Quality Improvement

Video Documentation as a Measure of Written Documentation Accuracy in Emergency Medical Service Field Intubations

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Abstract

Introduction
Quality improvement (QI) is a major focus of all departments and fields of health care, including emergency medical services. The chaotic and rapidly evolving atmosphere in which paramedics must practice can lead to inconsistency between what is documented and the actual events. This leads to difficulty when trying to evaluate the practitioners and when implementing a QI program. In this study, we evaluated the prevalence of discrepancy between the video and written record for Rapid Sequence Intubation (RSI) performed in the field as a demonstration of the utility of video documentation in QI.

Methods
We used a systematic retrospective chart review to compare written with video documentation in 100 consecutive prehospital RSI encounters in a single EMS agency.

Results
Of the patient care records (PCRs), only 6% matched the video record for all quality measures tracked. The largest reason for the discrepancy was in the time required to intubate (58%) whether LEMON was evaluated (42%), total number of intubation attempts (36%), first attempt success (24%), BVM used (18%), and whether an airway introducer device was used (12%).

Conclusion
Written documentation is inaccurate compared to video documentation when used as a quality improvement process for EMS prehospital RSI encounters.

Keywords
quality improvement; emergency medical technicians; emergency medical services; EMS, paramedics; Rapid Sequence Induction and Intubation; RSI; video recordings; documentation; emergency medicine

Introduction
Measuring performance within hospital and pre-hospital settings has relied primarily on written documentation recorded by medical providers. Written documentation relies on the memory of the providers to deliver sufficient accuracy. The documentation can be altered unknowingly based on the providers' subjective experience of the encounter and thus is prone to unintentional error. On rare occasions, the documentation may represent an intentional falsification of what occurred. In a study by Szauter et al of 207 medical student encounters evaluated, only 4% of the notes accurately represented what occurred during the encounter compared to video documentation.[1] A German Emergency Medical Services (EMS) study by Bergrath et al compared written to video

documentation of 28 teams of paramedics and EMS physicians after simulated emergency scenarios with high fidelity mannequins.[2] Of the actions performed in the simulated encounters, 39-42% were documented incompletely or incorrectly. No other published data exists that compares pre-hospital or hospital video documentation to written documentation.

We hypothesize that video documentation provides a more accurate record of what occurred, which is not subject to the memory or subjective experience of the providers. It also captures many intangibles that cannot be captured in a written record. Modern video recording devices make video documentation cheap, easy, and accessible.

Methods

We used a systematic retrospective chart review to compare written with video documentation. We looked at rapid sequence intubation (RSI) among emergency medical technicians at a single urban EMS agency in a large city, serving over 500 000 people with an annual call volume of over 20 000. We sought to demonstrate the prevalence of discrepancy between written documentation and events in the field by employing video documentation to record events as they took place and to demonstrate the superior accuracy of video documentation compared to conventionally written documentation.

Since May 2013, this urban EMS agency has deployed the TASER® Axon Flex© digital video camera (a standard body camera used in public safety) for recording all RSIs performed by its paramedics for the purpose of internal quality improvement (QI). As a separate internal QI process, the EMS agency has also been tracking provider-recorded electronic documentation of important RSI performance measures. This written documentation takes place electronically via the Zoll ePCR program.

Four independent, experienced RSI providers, consisting of 3 EMS supervisors and 1 EMS physician, reviewed 100 consecutive RSI video recordings by paramedic RSI providers. The video reviewers used independent audit tools to review the RSI videos and tabulate predetermined performance measures in a yes/no fashion. Two independent, experienced RSI providers reviewed each RSI video, and these records were then compared. When a discrepancy existed, a third video reviewer reviewed the video to break the tie.

After the performance measures were recorded by viewing the RSI videos, these performance measures were compared to the written documentation of what occurred as recorded by the provider as part of standard documentation practices. The prevalence of discrepancies between these 2 records was then quantified (**Table 1**).

Results

Of the patient care records (PCRs), 6% matched the video record for all quality measures tracked. When 2 common discrepancies were excluded, 27% percent of PCRs matched the video record. The discrepancies were a difference in bag valve mask (BVM) use and the Look-Evaluate-Mallampati-Obstruction-Neck-mobility (LEMON) assessment. The most common reason for a discrepancy between the PCR and the video record was whether or not the intubation took less than 45 seconds to perform, which occurred 58% of the time. Discrepancy about the length of the intubation (less or more than 45 seconds) meant that the intubation was, on average, 187 seconds. Other notable discrepancies included whether LEMON was evaluated (42% documentation discrepancy), the total number of intubation attempts (36%), first attempt success (24%), BVM used (18%), and whether an airway introducer device was used (12%).[3] The remaining discrepancies showed up less than 7% of the time.

Discussion

RSI is one of the riskiest, most complicated, and most difficult tasks paramedics perform. The success rate for paramedics' endotracheal intubation is around 80-85%.[4] When unsuccessful, it often has fatal consequences.[4]

In our current system, we track the paramedic's performance and procedural acumen primarily on written documentation completed by the paramedic. Written documentation is limited in its accuracy in airway management. Many factors contribute to the inaccuracy of written

Table 1. Percentage of Discrepancy per QI Measure

QI measure	Percentage discrepancy
Intubation < 45 seconds? (Duration defined as insertion of laryngoscope into mouth to endotracheal tube [ETT] placement)	57.58%
LEMON evaluated?	42.42%
Total number of attempts (an attempt is each separate laryngoscope insertion)	36.36%
First attempt success?	24.24%
BVM used? (other than for pre-oxygenation)	18.18%
Airway introducer device used? (on any attempt)	12.12%
Video laryngoscopy used? (at any time)	6.06%
Successful laryngoscopy? (ETT placed)	6.06%
Total number of ETT placements?	6.06%
Airway adjuncts utilized? (any oropharyngeal airway, nasopharyngeal airway, King Airway used)	6.06%
Duration of intubation (sec)	3.03%
Pre-oxygenation? (either BVM, non-rebreather King Airway, or Nasal Cannula O_2 provided before the intubation)	0.00%

documentation, including the high-stress atmosphere in which field RSI occurs, limitations of human memory, and the implicit bias and efforts to avoid scrutiny from quality control processes.

One meta-analysis found a connection between amplification and consistency of memory over time with severe emotionally arousing events and events with greater involvement.[5] However, some evidence shows that emotionally arousing events interfere with coherent narrative construction. This conclusion was derived from the fact that memory is a reconstructive process.[5]

A review of the consistency of memory among emotionally arousing events revealed that emotional reactions at the time of the event and the present mood could distort memories of that event.[5] Demonstrating this concept, German investigators studied documentation of 2 simulated scenarios among physician-staffed EMS teams. They found that in simulations of ST-elevation myocardial infarction and major trauma, administered medications were documented incorrectly 20% of the time and not documented at all approximately 10%-12% of the time.[1]

Video documentation offers a method of documenting RSI performance that is accurate, less prone to human error, and is more objective rather than subject to the mental state and recall of the provider at the time.

Limitations

While video recording seems an accurate means of assessing what occurs in patient encounters, it is still less than perfect as it is limited to what the device can capture on its screen and audio recordings. Both the quality of recording and the small sample size of patient encounters could prove to be limitations of this study. The study results might have changed if there had been more patient encounters. Additionally, this study evaluates paramedics and could not necessarily be generalized to other providers.

Conclusion

Written documentation and recall limitations can lead to an incomplete QI process. Our study suggests that the improved accuracy of video documentation can improve the QI process and education, thereby leading to better practice.

Conflicts of Interest

The authors declare that they have no conflicts of interest.

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