5% of staff responded that videoconferencing increased the duration of multidisciplinary rounds and 37% responded that it decreased resident and team education. Only 46% of staff agreed that the team was able to adequately maintain patient confidentiality at the bedside with the use of videoconferencing during rounds. Based on respondent comments, staff satisfaction

was higher on the cardiac team with 70% of the respondents agreeing that workflow and team productivity improved (i.e., presence of necessary team members and consultants, decreased distractions for team members at the patient bedside, and early completion of daily notes). Fifty-five percent of staff agreed that the use of videoconferencing to promote parental participation during multidisciplinary rounds was encouraged during this pandemic month. Sample staff survey comments are presented in ►Table 2.

Discussion

This pilot study demonstrated the feasibility of treatment and participant attitudes toward video-based multidisciplinary rounds to promote social distancing and enable the team and family to participate on rounds during a pandemic. Multidisciplinary rounds are a valued structural ICU process for the implementation of collaborative decision making and evidenced-based management to achieve optimal patient outcomes. Conducting rounds at the bedside has been shown to improve communication and trust between the patient/family and multidisciplinary team and enhance shared understanding and shared decision making regarding the patient plan of care.⁴⁻⁶ In addition, multidisciplinary rounds can effectively identify safety risks and prevent gaps and delays in care through the incorporation of care bundles, daily goals, and safety/quality measure checklists.^{6,7}

We used video teleconferencing since 2018 to enhance parental participation in PICU rounds for parents who could not physically be present and thus allowed us to rapidly incorporate videoconferencing into our new rounding process with social distancing. The patient census during the implementation was lower than expected, and although the addition of the donning and doffing strict isolation procedure for the majority of patients added to the bedside workflow, it was not seen as a hindrance for bedside rounding team members using the videoconferencing mobile cart. The staff education required was minimal and there was little technical difficulty encountered, making this a feasible solution for rounding while maintaining social distancing.

The staff survey results demonstrated that the use of videoconferencing for multidisciplinary rounds did not disrupt nurses' normal bedside workflow processes or significantly increase rounding time (►Table 1). However, the respondent comments suggested differences in satisfaction between the two rounding teams (►Table 2). On the cardiac team, nurse practitioners are the sole direct care providers at 7 days/week and have a highly systematic daily workflow. The use of videoconferencing allowed the nurse practitioners to more efficiently complete required work (i.e., writing daily notes) while maintaining consistent rounding processes and easily adapted to this new workflow. The medical team members agreed that videoconferencing was effective for social distancing during rounds and technically easy but were less satisfied with the new process. For the residents rotating into the PICU, this novel approach to rounds had not been adopted in other clinical areas and was perceived as having a greater impact on the medical team dynamics. The

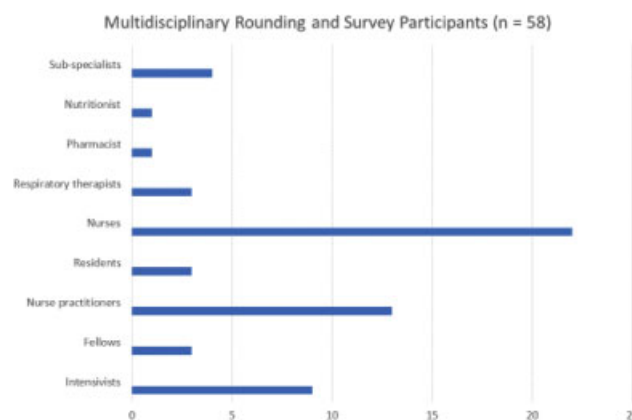


Fig. 3 Breakdown of the multidisciplinary rounding and survey participants.

Table 1 Use of ZOOM to facilitate multidisciplinary rounds staff survey results ($n = 58$)

Survey questions	Responses n (%)				
	Strongly agree	Agree	Neutral	Disagree	Strongly disagree
The use of ZOOM to facilitate multidisciplinary rounds has improved participation of the multidisciplinary team and subspecialists by increasing access to care	12 (20)	25 (43)	15 (26)	4 (7)	2 (4)
The use of ZOOM to facilitate multidisciplinary rounds has improved the efficiency of rounds by timeliness of order entry and completion of standard practices, i.e., nurse summarizing plan of care, daily safety checklist	7 (12)	21 (37)	18 (32)	9 (16)	2 (4)
The use of ZOOM to facilitate multidisciplinary rounds allows the team to maintain patient confidentiality at the bedside	4 (7)	22 (39)	19 (33)	10 (18)	2 (4)
The use of ZOOM to facilitate multidisciplinary rounds is disruptive to nurses by decreasing time to perform tasks and respond to other patients	0 (0)	2 (4)	15 (26)	37 (65)	3 (5)
The use of ZOOM to facilitate multidisciplinary rounds has decreased time to educate residents and other care team members	1 (2)	21 (36)	18 (32)	18 (32)	0 (0)
The use of ZOOM to facilitate multidisciplinary rounds has been an effective strategy to maintain social distancing between team members	29 (51)	21 (37)	4 (7)	2 (3)	1 (2)
The use of ZOOM to facilitate multidisciplinary rounds has improved team participation and engagement in rounds	7 (12)	12 (21)	26 (46)	10 (18)	2 (3)
The use of ZOOM to facilitate multidisciplinary rounds has been an effective method to communicate clinical information and participate in shared decision making	7 (12)	39 (67)	7 (12)	3 (5)	2 (4)
The use of ZOOM to facilitate multidisciplinary rounds has not interfered with normal workflow in the PICU	4 (7)	35 (60)	7 (12)	9 (16)	3 (5)
The use of ZOOM to facilitate multidisciplinary rounds has significantly increased the duration of rounds	1 (2)	5 (9)	13 (22)	34 (59)	5 (9)
The use of ZOOM to facilitate multidisciplinary rounds is technically difficult, i.e., frequent visual or audio challenges	0 (0)	13 (22)	17 (29)	27 (47)	1 (2)
The use of ZOOM to facilitate multidisciplinary rounds has improved workflow, productivity, i.e., presence of necessary team members, decreased distractions for team members at the bedside, early completion of notes	5 (9)	26 (45)	15 (26)	10 (17)	2 (3)
The use of ZOOM to facilitate multidisciplinary rounds has provided additional opportunities for team education, family education, and family communication and engagement	0 (0)	13 (23)	25 (43)	17 (29)	3 (5)
During this unfortunate time of visitation restrictions, parental participation by ZOOM is encouraged to allow participation in multidisciplinary rounds or other opportunities that are convenient for the parent	3 (5)	29 (50)	15 (26)	10 (17)	1 (2)
The use of ZOOM to facilitate multidisciplinary rounds is an effective rounding method	9 (16)	37 (64)	8 (14)	2 (3)	2 (3)
I would like multidisciplinary rounds via ZOOM to continue after social distancing restrictions are removed	5 (9)	24 (41)	7 (12)	15 (26)	7 (12)

Abbreviation: PICU, pediatric intensive care unit.

respondent comments suggested less resident and team teaching occurred and there was decreased resident engagement with nurses and families (► **Table 2**). The team work spaces are outside the PICU making it critical during huddles to identify team members, responsibilities and roles and desired communication channels/devices to readily access team member, as well as ensuring presence on the unit on a frequent basis. The critical care team rapidly transitioned education activities to videoconferencing and as team members became more accustomed to social distancing educational activities, the educational value and satisfaction has

increased. However, small team educational activities continue to be important, as well as one on one education to stay connected and encourage team interaction.

We added a secure ZOOM software platform in 2018 to increase family engagement during multidisciplinary rounds. This had led to increased involvement of parents on rounds in the prepandemic era. Surprisingly, the survey results revealed parental participation via videoconferencing was lower during the study period than we anticipated. We speculate that this may be due to the change in visitation policies during the pandemic, as the waiting areas had been

Table 2 Use of ZOOM to facilitate multidisciplinary rounds staff survey comments

Representative statements
Rounds are much more efficient and allow providers to go to individual bedsides and have one on one conversations with family.
It needs work but has the potential to favorably impact care after the pandemic. There is no better option for social distancing during the times we are in.
This novel idea has helped patients and families stay connected to the team and was welcomed for that purpose prior to COVID-19. I feel that presence of the residents on rounds is vital to their learning and management/ownership of the patient and that the primary resident for the patient should be allowed to be present at bedside (even during pandemic distancing measures).
I think it has been a valuable tool during this unique time.
Use of ZOOM rounds has enabled social distancing; however, I believe it has also enhanced the distancing between resident physicians and patients.
When rounding it may be helpful if all people in the PICU had situational awareness of rounds going on and kept conversations quiet when rounds are going on. The audio often catches side conversations.
Difficult to do bedside teaching. I felt like residents were disconnected from patients and nursing staff.
ZOOM has been an adequate way to communicate while keeping team members at safe distances.
I have been able to complete notes by the end of cardiac rounds which has been very helpful.
As the clinical pharmacist, It has been extremely helpful to be able to participate in medical and cardiac team rounds simultaneously.
I think there is less teaching opportunities for residents with ZOOM rounds but if the attending comes to the work room after rounds to make any further teaching points then that would mitigate that discrepancy.
I would encourage the use of ZOOM rounds with the addition of bedside teaching and education.
Sometimes sound has been challenging.
I feel there is a lack of communication between team members when orders are being written. When rounding it may be helpful if all individuals in the PICU had situational awareness that rounds are going on and keep conversations quiet.
Difficult to hear the provider on the computer if not standing directly next to it.
ZOOM rounds has improved the efficiency of rounds on the cardiac team and has allowed additional time for other work activities, such as coordination of care and bedside discussions, with families.

Abbreviations: COVID-19, novel coronavirus disease 2019; PICU, pediatric intensive care unit.

closed and closure of many businesses or transfer of work to a virtual environment enabled families to be able to be at their child's bedside. In addition, the cardiac team has frequent discussions with the parents and include a daily update after rounds and therefore may not have been perceived as necessary. However interpretation is limited as we did not directly survey the patients' families to gauge their response to this change in rounding practice and will need to engage parents more in the process by actively adding them to the videoconference call when not physically present.

Technical challenges are always a likely barrier when implementing a new process that is highly dependent on audio, visual, and software. We selected to use ZOOM that was supported by hospital internet technology (IT) who ensured security; however, this could be implemented on any secure Healthy Insurance Portability and Accountability Act (HIPPA) compliant software meeting platform. The other participants on rounds used a mix of hardware devices that included hand-held smart phones, laptops, and/or desktops with a webcam. Having participants on both audio and visual assisted with managing the conversation and flow of rounds. The wide lens camera and directional microphone incorporated into our telecart enabled the participants to both see and hear the bedside team and the patient/family. The internet speed was adequate with upload and download

testing speed between 90 and 100 megabits per sec (Mbps). A secure texting application allowed for communication of meeting ID and passwords to the rounding team, as well as coordinating timing of the initiation of rounds, and facilitate breaks needed to tend to emergencies on the unit. To manage participants on mute or participants that needed to tend to something else, our team used the chat feature in the ZOOM software to indicate when someone needed to step away or point out that someone was on mute.

Maintaining patient confidentiality with the use of videoconferencing was of utmost concern. Primary measures to ensure confidentiality and patient privacy included the sole use of a secure texting application and HIPPA compliant video software. However daily reminders of patient confidentiality and videoconferencing etiquette are key. We instituted a brief reminder by the attending physician that includes appropriate speaker volume, proximity of presenting provider/speaker to the mobile microphone, limiting surrounding conversations, and ensuring secure locations of remote team members.

Limitations

Although this project only describes our early pilot process and has several limitations, including survey-based results,

small number of respondents, and short study period, the change was instituted during the height of the pandemic and uncertain, stressful circumstances for the staff. Although it is unknown if this novel rounding process helped to minimize the chances of spreading SARS-CoV-2 during bedside rounds, we found great benefit in this process as it facilitated the participation of all team members, as the nonessential members (i.e., clinical pharmacist, nutritionist, and case manager) were required to work from home. However, further investigation regarding the perceived differences in staff satisfaction between the medical and cardiac rounding teams and how to improve remote trainee educational activities and team engagement are warranted.

The pandemic has rapidly changed many of our traditional work processes and some potential work processes for permanently. Video-conferencing can be an effective method to facilitate social distancing during multidisciplinary rounds but has also been shown to enhance communication between the family and the health care team.⁹ There are endless possibilities for its use to engage and connect with families in the care of their child.^{10,11}

Future Direction

The introduction of videoconferencing to facilitate multidisciplinary rounds was expected to be a short-term solution for our PICU to maintain social distancing during the COVID-19 pandemic. Although there are barriers to address, we have also observed potential benefits that question some of the traditional ICU practices and whether there are opportunities to rethink our rounding practices. For example, what is the long-term utility of videoconferencing to effectively bring patients, families, multidisciplinary team, and subspecialty teams together for rounds and for other opportunities.

Conclusion

Although we have entered unprecedented circumstances, maintaining the best practices at ICU are critical to achieve optimal outcomes. Multidisciplinary rounds are an integral ICU process that must include collaborative evidenced-based management that is family centered and strives for efficient but high quality and safe care. Video-conferencing is a feasible solution to safely conduct multidisciplinary rounds while maintaining social distancing during the pandemic. Incorporating videoconferencing into our traditional round-

ing practice may be advantageous in improving team and family access to rounds, workflow efficiency, rounding structure, offers creative teaching opportunities, and family engagement opportunities. However, further investigation is needed to address how to improve parent participation and optimize educational aspects of rounds which are central to trainee learning.

Conflict of Interest

None declared.

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