Incorporating Retrieval Practice Into Intensive Care Unit Teaching Rounds: A Feasibility Study

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ABSTRACT

Background Teaching rounds are an important component of the learning environment for residents in the intensive care unit (ICU). Retrieval practice is a cognitive learning tool that helps learners consolidate information and might improve the quality and culture of teaching rounds.

Objective We performed a feasibility study from October 2018 to June 2019 to investigate the incorporation of retrieval practice into ICU rounds.

Methods Participants included internal medicine and family medicine residents and pulmonary and critical care medicine fellows and faculty on medical ICU (MICU) teams at a tertiary care academic medical center. For 1-week periods, residents were asked to use retrieval practice after rounds, sharing one learning point. Participants were anonymously surveyed about the feasibility and acceptability of this strategy and perceptions of the educational value of ICU rounds before and after incorporating retrieval practice.

Results We enrolled 9 MICU teams, including 31 residents, 8 fellows, and 8 attendings. Pre- and postsurvey response rates were 89% and 91% (42 and 43 of 47, respectively). Sixty-nine percent of respondents (30 of 43) reported sharing learning points on at least 3 days of the intervention week. Eighty-six percent of respondents (37 of 43) said retrieval practice did not adversely affect the workflow at the end of rounds. The perception that teaching on rounds was a priority increased after the intervention (3.93 versus 4.28 on 1–5 Likert scale, $P = .047$).

Conclusions Using retrieval practice on MICU rounds was feasible and acceptable and was associated with an increase in the perceived priority given to teaching on rounds.

Introduction

Intensive care unit (ICU) teaching rounds present rich opportunities for bedside teaching and behavioral modeling by fellows and attendings.[1] Rounds also comprise a large proportion of the workday for residents.[2] Barriers to effective teaching on ICU rounds (and on other inpatient services) include learners at multiple stages of training, movement in physical space, and frequent interruptions.[3] Teaching may be implicit rather than explicit and, therefore, not recognized by residents.[4] In addition, the educational needs of trainees can become secondary to patient care.

Retrieval practice is a cognitive learning tool that helps learners consolidate, retain, and apply new information.[5] It involves self-generated recall of learned content, strengthening the memory and understanding of what was learned.[6] Retrieval practice has been utilized in preclinical settings with positive results, and there have been calls for its use in graduate and continuing medical education.[7–9] Asking residents to share learning points on rounds, a form of retrieval practice, has been suggested but not, to our knowledge, studied.[10]

We investigated the feasibility and acceptability of integrating retrieval practice into ICU rounds. We also assessed whether there were effects on how ICU teams perceived the educational value of rounding.

Methods

From October 2018 to June 2019, we performed a prospective feasibility study in a tertiary care academic medical center. Eligible participants included internal medicine and family medicine residents and pulmonary and critical care fellows and faculty on medical ICU (MICU) teams. Settings included 2 MICUs to which residents rotate at our institution. Teams included an attending physician, a fellow, 3 residents, and 2 medical students who worked together for 2 consecutive weeks. Enrollment of MICU teams occurred over this 2-week period. Teams were excluded if the same attending wasn't present for both weeks or if a study author was on service. Attendings and fellows who were previously enrolled

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Editor's Note: The online version of this articles contains the surveys used in the study.

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TABLE 1
Perceived Educational Value of Intensive Care Unit (ICU) Rounds by Residents, Fellows, and Attendings

Statement	Preintervention,[a,b] mean (SD)	Postintervention, mean (SD)	*P* Value
I found the ICU rounds this week to be educationally valuable.	4.17 (0.621)	4.30 (0.599)	.31
Residents had adequate time to process new information on ICU rounds this week.	4.05 (0.623)	4.23 (0.527)	.14
An appropriate amount of time was spent on ICU rounds this week.	4.00 (0.855)	4.21 (0.638)	.20
Teaching residents was a priority for the team this week.	**3.93 (0.867)**	**4.28 (0.867)**	**.047**
The educational topics discussed on rounds were relevant to patient care.	4.36 (0.618)	4.37 (0.618)	.91
ICU rounds inspired residents to further research or learn about a topic independently.	4.05 (0.764)	4.21 (0.742)	.33

[a] Columns reflect a 1–5 Likert scale (1, strongly disagree, to 5, strongly agree).
[b] Bold entries reflect values that were statistically significant at $P < .05$.

were not resurveyed if their subsequent teams participated.

Teams were encouraged during the second service block week to incorporate retrieval practice, whereby residents shared one learning point at the end of rounds. We gave a brief explanation to all participants regarding what the sharing of learning points entails and asked attendings and fellows to facilitate the residents' retrieval practice. Signs reminding teams to perform retrieval practice were taped to rounding computers. We gave no other instructions regarding rounding or educational expectations.

The feasibility and acceptability of incorporating retrieval practice into ICU rounds, as well as the effects on the perceived educational value of rounds, were assessed by surveys. Pre- and postsurveys were developed by the investigators and reviewed for consistency and clarity by independent content experts. We piloted the surveys with a small group of residents, fellows, and attendings to ensure reliability. Question formats included Likert-scale agreement, multiple choice, and free text (provided as supplemental material). The surveys were anonymous and administered in person via iPads (Apple, Cupertino, CA).

At the end of the first week of a block, we surveyed residents, fellows, and attendings about their perceptions of the educational value of ICU rounds. We surveyed participants again at the end of week 2 about the feasibility and experience of sharing learning points, as well as the perceived educational value of ICU rounds that week.

Independent *t* tests and Mann-Whitney *U* tests were used to test for statistically significant differences. Results were analyzed for all participants together as well as by role (residents and fellows/attendings). Because the surveys were anonymous, pre and post responses were not linked for any individual participant.

The Institutional Review Board at The Ohio State University approved this study.

Results

We enrolled 9 MICU teams, including 31 residents, 8 fellows, and 8 attendings. Overall, 42 and 43 of 47 participants (89% and 91% response rates, respectively) responded to the pre- and postsurveys. Nineteen residents (61%) were postgraduate year (PGY)-1, and the rest were PGY-2 to PGY-5. Twenty residents (65%) were categorical internal medicine, and the remainder (11 of 31; 35%) were a mix of internal medicine–pediatrics, emergency medicine–internal medicine, preliminary, and family medicine.

Seventy percent of survey respondents (30 of 43) reported incorporating retrieval practice into rounds on at least 3 days of the intervention week. Eighty-six percent of participants (37 of 43) said the workflow at the end of rounds was not affected, whereas 72% (31 of 43) said they likely will use the sharing of learning points on rounds in the future. After incorporating retrieval practice into ICU rounds, there was an increase in the perception that teaching of residents was a priority (3.93 [SD = 0.867] versus 4.28 [SD = 0.734] on a 1–5 scale [5, strongly agree], $P = .047$). Respondents indicated an increase in estimated time spent dedicated to teaching on rounds after the intervention (26.2 minutes [SD = 14.082] versus 38.9 minutes [SD = 26.614], $P = .012$). There were no other statistically significant differences between the pre- and postintervention surveys with the pooled analysis (TABLE 1). When the responses of residents and fellows/attendings were analyzed separately, fellows and attendings perceived a statistically significant decrease after the intervention in the relevance

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TABLE 2
Representative Comments Regarding Residents Sharing Learning Points After Rounds

Residents	Fellows/Attendings
▪ "Allowed me to learn from my colleagues [and] encouraged me to focus [on] education during rounds." ▪ "Fostered recall/recollection as a team and review of interesting patient cases." ▪ "It was nice to have time after rounds to digest all that we had seen. We got to take a step back and think about what we learned." ▪ "Reiterating learning points led us to notice gaps in understanding. Discussing topics at the end led to more time immediately after rounds for education." ▪ "Sometimes difficult to do based on the clinical status of the patients." ▪ "Sometimes it is difficult to find time for learning points in the setting of patient care, and sometimes I feel uncomfortable being put on the spot."	▪ "Reiterated important points for whole team and stimulated further discussion." ▪ "Trainees gained a better understanding of concepts in critical care medicine." ▪ "We reinforced vital points to make sure they had sunk in. There was good participation from team members." ▪ "This week had less than optimal teaching due to schedules and fatigue, but not as a function of these learning points. The learning points actually helped mitigate that." ▪ "Hard to remember to do it." ▪ "There is an implicit assumption that all learning points are educational learning points. Some learning points echoed by residents were small, superfluous details that are likely to be forgotten in days."

of educational topics discussed pertaining to patient care (4.68 [SD = 0.480] versus 4.27 [SD = 0.458] on a 1–5 scale [5, strongly agree], $P = .024$). No other differences were noted between the pooled and separately analyzed data.

TABLE 2 includes representative comments from participants. They appreciated that summarizing learning points stimulated discussion, independent research, and reflection on what was learned and allowed for focus on the educational nature of rounding. They cited barriers, including urgent clinical situations and remembering to incorporate the practice on busy clinical services and noted questions about the significance of some of the shared learning points.

Discussion

In the era of work hour regulations and compressed workdays for residents, there is a need for educational interventions that maximize clinical learning opportunities. The results of this study indicate that ICU teams found the use of retrieval practice during rounds to be acceptable and feasible. After the intervention, respondents noted an increase in both the perceived priority and estimated amount of time spent teaching on rounds. Importantly, participants felt the length of rounds was still acceptable.

A culture of teaching is important to encourage both attendings and fellows to teach residents and residents to teach each other. Although this study focused on retrieval practice feasibility, we found the perceived increase in priority given to teaching encouraging. Of note, when analyzed separately, fellows and attendings reported a decrease in the clinical relevance of educational topics discussed on rounds after the intervention. Although we did not study the learning points residents generated, some fellows and faculty did note that the learning points were at times "superfluous details" (TABLE 2). This suggests that what attendings and fellows feel the take-home points from rounds should be may not always align with what residents learn.

This study has several limitations. It occurred at a single institution within 2 clinical units with a limited number of participants. All participants received the intervention, and outcomes were self-reported. Despite these limitations, we anticipate that the cognitive basis for retrieval practice makes it likely to be generalizable to other clinical learning environments besides the ICU.

Potential future directions of inquiry include assessing the types of knowledge residents accumulate on rounds, qualitative analysis on how retrieval practice affected the culture of teaching, as well as the feasibility of implementation in other rounding or clinic environments.

Conclusions

Using retrieval practice on ICU rounds by asking residents to share learning points was feasible, acceptable, and associated with a perceived increase in the prioritization of teaching on rounds.

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