

ORIGINAL CONTRIBUTION

Conceptualizing intubation sharing: A descriptive qualitative study of videolaryngoscopy for pediatric emergency airway management

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Abstract

Background: This study characterizes clinical and educational practices around the use of videolaryngoscopy in pediatric emergency airway management through qualitative exploration.

Methods: This is a descriptive qualitative study using semi-structured interviews of emergency medicine physicians. Physicians were selected by theoretical sampling from urban, tertiary care pediatric hospitals across the United States until theoretical data saturation was achieved. The study applied a constructivist grounded theory approach to data collection and analysis. Manual line-by-line coding of interview transcripts was used initially, then grouped into categories with constant comparative analysis to generate the final coding scheme organized by themes and subthemes. Finally, memo-writing and iterative analysis meetings explored relationships between themes and identified an interpretive model.

Results: Theoretical saturation was achieved after 10 of the initial 12 interviews. Emerging from the data were six themes that describe the concept of intubation sharing: (1) Videolaryngoscopy encompasses multiple modalities that all provide a shared view and ability to record; (2) Airway experts and systems help realize the full potential of videolaryngoscopy; (3) Videolaryngoscopy can be a clinical, educational, quality assurance and research tool; (4) Some skills required for videolaryngoscopy are unique, while others overlap with direct laryngoscopy; (5) Videolaryngoscopy allows a coaching laryngoscopist to provide real-time guidance to the primary laryngoscopist from a shared view; (6) Videolaryngoscopy provides an opportunity for post-intubation coaching and feedback and shared learning from a single experience for the provider community.

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Conclusions: Through this multicenter qualitative interview study, we derived the concept of intubation sharing through videolaryngoscopy for real-time and remote coaching, for both the primary laryngoscopist and the community of emergency medicine providers who intubate.

KEYWORDS

airway management, intubation, pediatrics, videolaryngoscopy

INTRODUCTION

Background

Pediatric intubation is an infrequent critical procedure in emergency medicine. Rates of intubation success for pediatric patients are lower than those for adults, and pediatric trainees are not always competent in this procedure at the end of training.¹⁻⁴ Videolaryngoscopy provides an opportunity for both improved visualization of glottic anatomy and shared visualization by providers other than the primary laryngoscopist. This may allow for improved clinical outcomes and provide a valuable opportunity for airway education during and after procedural attempts.

Videolaryngoscopy is widely adopted for emergency airway management in adults, where studies have demonstrated superiority of videolaryngoscopy over direct laryngoscopy.⁵ Data on the use of videolaryngoscopy in pediatric intubations are mixed. The most recent Cochrane review, which involved data from 800 children, showed worse outcomes with videolaryngoscopy compared to direct laryngoscopy, both in terms of the length of attempts and the failure rate. However, a more recent study of over 600 pediatric intubations within National Emergency Airway Registry (NEAR) found higher first pass success with videolaryngoscopy compared to direct laryngoscopy.²

Beyond clinical application, multiple studies have demonstrated benefit to videolaryngoscopy as an educational tool.⁶⁻⁹ During traditional direct laryngoscopy, providing procedural assistance is limited by the inability of the supervisor to directly visualize the laryngeal anatomy. Guidance can be offered based on changes in vital signs and verbal descriptions provided by the primary laryngoscopist. In contrast, videolaryngoscopy provides a shared view of the airway anatomy that enables a second clinician to offer real-time teaching and supervision during endotracheal intubation.

Adoption of videolaryngoscopy for pediatric intubation has been increasing. In two national database studies including both pediatric and general emergency departments, the reported use of videolaryngoscopy for pediatric intubation increased from <5% of intubations to more than 50% of intubations over 3 years.^{2,10} Despite more widespread videolaryngoscopy use, little is known about how it has been incorporated into pediatric airway management as a clinical or educational tool in the emergency medicine setting. Understanding how videolaryngoscopy technology is being adopted and utilized by emergency medicine providers caring for children can help inform clinical care, research and education.

Objective

Our objective was to use qualitative exploration to characterize practices around the use of videolaryngoscopy in pediatric emergency airway management both as a clinical and educational tool.

METHODS

Study design and setting

This is a descriptive qualitative study using semi-structured interviews of emergency physicians from urban, tertiary care academic pediatric hospitals across the United States of America. Semi-structured interviews were designed to understand current practices and considerations around use of videolaryngoscopy in pediatric patients requiring intubation in the emergency department. The research team consisted of 2 fellows (K.M. and A.M.) and one faculty member (J.N.). The interviewer (K.M.) was in her final year of pediatric emergency medicine fellowship with advanced postgraduate training in qualitative research. We applied a constructivist grounded theory approach to data collection and analysis.¹¹ We used Charmaz criteria for grounded theory and the Consolidated Criteria for Reporting Qualitative Research to guide reporting of interview data and analysis.^{11,12} This study was deemed exempt by the Institutional Review Board of Boston Children's Hospital.

Selection of participants

We used theoretical sampling to select interview subjects. Subjects were pediatric emergency medicine fellowship-trained attending physicians. Initial sampling was designed to identify pediatric airway experts with institutional diversity. Pediatric airway expertise was defined as having at least 3 publications on airway management in peer reviewed journals or having taught in 3 or more national airway courses. To gain institutional variability, we selected subjects who represented hospitals that varied in terms of geographic location and volume of patients seen. Based on the analysis of initial interviews with airway experts, the team identified benefit in including subjects with less airway expertise. This was designed to enhance transferability and account for the possibility of unique perspectives on videolaryngoscopy across individuals with differential allocation of focus on airway

management. Each airway expert identified another emergency medicine attending at their respective institutions who did not meet the definition of a pediatric airway expert. We asked experts to identify subjects rather than ask for volunteers to avoid self-selection by those with strong interests in airway management. We continued to add subjects until we achieved theoretical data saturation in our qualitative analyses.

Measurements and outcomes

Interviews were conducted using an interview guide (Supporting Information Appendix 1) that was developed based on published reviews of pediatric emergency airway management.¹³ Questions were designed to be open-ended to encourage reflection and individual interpretation. K.M. conducted all interviews. A.M. also participated in interviews and met regularly with K.M. to adapt the protocol. We reviewed and revised questions to allow for further analysis of emergent topics and developing hypotheses. All interviews were audio-recorded, de-identified and transcribed verbatim into transcripts. Subjects were asked to reserve more time than anticipated to complete the interview to ensure interviews were not time-constrained.

Analysis

Data were analyzed using a constructivist grounded theory approach. An initial coding scheme was generated through manual line-by-line coding of all interview transcripts. Resulting codes were then grouped into categories to generate the final coding scheme (Supporting Information Appendix 2) that organized codes into themes and subthemes. To ensure the codes were clear and unambiguous, each interview transcript was coded by one team member and then double-coded by another unblinded team member (K.M. and A.M.). Coded transcripts were compared, and overlap and differences in interpretation of codes were discussed within the research team until consensus was reached. In line with the principles with constant comparative analysis, transcripts were re-examined as additional interviews were completed.

The coding themes and subthemes were discussed, described and refined by the research team. Concurrent and comparative coding was performed until theoretical saturation was reached. After completing this process, the interviews were reread to ensure consistency in coding and capture. Themes were also compared between subjects identified as airway experts and those without airway expertise to analyze for new or differing concepts. The presence of identified themes and subthemes in each interview was tabulated. Illustrative quotations were selected for themes and subthemes.

After completion of the coding, distillation of themes, and organization into themes and subthemes, a final level of analysis explored relationships between themes to identify an interpretive model. This

was done through both memo writing and during iterative analysis meetings of the research team.

The interpreted themes were circulated to all interview subjects for a respondent validation. No new themes or interpretations emerged during the respondent validation.

RESULTS

Characteristics of study subjects and interviews

We initially interviewed a total of 6 pediatric airway experts. Adding subjects with a focus outside airway management resulted in a total of 12 subjects. All subjects who were asked to participate agreed to be interviewed. Characteristics of the 12 interview subjects are shown in Table 1. We achieved theoretical saturation after 10 interviews, with no new themes identified in the final 2 interviews.

The interviews were conducted in November and December 2019 and were done in-person or by telephone depending on the subjects' proximity. Interviews lasted from 14 to 37 minutes (mean 24 minutes, standard deviation 7 minutes).

TABLE 1 Characteristics of interviewed subjects

N = 12	
Size of Emergency Department (visits per year)	
<50,000	2
50–75,000	6
>75,000	4
Geographic Location of Emergency Department ^a	
Northeast – New England	4
Northeast – Midatlantic	2
Midwest – East North Central	2
West – Mountain	2
West – Pacific	2
Years out of PEM fellowship	
<5	3
5–10	4
11–15	5
Airway expertise	
Expert ^a	6
Non-expert	6
Sex	
Male	9
Female	3

^aCensus Bureau-designated region – division.

^bPediatric airway expertise was defined as having met at least 2 of the following criteria: (1) published peer-reviewed work related to pediatric airway management, (2) been identified as a content expert to peer-review publications related to pediatric airway management, (3) authored a textbook chapter on airway management, or (4) taught at a national airway course.

Main results

Emerging from our data was the concept of intubation sharing: each intubation performed with videolaryngoscopy enables sharing of intubation for real-time and post-procedure coaching of the primary laryngoscopist and for improving the performance of the community of providers who will perform future intubations. Each element of this emergent theoretical model, illustrated in Figure 1, will be examined and explained by reviewing in detail the themes that informed it with illustrative quotations from subjects (Table 2).

Theme 1: Videolaryngoscopy encompasses multiple modalities, all of which provide a shared view and ability to record.

Videolaryngoscopy is not a single tool, but refers to multiple modalities including direct laryngoscopy using a video-equipped device with a traditional blade (referred to as video-assisted direct laryngoscopy), indirect videolaryngoscopy using a video-equipped device with a traditional blade and indirect videolaryngoscopy using a hyperangulated blade. Practice around which modality is utilized varies, even within single institutions.

Regardless of modality, videolaryngoscopy provides a shared view and ability to record intubation that are transforming pediatric intubation. The shared view allows for a two person collaboration between the primary laryngoscopist and a coaching laryngoscopist.

The ability to record allows each intubation experience to be shared remote from the procedure.

Theme 2: Airway experts and systems help realize the full potential of videolaryngoscopy.

Subjects felt that the utility of videolaryngoscopy is best realized when there is an identified airway expert to champion its use, when there is a system to ensure intubations are recorded, and when there is system in place for post-intubation feedback.

For all forms of laryngoscopy, regardless of device or modality of use, subjects emphasized that preparation matters. Descriptions of preparation encompassed many aspects of airway management including: the patient, equipment, and an intubation and contingency plan. Noting that intubation occurs in stressful settings, a common theme included advocating for tools to standardize the procedure, such as checklists. These practices help ensure that the benefits of videolaryngoscopy are consistently realized.

Theme 3: Videolaryngoscopy can be a clinical, educational, quality assurance and research tool.

Subjects highlighted the clinical advantages of videolaryngoscopy, including a better view and an opportunity for real-time guidance. Videolaryngoscopy was also considered a possible rescue device for a failed intubation attempt, either by using a videolaryngoscope if it was not used initially or by changing the modality of

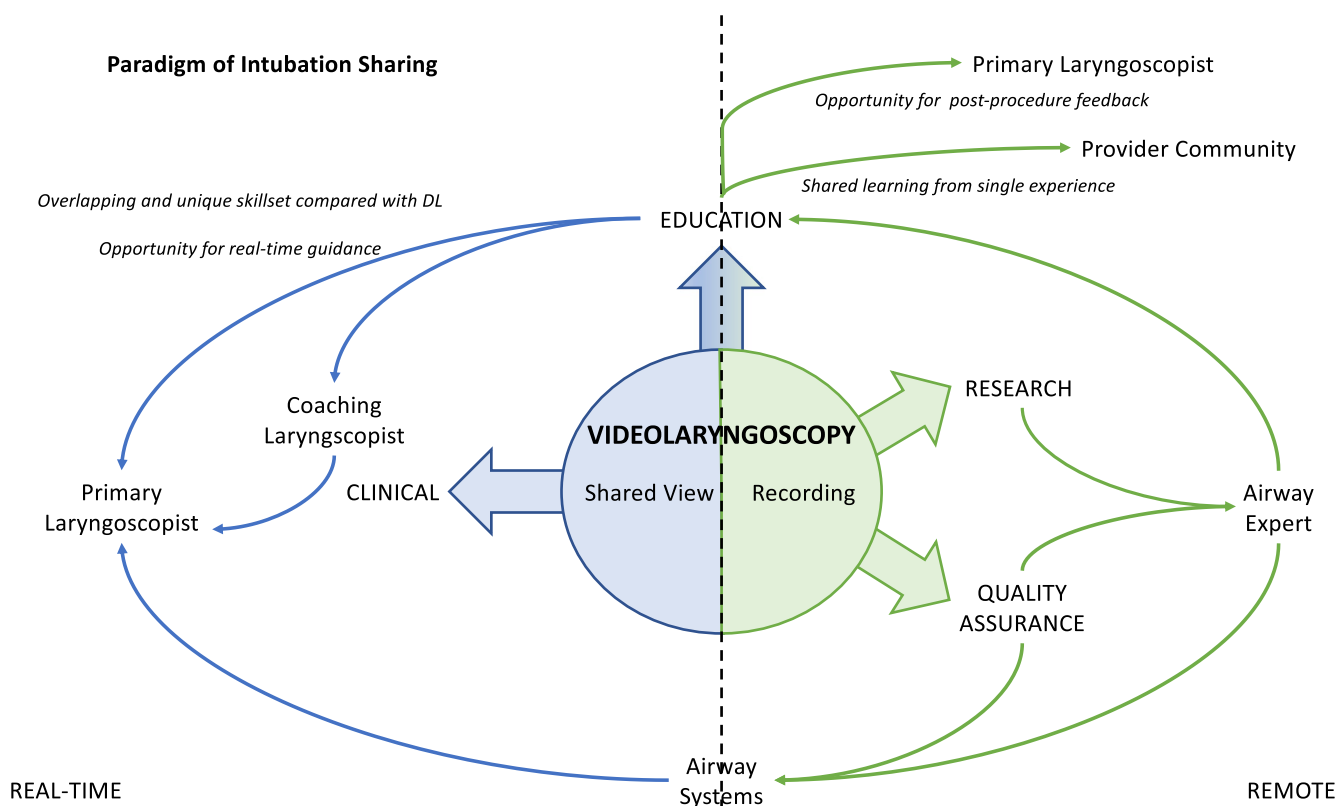


FIGURE 1 Paradigm of intubation sharing

TABLE 2 Emergent themes around videolaryngoscopy in pediatric emergency airway management

Theme - subthemes	Illustrative quotations
Theme 1: Videolaryngoscopy encompasses multiple modalities, all of which provide a shared view and ability to record Subthemes: Multiple Modalities Shared View Recording	I think there's nothing better than actually seeing what they're seeing. I think that it's a tremendous advantage from both an education standpoint as well as a patient safety standpoint "Did you see it goes through the cords? ... that question doesn't even get answered, doesn't even get asked anymore...nobody's saying, "Did it go through the cord?" because you already know the answer to that. Whereas, that was probably the key question prior to the availability of the video laryngoscope We watch just a ton of video. We video record all of our cases and we watch a bunch of them... Just spending a lot of time watching videos, thinking about them, talking to colleagues who watch a lot of videos as well, and just observing
Theme 2: Airway experts and systems help realize the full potential of videolaryngoscopy Subthemes: Airway Expert Airway System	I think it's really important in any given ED that is serious about owning airway management, that there are airway champions in the ED that are in charge with making sure that all of the staff and trainees are continuously improving their approach But I think that until [recording] becomes standard practice, those of us that want to use it for education, may or may not have it available, and it may not have the educational benefits that we'd hope Standardization before and during the procedure, the choreography of the procedure, who's doing what when and having that be standardized and having it be not something that the proceduralist has to manage
Theme 3: Videolaryngoscopy is a clinical, educational, quality assurance and research tool Subthemes: Clinical tool Educational tool Quality assurance tool Research tool	We actually do a really good, nice job leveraging the video that we have to use as training in multiple settings, training for our fellows, training for our faculty, and then towards research. And I think that's really important that we use this wealth of information to actually improve our practice in general The obvious, overwhelmingly most important problem, or biggest contributor to not acquiring a higher level of airway skill is just experience. The more we can supplement that... watching these videos ... provides ... additional meaningful experience... can certainly supplement what they're missing out on by not having more cases in the ED What we'll do throughout the year is introduce these airway videos as part of a QI curricula talk about good and bad techniques and examples.. outside of the individual feedback with the trainees, the videos are used for educational and improvements at work
Theme 4: Some skills required for videolaryngoscopy are unique, while others overlap with the skills required for direct laryngoscopy Subthemes: Unique skill set Learn DL Screen to motor	Just putting a video screen into the procedure and improving the visualization of the airway doesn't equate to better performance... you [need] to train specifically on the video laryngoscope skillset because it's different Learners don't always necessarily perceive it as two different procedures, and I think it does sometimes cause a struggle. We don't want the video laryngoscopy to be a crutch...it's always an opportunity to improve your direct laryngoscopy skills It's very different to try to put a small tube through a small hole when you're staring right at it...versus staring indirectly at... a blown up version of itThere's a whole host of biomechanical issues with looking at a screen and not directly at your target
Theme 5: Videolaryngoscopy allows a coaching laryngoscopist to provide real-time guidance to the primary laryngoscopist from a shared view Subthemes: Novel skill that must be learned Dynamic and titratable	The person standing next to them who's providing direction also has a big role to play... the role of that backup person can be the difference between success and not success So there are opportunities to help by saying, "I have a shared view. I can make your view better" I think where it's a minor technical thing... in the experienced provider, I might hold off on saying anything. Then the novice provider, I probably would interject more rapidly, as more of a coach than feedback While we often think it's sort of an art, there's a science to it ... I think [real-time guidance] is a skill that people can develop
Theme 6: Videolaryngoscopy provides an opportunity for post-intubation coaching and feedback to the primary laryngoscopist and shared learning from a single experience for the provider community Subthemes: Primary laryngoscopist Shared experience	This is an infrequent event at such high stakes that to spend five minutes to have everyone review their video is a worthwhile thing... everyone should do it More significant stuff you have to correct in real-time; the fine tuning stuff I think can often be done post procedure to review the tape.. and say, ... "This went well, let's think about how we can make it even better" I think the review of it can make us all get better. And importantly not just the provider... use [the videos] for teaching purposes for the broader group... everyone can learn from watching other people's videos and how they kind of managed airways The real power of the video that I would see is not only for [the laryngoscopist], but potentially for.. all providers... just getting to know the anatomy by the use of those videos will be extremely useful... it's not the technical skill for our general emergency providers... it's the visualization and knowing what they're looking at... seeing less than a handful of pediatric airways just makes for a challenge. These are such high-risk, low-frequency procedures that we should take advantage of every opportunityIf everyone's looking at all of these together over and over and over again... it's the way you're going to develop the best skills and the best approach to this, the best contingency planning down the road

videolaryngoscopy employed when possible: for example, switching from direct to indirect visualization with the same device. In addition to its clinical utility, subjects noted the educational value of videolaryngoscopy by providing an opportunity for shared learning from a single clinical encounter. This learning can help overcome the challenge posed by the infrequency of pediatric intubations. Furthermore, recording creates opportunities for video review for quality assurance and assessment of competency, as well as a medium for data extraction for research.

Theme 4: Some skills required for videolaryngoscopy are unique, while others overlap with the skills required for direct laryngoscopy.

Despite the many benefits and the increasing adoption of videolaryngoscopy, subjects stressed the importance of learning direct laryngoscopy, noting the potential for equipment problems or lack of availability of a videolaryngoscope in some settings. Subjects highlighted the advantage of video-equipped devices that allow video-assisted direct laryngoscopy as effective tools for teaching and improving direct laryngoscopy skills.

While the skills required for videolaryngoscopy and direct laryngoscopy overlap, each videolaryngoscopy device and modality of use has its own learning curve. Subjects noted that indirect videolaryngoscopy in which the laryngoscopist relies on the video screen for visualization is a distinct skill set compared to direct laryngoscopy. Subjects felt the ability to translate what is seen on the video screen to motor movements is a unique challenge when using a videolaryngoscope. While glottic visualization is often easier with videolaryngoscopy, tube passage tends to be more challenging and intubation attempts may be longer. This latter disadvantage of indirect laryngoscopy was mentioned only by airway experts. Of note, increased procedural success was noted as an advantage of videolaryngoscopy by 3 of 6 non-airway experts but was mentioned by any airway experts. In addition, subjects mentioned the risk of trauma and task fixation as other potential disadvantages of using videolaryngoscopy.

Theme 5: Videolaryngoscopy allows a coaching laryngoscopist to provide real-time guidance to the primary laryngoscopist from a shared view.

This role is novel, and subjects expressed there is a learning curve for optimal coaching. They felt the approach of the coaching laryngoscopist should not be fixed – it must adapt to fit each intubation. Specifically, subjects commented on being selective around what needs to be corrected in real-time, reserving other feedback for before or after an attempt. Subjects commented that they decide whether to give real-time feedback based on the laryngoscopist, the patient, the modality of videolaryngoscopy being employed, or the anticipation of success or harm. After deciding to give feedback, subjects noted the importance of titrating the timing, amount and specificity of feedback based on witnessed progression by the primary laryngoscopist, the importance of the feedback and the anticipated response of the proceduralist.

Subjects recommended planning ahead for real-time feedback with the primary laryngoscopist, including expectations around who will speak during an attempt. They felt that guidance is generally beneficial, but coaching laryngoscopists should be aware that it can have pitfalls and remember that the direct glottic view may differ from the view on the video screen. These last two points were mentioned by multiple airway experts (3 and 4 of 6, respectively) but not by any non-airway experts.

Theme 6: Videolaryngoscopy provides an opportunity for post-intubation coaching and feedback to the primary laryngoscopist and shared learning from a single experience for the provider community.

In addition to real-time feedback, subjects highlighted that videolaryngoscopy can enhance post-intubation coaching. This can be done through immediate debrief with the primary laryngoscopist by the coaching laryngoscopist. Coaching can also be temporally removed from the attempt. Subjects expressed that post-intubation feedback ideally includes an opportunity for self-assessment by the primary laryngoscopist and highlights both positive and negative aspects of the intubation. And while post-intubation video review provides opportunities to address details regarding intubation technique, subjects also viewed it as a potential springboard into more general conversations about the airway management of the patient.

Post-intubation video review can also occur with a larger audience and can be facilitated by an identified reviewer, such as an airway expert. Subjects expressed a belief that experience and repeated airway exposure are tied to intubation success. The ability to share recorded videos with the provider community as a means to increase exposure to airway management was identified as a key advantage of videolaryngoscopy.

DISCUSSION

To our knowledge, this study is the first that directly interviewed emergency physicians about how they use videolaryngoscopy for pediatric intubation, both from an individual encounter and a systems standpoint. Our analysis revealed the concept of intubation sharing, with the use of videolaryngoscopy allowing real-time and remote coaching of both the primary laryngoscopist and the community of providers who perform pediatric intubations in the emergency department. This concept suggests that in addition to its clinical utility, videolaryngoscopy is recognized as a valuable educational tool, with additional roles in research and quality improvement.

The majority of published data has focused on the clinical utility of videolaryngoscopy in the pediatric emergency department. However, participants in this multi-center study highlighted multiple potential uses for videolaryngoscopy outside the clinical sphere. Subjects consistently recognized the educational power of videolaryngoscopy. While many other specialties, including anesthesia and neonatology, have reported on the educational utility of videolaryngoscopy, this was not yet well described in the emergency

department.^{7,8,14-16} One of the frequently mentioned benefits of videolaryngoscopy in these studies is the shared view. Little is known about how this translates to current or best clinical practices in the emergency department. To our knowledge, our study is the first to characterize how the shared view provided by videolaryngoscopy is being used for educational purposes to improve pediatric emergency intubation. Subjects also highlighted the power of videolaryngoscopy as a tool to create shared learning from a single experience. Pediatric intubation is rare, making both achieving sufficient exposure during training and maintaining competency after training challenging.^{4,17-20} Subjects stressed the importance of creating a system for recording and reviewing intubations performed with videolaryngoscopy as a means of addressing these challenges, enabling multiple learners to benefit from the intubations that are performed.

With regard to the clinical utility of videolaryngoscopy in the emergency department, previous studies focused primarily on outcome metrics such as frequency of attempts and rates of success.^{2,21} There has been limited reported data on how the videolaryngoscopy equipment was being used: whether for direct or indirect visualization and with or without real-time guidance. This study suggests that practices around use of videolaryngoscopy are varied in terms of which of the multiple possible modalities are used, including indirect videolaryngoscopy and video-assisted direct laryngoscopy. In fact, our study revealed that even within institutions, the mode varied among providers. A major question in the literature has been whether videolaryngoscopy improves intubation success in pediatric patients.²¹ Our study offers insight into why this might be hard to answer, given the variation in how it is used clinically. Furthermore, subjects shared practices around videolaryngoscopy that could contribute to improved success, such as practicing each modality intentionally and optimizing the use of a coaching laryngoscopist. Our study also identified situations in which providers should be aware of the limitations of videolaryngoscopy, such as the potential for the direct view to differ from the view on the screen during video-assisted direct laryngoscopy or the potential for challenging tube passage due to the unique skill of translating what is on the screen to appropriate motor movements.

It is interesting to note that there were ideas that were mentioned exclusively by the airway experts. These included the fact that real-time procedural guidance is not always beneficial and that the view on the videolaryngoscopy screen can differ from the direct view. The difference between the direct view and what is seen on the videolaryngoscopy screen is published in the literature, but not mentioned by non-experts.^{13,22} This reinforces a point made by subjects around the benefit of having airway champions to best leverage the power of videolaryngoscopy to improve intubation practices for pediatric patients in the emergency department.

LIMITATIONS

This study included a small number of interview subjects who were identified as meeting our definition of pediatric airway expertise.

The small sample size potentially limited representation across specific demographic groups. The decision to allow airway experts to identify non-expert participants for inclusion was intended to avoid self-selection by individuals with strong interest in airway management, however the experts' selection could have been impacted by their implicit or explicit biases. The sex of participants mirrored the national composition of emergency medicine physicians, which is approximately 75% male.²³ We did not ask participants to self-report race or ethnicity, so cannot comment on how the racial and ethnic composition compares to nationally reported data. While we did achieve theoretical saturation, the study focused on fellowship-trained, pediatric emergency medicine attendings practicing at tertiary academic pediatric hospitals. Both their practice settings and their training may limit the transferability of these findings. The majority of children are cared for by providers practicing at sites other than academic pediatric emergency departments, with different training pathways and with different levels of airway experience.

Two members of the research team (K.M. and J.N.) meet the definition of airway management expertise and may have had preexisting ideas around use of videolaryngoscopy based on their research or teaching. To protect against this influence, the team member without airway expertise (A.M.) was involved in coding all transcripts, either as the initial coder or as the double-coder. However, framing of questions by researchers with airway expertise may have facilitated further exploration on relevant topics during the semi-structured interviews.

Participants did not review, comment or correct their transcripts. This lack of transcript validation may have affected reflexivity if comments or statements were incorrectly interpreted by the study team. A participant check was performed to help protect against misinterpretation and to ensure the material important to the interview subjects was not inadvertently omitted. Finally, we obtained all data from interviews and did not engage in methodologic triangulation.

CONCLUSIONS

Through this multicenter qualitative interview study, we derived the concept of intubation sharing: videolaryngoscopy enables sharing of intubation for real-time and remote coaching not only of the primary laryngoscopist but also for the community of emergency medicine providers who intubate. We found that videolaryngoscopy is a multifunctional tool for clinical care, education, research and quality improvement. Realizing the full potential provided by videolaryngoscopy use for pediatric intubation in the emergency department will be facilitated by implementing systems around airway management, identifying airway champions, and considering the novel opportunity offered by procedural coaching both during and remote from the intubation.

CONFLICTS OF INTEREST

KAM, AM, DL and JN report no conflicts of interest.

AUTHOR CONTRIBUTIONS

KAM conceived of the study, performed the data collection, analyzed the data, drafted and revised the manuscript; AM performed the data collection, analyzed the data, drafted and revised the manuscript; DL analyzed the data, drafted and revised the manuscript; JN conceived of the study, drafted and revised the manuscript.

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SUPPORTING INFORMATION

Additional supporting information may be found online in the Supporting Information section.

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