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Ethical dilemmas of recording and reviewing neonatal resuscitation

Maria C den Boer,[1,2] Mirjam Houtlosser,[2] Henriëtte Anje van Zanten,[1] Elizabeth E Foglia,[3] Dirk P Engberts,[2] Arjan B te Pas[1]

[1]Division of Neonatology, Leiden University Medical Center, Leiden, The Netherlands
[2]Department of Medical Ethics and Health Law, Leiden University Medical Center, Leiden, The Netherlands
[3]Division of Neonatology, Department of Pediatrics, University of Pennsylvania School of Medicine, Philadelphia, Pennsylvania, USA

Correspondence to
Maria C den Boer, Leiden University Medical Center, Leiden 2300 RC, The Netherlands; m.c.den_boer@lumc.nl

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ABSTRACT

Neonatal resuscitation is provided to approximately 3% of neonates. Adequate ventilation is often the key to successful resuscitation, but this can be difficult to provide. There is increasing evidence that inappropriate respiratory support can have severe consequences. Several neonatal intensive care units have recorded and reviewed neonatal resuscitation procedures for quality assessment, education and research; however, ethical dilemmas sometimes make it difficult to implement this review process. We reviewed the literature on the development of recording and reviewing neonatal resuscitation and have summarised the ethical concerns involved. Recording and reviewing vital physiological parameters and video imaging of neonatal resuscitation in the delivery room is a valuable tool for quality assurance, education and research. Furthermore, it can improve the quality of neonatal resuscitation provided. We observed that ethical dilemmas arise as the review process is operating in several domains of healthcare that all have their specific moral framework with requirements and conditions on issues such as consent, privacy and data storage. These moral requirements and conditions vary due to local circumstances. Further research on the ethical aspects of recording and reviewing is desirable before wider implementation of this technique can be recommended.

INTRODUCTION

Approximately 10% of neonates require some form of neonatal stabilisation, with neonatal resuscitation provided to approximately 3% of neonates.[1] Neonatal resuscitation is thus the most common frequently occurring form of acute resuscitation in hospitals.[1 2] Applying respiratory support to neonates during transition at birth can be problematic. Establishing effective ventilation is often the key to successful resuscitation, but can be hampered by inadequate resuscitation techniques or subjectivity in monitoring.[3] There is increasing evidence that inappropriate respiratory support can have severe consequences.[4–6] The therapeutic margin between ineffective and injurious ventilation may be very narrow, and healthcare providers are often unable to identify inappropriate or injurious inflations in real time. Several neonatal intensive care units (NICUs) implemented a system of recording and reviewing neonatal resuscitation in order to improve the quality of care.

New techniques create new ethical questions. NICUs that have implemented the technique of recording and reviewing neonatal resuscitation reported concerns about parental and provider consent,[3 7–12] data storage,[9–13] impact on providers and parents,[2 3 12] privacy[3 8 10 11 13 14] and medicolegal consequences.[3 8 10–12] The concerns reported by each NICU seem to be related to the context, as this technique is used for more than one purpose and is used within various domains of healthcare. As such, various interests and values of the stakeholders of recording and reviewing neonatal resuscitation are at stake.

In this review, we aim to provide insight in the ethical dilemmas that impede the implementation of recording and reviewing neonatal resuscitation. We reviewed the literature about the development of this technique, as well as the ethical aspects that need to be taken into consideration.

DEVELOPMENT OF THE TECHNIQUE OF RECORDING AND REVIEWING NEONATAL RESUSCITATION

Video recording neonatal resuscitation

Video recording in the medical setting was first described by Peltier *et al* in 1969[15] and in the neonatal setting specifically by Hoyt *et al* in 1988.[2] Finer *et al* pioneered video recording neonatal resuscitation as part of a quality assurance procedure in 1999.[12] In more recent years, a limited number of hospitals in Australia, the USA, France, Germany and in the Netherlands have reported to record neonatal resuscitation on a regular basis.[3 9 11–13 16 17]

According to Finer and Rich, video recording is a good method to evaluate the competencies of healthcare providers objectively during actual neonatal resuscitation.[18] Reviewing video recordings allows providers to compare their performance during resuscitation with the guidelines.[2] Systematic and procedural errors can be measured,[1 9 18 19] and further training can be implemented to re-educate providers and improve performance.[2 9] Furthermore, video recordings potentially have a valuable role in assessing new approaches to neonatal resuscitation,[2] although significant measurable improvements of the clinical performance of neonatal resuscitation have not yet been reported.[9 20] Video recording is reported to be valuable for quality assurance and improvement, and to function as an educational tool,[2 9 12 18 21 22] as a basis for future neonatal resuscitation research,[9] and for auditing purposes.[12]

Recording of physiological parameters

Although video recording neonatal resuscitation is valuable for quality assurance and improvement,

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education, research and audits, it does not provide information about the quality and the effect of the intervention. This information can be gathered by adding vital physiological parameters to the recordings.

Real-time information on vital physiological parameters could improve neonatal resuscitation; with monitoring, these parameters can be kept within the safe range and severe injuries can be prevented.[3] Measuring oxygen saturation and heart rate using pulse oximetry is now recommended in the international guidelines. These measurements, including a continuous measurement of how much oxygen was being administered, may provide more accurate and objective information regarding the quality and effect of the performed intervention.

The effect of the respiratory support provided during neonatal resuscitation can also be monitored by, among other devices, a respiratory functioning monitor (RFM). The monitored parameters can be used to evaluate ventilation and mask technique,[3 23 24] and RFM readings can confirm endotracheal intubation, leak around the endotracheal tube or airway obstruction within seconds.[24] Furthermore, an RFM enables the healthcare provider to observe the infant's breathing pattern.[24]

Although the RFM could remove subjectivity in evaluating neonatal resuscitation,[3] it does not provide any interpretation of the signals or a diagnosis. Due to caregivers' possible inexperience and lack of knowledge, misinterpretation of vital physiological parameters may sometimes occur.[24] Inexperience also results in difficulties incorporating the information of the RFM. Providers stated that they do not use the monitor for evaluating mask technique or ventilation pressures for these reasons.[8] Although neonatal healthcare providers are familiar with the RFM when using mechanical ventilators in the unit, training in interpreting the RFM during resuscitation is necessary.[3] Evaluating RFM recordings can be a tool for training providers, thus improving patient care.

Simultaneously recording video imaging and physiological parameters

Recording video and physiological parameters simultaneously results in an accurate and transparent documentation of neonatal resuscitation. In several studies, reviewing this documentation revealed deviation from the guidelines for neonatal resuscitation.[7 9 21] As a result, guidelines were changed and providers were taught to follow them more closely. Simultaneously recording video and vital parameters therefore contributes to improving the quality of care. However, the simultaneous recordings also reveal that medical record documentation often differs from the actual procedure.[1 7 21] As such the recordings can also be used to supplement or even correct the documentation of delivery room management.[8]

Adding audio to the recordings can be valuable for evaluating collaboration and teamwork. Several studies reported that recordings with audio revealed problems in the conduct by the team, the team leader or both.[9 21 25 26]

THE ETHICAL PERSPECTIVE

Reported concerns

There is a general consensus regarding the importance of quality improvement of healthcare.[27] Although providers in the field agree that recording and reviewing neonatal resuscitation is advisable as it may improve the quality of the procedure,[2 7 9 11 16 18 21] the implementation of this technique can create controversy. Centres that record and review neonatal resuscitation reported concerns about privacy,[3 8 10 11 13 14] medicolegal consequences,[3 8 10–12] data storage,[9–13] the impact on providers and parents,[2 3 12] and provider and parental consent.[3 7–12]

Privacy

In general, video recording in hospitals is subject to strict privacy regulations, although more flexible requirements apply when recordings are being used solely for auditing purposes.[3] Video recording can infringe the privacy of families and providers, and therefore it is important to take this into account.[12]

Several studies reporting video recordings in the delivery room stated that only the hands and arms of the healthcare providers are shown.[2 8 10 12 14] However, in practice it may be difficult to guarantee privacy when recording or during plenary review of the recordings. Some healthcare providers felt uncomfortable when they could be identified in the recordings,[10] but their experiences have not been fully explored.

Making identifiable recordings part of the infant's medical record can be seen as a part of family-centred care, as videos can be shown to the parents.[8] However, there is a risk that family privacy may be infringed; providers, depending on the local requirements, may have a legal obligation to keep the recordings for several years. This risk increases when several users have immediate access to electronic medical records. Concerns about inappropriate use of photographs in medical records were reported[28 29] and could also apply to video recordings.

Concerns about privacy can be complicated by adding audio to the recordings. Providers could be identified by their voice during plenary review. Furthermore, recording audio can capture the voices of people who are not visible, such as the father who may be present during the resuscitation. Finally, statements about other persons, such as the mother or other patients on the ward, can be captured unintended.

Medicolegal consequences

Privacy may also be a concern because of possible medicolegal consequences. Since Peltier *et al* started video recording in hospitals, healthcare providers have expressed their concerns about the potential of medical malpractice litigation.[15] For this reason many trauma centres choose not to implement video recording in resuscitation cases.[12] Furthermore, providers are concerned that showing parents the recordings could increase the risk of medicolegal consequences.

Although recordings used for auditing may be protected by law,[3 12] the medicolegal consequences of recording neonatal resuscitation need to be considered carefully within the context of local regulations. No related legal cases have been reported by NICUs,[8 10 11] and it is not yet clear whether the baby and providers are identifiable in the recordings in order to be used in court.[12] The question whether recordings are identifiable can be even more complicated when audio is added to the recordings, as it is not clear what would be the status of unintended captured information, such as information about the management of the mother.

Data storage

When recordings are used for auditing, several centres reported deleting them directly after review.[2 10] If recordings are stored, however, the storage method affects future use and access. For instance, data can be separated from identity markers and may therefore be used for retrospective studies without patient consent. One benefit of de-identification is that it could prevent the recordings being used in legal cases,[3] although this may differ according to local legal regulations. Data storage should

be considered carefully as it may have consequences for consent and privacy.

Impact on healthcare providers

The presence of the video recorder may alter the conduct of healthcare providers in the delivery room. The reported negative effects of being recorded include negative emotions, the development of a climate of mistrust, a decrease in job satisfaction and an increase in stress and health problems.[30 31] Video recording neonatal resuscitation could cause providers anxiety during the resuscitation itself,[12] creating a higher level of risk for the patient. The awareness of being observed may also enhance distraction and therefore add a risk to video recording.[10]

Although such negative effects may occur, healthcare providers stated that they adapt to the presence of the video recorder very quickly.[2] According to the experiences of Finer *et al* changes in the providers' behaviour are normally for the better, resulting in improved clinical performances.[2] Several studies show that this improvement could be due to the awareness of being observed, an effect known as the Hawthorne effect.[31 32]

Plenary video review could also affect healthcare providers; they may feel exposed, embarrassed or vulnerable when they become the object of a group video review.[33] However, O'Donnell *et al* reported other experiences. Providers accepted plenary review as little different from being observed by senior colleagues and found it useful as a means to improve their own clinical performances.[12]

Using video recording during audits has several benefits. First, an audit can be a second opportunity for a postbrief, and more providers can participate in and learn from a specific resuscitation.[21] Second, it is not subjected to recall bias.[18] As the recording can be watched by many observers, individual observer bias can be avoided or reduced.[21] Reviewing video recording is therefore a powerful tool to help reduce the amount of errors during neonatal resuscitation.[18] Finally, one study showed improvement in teamwork after several months of plenary video review, although measurable improvements in the clinical performance after auditing have not yet been reported.[16] Further research is needed to investigate how auditing affects the performance of individual healthcare providers.

Impact on parents

Makary *et al* reported that patients like the idea of having their procedure recorded, and offering patients a copy of the recording can increase patient satisfaction through increased transparency.[32 34] Recording neonatal resuscitation could also specifically benefit parents. Several studies show the benefits of parental presence during the resuscitation of their child,[35–39] and there may be an analogy with showing parents the video of the resuscitation of their newborn. In the experience of several hospitals, parents find recording neonatal resuscitation acceptable.[3 9 12] However, parents' experiences of viewing recordings have not yet been studied.

Provider consent

As stated above, recording and reviewing neonatal resuscitation may add risks for the healthcare provider. Therefore, their consent was explicitly sought in several hospitals.[9–11] When the technique is considered standard practice or is used for auditing, however, explicit provider consent is deemed unnecessary.[10] Moreover, as individual providers may be unable to refuse to be recorded, they may feel vulnerable and affected in their privacy. Provider autonomy may therefore be limited in these cases.

Parental consent

Parental consent for recording for audit purposes is often considered unnecessary[3 11 12] and in hospitals where recording neonatal resuscitation is part of standard care parental consent may not be sought. Nevertheless, as video recording their child could potentially cause anxiety for parents[12] and adds a privacy risk,[10] parental consent is an issue that should be considered.

Parental consent is required when recordings are used for research. However, it may be impossible or inappropriate to approach parents for antenatal consent in an emergency situation,[10 11] while deferring consent, that is, approaching parents for consent postnatally, is still considered controversial. Furthermore, when the recording is part of the medical record it may be used for retrospective studies that do not always require parental consent. Finally, parental consent should be taken into account when the recording is used for educational purposes in the interests of protecting the family's privacy.[10]

CONFLICTING HEALTHCARE DOMAINS

In 1999, recording and reviewing neonatal resuscitation was implemented as a quality assurance tool.[2] Over time and as several NICUs started to implement this technique, it developed into a valuable tool for education, training, research, patient care and quality improvement. As such, recording and reviewing neonatal resuscitation is operating in several domains of healthcare: patient care, quality assurance, research and education. We argue that this complicates implementation of the technique even more, as these domains each have their own moral frameworks with requirements and conditions for issues such as consent, privacy and data storage, that may vary as well by institutional, local, federal, and national rules and laws. The moral and legal issues sometimes conflict with each other; for example, the moral framework for patient care may be inconsistent with the moral framework for the domain of research. The record retention period, for example, can be up to 30 years for patient care, whereas for research this period is often 15 years. This results in additional ethical dilemmas.

When the technique of recording and reviewing neonatal resuscitation operates in various domains of healthcare, various stakeholders are affected. In table 1 we show what ethical dilemmas arise for these stakeholders and what ethical values and principles are at stake. We will illustrate this using the experiences of a Dutch NICU.

The Dutch case

In 2009, the NICU in the Leiden University Medical Center (LUMC), the Netherlands, started recording both vital physiological parameters and video during neonatal resuscitation in the delivery room for research and auditing. Audits are performed on a weekly basis in the presence of neonatologists, fellows and residents. The goal of the audit is to discuss interventions and guidelines in order to improve neonatal resuscitation. Interventions are reviewed and then presented by the co-ordinator of the audit, who is part of the medical team. All healthcare providers present are invited to give feedback. Open discussion of the recordings is generally considered acceptable. The medical record is checked for any discrepancies between the chart, the recordings and the guidelines.

From 2010 onwards, parents have been given the opportunity to see the recordings of their baby's resuscitation. The co-ordinator of the audit watches the recordings with them and then explains the process of neonatal resuscitation. Generally speaking, parents who choose to watch these video recordings

Table 1 Ethical dilemmas of recording and reviewing neonatal resuscitation

	Quality assurance	Patient care	Research	Education	*Ethical values/principles*
Neonate	Can the impact of the technique deteriorate received care?	Can the impact of the technique deteriorate received care?			*Non-maleficence*
			Is neonate research subject?		*Vulnerability* *Research ethics*
	Should identifiability be precluded?	Is the newborn identifiable when recordings are part of the medical record?	Is de-identification of the recordings mandatory?	Should identifiability be precluded?	*Privacy* *Vulnerability*
Parents	Can (information about) parents be captured on recordings?	Can (information about) parents be captured on recordings?	Can (information about) parents be captured on recordings?	Can (information about) parents be captured on recordings?	*Privacy* *Vulnerability*
	Should identifiability be precluded?	Are parents identifiable when recordings are part of the medical record?	Is de-identification of the recordings mandatory?	Should identifiability be precluded?	*Privacy*
	Are parents informed?	Are parents informed about the use of the technique during resuscitation of their child?	How and when should parents be informed?	Is parental consent needed for de-identified recordings?	*Voluntariness* *Autonomy*
	Can parents refuse?	Can parents refuse the use of the technique?	Should parents consent?		*Voluntariness* *Autonomy*
		Can parents view recordings?			*Transparency* *Vulnerability*
Provider			Is provider research subject?		*Vulnerability* *Research ethics*
	Should identifiability be precluded?	Should identifiability be precluded?	Is de-identification of the recordings mandatory?	Should identifiability be precluded?	*Privacy* *Vulnerability*
	Can individual providers refuse to be recorded?	Can individual providers refuse to be recorded?	Should provider consent?	Is provider consent needed for de-identified recordings?	*Voluntariness* *Vulnerability* *Autonomy*
	How are providers informed?	How are providers informed?	Are providers informed?	Are providers informed?	*Vulnerability* *Voluntariness*
	Can recordings be claimed for medicolegal purposes?	Can recordings be claimed for medicolegal purposes?			*Vulnerability* *Transparency*
	Which providers have access to the recordings?	What is the impact on provider if parents can watch recording?	Who has access to the recordings?	Who has access to recordings?	*Privacy* *Vulnerability* *Voluntariness*
	Should be acted on observations of substandard care (ie, malpractice)?		Should be acted on observations of substandard care (ie, malpractice)?	Should be acted on observations of substandard care (ie, malpractice)?	*Professional ethics* *Research ethics*
	Will recordings be deleted after review?	Should recordings be part of medical record?	Should recordings be stored de-identified?	Should recordings be stored de-identified?	*Privacy* *Vulnerability*
	For which period is data stored?	For which period is data stored?	For which period is data stored?	For which period is data stored?	*Privacy*

report a positive response. However, their experiences need to be explored further.

Since 2016, this technique has been considered standard care and the recordings have become part of the medical record. Recordings are also used for education. The goal of the technique is to improve the quality of neonatal resuscitation and to provide transparency.

Conflicting ethical values and principles

In the domains of quality assurance, patient care, research and education have different aims. Quality assurance aims at attaining a high quality of care, patient care at providing the best possible care to the patient. Research strives for new knowledge and the goal of education is competent providers. Benefiting one aim or its stakeholders adds risk of losing out on other aims or stakeholders. For instance, when recordings are openly discussed, as is done during the audits at the LUMC, provider autonomy, voluntariness and vulnerability risk losing out. Or, although providers working at the NICU of the LUMC consider making recordings part of the medical record as family-centred care, it also adds a privacy risk to providers, parents and neonate. And, when considering the technique standard of care, parental and provider voluntariness may lose out. In order to implement the technique of recording and reviewing neonatal resuscitation, possible benefits and disadvantages should be balanced.

Further research

Table 1 is not conclusive; further research into the ethical dilemmas for the various stakeholders is needed. Other parties such as the authorities may be involved too. They are important stakeholders in the pursuit of quality improvement in healthcare and might encourage audits using video recordings in order to enhance quality improvement. By doing so, they would also respond to the public's call for the use of video recordings to increase hospital transparency.[34] However, research is needed to define whether governmental involvement as such is desirable and what additional ethical dilemmas could then arise. In the following years, we will further explore

the conflicting ethical values of all stakeholders of recording and reviewing neonatal resuscitation. Furthermore, we will study how stakeholders outweigh benefits and risks. As such, we expect to provide insight and guidance to advance the implementation of the technique of recording and reviewing neonatal resuscitation.

CONCLUSION

Recording and reviewing neonatal resuscitation can be a valuable tool for quality assurance, patient care, research and education. However, the ethical dilemmas that create a barrier for further implementation of the technique have not been studied thoroughly. Further research is needed to define whether other ethical conflicts exist that need to be covered. The experiences and perceptions of stakeholders using this technique need to be mapped in order to determine the impact of ethical concerns and to find a solution for existing ethical dilemmas.

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