REVIEW

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The Role of Electronic Fetal Monitoring (EFM) in Obstetric Malpractice: An Evaluation from the Perspectives of Midwives, Nurses, and Forensic Medicine

Elektronik Fetal Monitörizasyonunun (EFM) Obstetrik Tıbbi Malpraktis Hatalarındaki Rolü: Ebelik, Hemşirelik ve Adli Tıp Perspektifinden Bir Değerlendirme

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Öz

Bu derleme, elektronik fetal monitörizasyonunun (EFM) obstetrik tıbbi hata davalarındaki önemini, ebelik, hemşirelik ve adli tıp perspektiflerinden değerlendirmeyi amaçlamaktadır. Doğum sırasında olumsuz olayların önlenmesinde temel yaklaşımlardan biri, fetal sıkıntının erken tanınmasıdır. Ebeler ve hemşireler, doğum sırasında EFM izlerini uygulamak, değerlendirmek ve kaydetmekle sorumludur; bu izler, adli tıbbi değerlendirmelerde kritik öneme sahip delillerdir. Tıbbi kayıtların bulunmaması durumunda, takip, tedavi ve tıbbi uygulamalar dava süreçlerinde tartışmalı hale gelir, bu da dava sürecinde gecikmelere yol açar. Çünkü tıbbi kayıtlar, tıbbi malpraktis davalarının değerlendirilmesinde hayati öneme sahiptir ve uzman tanıklar, bakım standartlarını değerlendirmede önemli bir rol oynamaktadır. Yaygın bir şekilde kullanılmasına rağmen, EFM'nin güvenilirliği, rolü ve faydaları konusunda daha fazla netlik gerekmektedir. Ayrıca, tıbbi malpraktis davalarında uzman tanıklar, uygulamaları tartışmalı güvenilirliklerle farklı şekilde yorumlayabilmektedir. EFM'nin güvenilirliği tartışılmakla birlikte, fetal sıkıntının erken tanınmasında vazgeçilmez bir araç olduğu göz ardı edilemez. Bu önemi ve dava sürecinde yazılı kanıt ihtiyacı göz önüne alındığında, adli hemşirelerin, ebelerin ve avukatların tıbbi kayıtları standartlara uygun şekilde tutma konusunda eğitim alması önerilmektedir.

Anahtar Kelimeler: Ebe, Hemşire, Elektronik Fetal Monitor, Adli Tıbbi Bakış, Tıbbi Hata

Abstract

This review aims to assess the significance of electronic fetal monitoring (EFM) in medical error claims in obstetrics from the perspectives of midwifery, nursing, and forensic medicine. One fundamental approach to preventing adverse events during labor is the early recognition of fetal distress. Midwives and nurses are responsible for applying, evaluating, and recording EFM tracings during labor, which are crucial evidence in forensic medical evaluations. In the absence of medical records, the follow-up, treatment, and medical practices become contentious during trials, leading to delays in the litigation process. This is because medical records are vital in evaluating medical malpractice claims, and expert witnesses play a key role in assessing the standard of care. Despite its widespread use, there is a need for greater clarity on the reliability, role, and benefits of EFM. Furthermore, expert witnesses in medical malpractice cases may interpret practices with controversial reliability differently. While the reliability of EFM is debated, it cannot be ignored that it is an essential tool for early recognition of fetal distress. Given its importance and the need for written evidence in the trial process, it is recommended that forensic nurses, midwives, and lawyers receive training on maintaining medical records according to standards.

Keywords: Midwife, Nurse, Electronic Fetal Monitoring, Medicolegal Aspects, Medical Error

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INTRODUCTION

Gynecology and obstetrics are the fields where allegations of medical malpractice occur most frequently and are some of the riskiest branches of forensic medicine (1). Gynecology and obstetrics clinics are units where patient circulation and workload are intense, unexpected emergencies may develop, and the risk of medical errors is high due to many invasive interventions (2). The Forensic Medicine Institute (FMI) is asked by the courts for its expert opinion on medical malpractice, with 30% of cases in gynecology and obstetrics, and 90% related to pregnancy follow-up and childbirth (3).

The leading causes of fetal and perinatal mortality are antepartum or intrapartum asphyxia, maternal diseases, antepartum hemorrhage, fetal developmental abnormalities, and congenital anomalies (4,5). Since the majority of perinatal asphyxia occurs in the intrauterine period, early detection of asphyxia is important (6,7). Electronic fetal monitoring (EFM) is one of the most commonly used methods for early detection of fetal asphyxia, which is among the causes of fetal and perinatal morbidity and mortality, and for minimizing fetal death and neurological sequelae. It is stated that EFM is easy to use and superior to many applications in identifying intrapartum asphyxia (8).

EFM records followed by midwives and nurses during birth must be kept and filed by scientific standards. The American Nurses Association has determined the principles of effective recording and communication in obstetrics. Some of these principles are related to the quality of records, writing, and entry of records. Some of these principles include precise, concise, timely, and complete writing of records, readability, writing the date, time, and patient identity in EFM records, and writing nurse notes according to the patient's changing condition promptly in detail and accordance with medical terminology (9). When there is an allegation of medical malpractice, medical records are the most critical tool for evaluating the medical process and care (3). The evaluation of medical records is essential in terms of enabling the expert to understand the care applied to the patient and to provide evidence that midwives/nurses act by the standard of care (3,10,11).

Since EFM is the most important evidence to be evaluated by expert witnesses in medical malpractice claims, this review aims to discuss its importance for midwives and nurses in obstetrics-related medical malpractice and expert witness practice.

Understanding Electronic Fetal Monitoring

EFM is the most commonly used tool in the field of obstetrics due to its ease of use to early identify and prevent risky conditions that may cause fetal death, such as hypoxia (6,8). The main aim of EFM is to prevent complications such as cerebral palsy, neonatal convulsions, or intrapartum fetal death (12).

With the widespread use of EFM in obstetrics, cesarean section rates have increased, but there has been no significant reduction in neonatal risk. A Cochrane systematic review showed that EFM monitoring during labor reduced the rate of neonatal seizures, but there was no significant difference in cerebral palsy, infant mortality, or neonatal health (13). All of these abnormalities may be related to differences in interpretation (14).

Some institutions and international organizations have published guidelines on interpreting EFM. Although there is consensus among these guidelines, there are also differences. For example, there are variations in FHR that are designated as "abnormal" (15). For this reason, there have been efforts to reduce variation in EFM interpretation and move from a paper-

based pattern interpretation to a physiology-based interpretation to identify the characteristics of the fetal compensatory response (16,17).

Mohan et al. (14) noted that the definition of baseline heart rate, bradycardia, and duration of prolonged bradycardia are among the areas of variation where there may be controversy regarding guideline standardization. At the same time, in the context of globalization, a standard approach by all guideline-producing institutions and organizations to provide a single, simple, logistically approvable guideline or a concurrent approach by international guideline development committees working together to minimize variation has been suggested. Consensus on the definition of bradycardia and prolonged deceleration using agreed terminology was emphasized significantly, as this may affect the outcome of hypoxic events.

The Role of Midwives and Nurses in EFM

In Turkey, midwives and nurses actively perform EFM follow-up in labor. There are different legal regulations on midwives' duties, authorities, and responsibilities. These are Regulation No. 17863, 'Management Regulation of Inpatient Treatment Institutions' and the Regulation No. 29007, 'Job Descriptions and Responsibilities of Health Professionals and Other Professionals Working in Health Services'. In these legal regulations, midwives are authorized to follow the heart sounds of children, perform all kinds of gynecological examinations, if necessary, perform regular deliveries and emergency breech deliveries in the absence of a physician, manage pregnancy follow-up and the birth process, identify normal deviations in the birth process, report emergencies to the physician, and perform emergency interventions with the guidance of the physician.

In Nursing Regulation No. 27515, it is seen that the duties and responsibilities of women's health and diseases nursing include counseling couples and pregnant women, providing care and follow-up during pregnancy, recognizing risky conditions that may develop during pregnancy at an early stage, applying the recommended treatments and referring when necessary, directing the patient to give birth under appropriate conditions, monitoring and reporting deviations from the norm related to labor, caring for the newborn baby and mother and examining the newborn, providing education and counseling to women. In this respect, the responsibility of nurses is mainly to monitor, care, and educate.

In New Zealand and Australia, EFM monitoring is among the duties of midwives. Midwives and nurses record EFM follow-ups and interpretations during labor and delivery (18). Midwives and nurses must keep and file the EFM records they follow in pregnant women during the labor process according to scientific standards. In the event of a medical malpractice claim, it demonstrates that the expert witness understands the care provided to the patient and that the midwives/nurses acted following the standard of care. Adherence to the accepted standard of care and meticulous record-keeping can eliminate the possibility of midwives and nurses being found negligent in medical malpractice cases. Nurses and midwives in labor and delivery rooms and obstetric wards are responsible for correctly monitoring and interpreting EFM tracings. In cases where EFM is not applied, emergency interventions may be delayed, and fetal health may be negatively affected (8,19).

To correctly interpret electronic fetal monitoring tracing, nurses and midwives in obstetrics and gynecology clinics should be supported with EFM certification courses. It is essential that there are standards and policies regarding EFM application in the

labor unit and that all team members comply with the unit policies to prevent undesirable situations in labor. A randomized controlled study reported that 67% of midwives wanted to receive training on EFM every six months (20). In Turkey, a study conducted by Tokat et al.(21), reported that 85% of midwives and nurses did not receive EFM training in the hospitals where they worked, and 68.1% needed help in interpreting EFM result tracings. Health institutions and organizations need to provide the necessary training for the application of internationally accepted standards for the correct application and interpretation of EFM, to evaluate the effectiveness of the training, and to have written guidelines in appropriate places that health professionals can access whenever they need to apply these standards. It is also essential that nursing and midwifery students are trained on this subject during the undergraduate period according to the established standards (8,21).

Evaluation of Medical Malpractice Claims in terms of Midwifery and Nursing

If deviation from standard care is detected, the liability for health professionals in medical malpractice claims is mentioned. Although the obligation of care and attention is fulfilled in medical practices and practices for standard care are performed, when an undesirable result occurs, this situation is stated as the standard deviations of medical practices within the scope of permissible risk. This concept, defined as a complication, is the result that occurs even though medical interventions have been performed under the standard of care. In this case, it would not be correct to state that health professionals have liabilities (22).

In recent years, complaints regarding medical malpractice claims have become more critical for all healthcare professionals. Due to the increase in the number of complaints of medical malpractice claims over the years, the workload of the FMI, one of the official expertise institutions that provides expert opinion in these files, has increased significantly. For this reason, some amendments were made to the Forensic Medicine Institution Law No. 2659 on 03.11.2016 with the newly enacted Expert Witness Law No. 6754. With the new amendment, two separate specialized boards were established for medical malpractice cases. Due to the increase in medical malpractice cases and the scientific complexity and difficulty in providing expert opinion, it was a correct decision to establish separate specialization boards dealing with these claims (23).

There has yet to be any current data on the files of medical malpractice claims sent to the seventh and eighth specialization boards, which became functional in 2018. However, medical malpractice claims in the field of obstetrics have been evaluated based on studies conducted in the past. Looking at recent studies, it is seen that in many studies conducted on cases of medical malpractice allegations, obstetrics and gynecology rank first. Along with this specialty, it is seen that lawsuits for medical malpractice claims are frequently filed in specialties such as general surgery, emergency medicine, orthopedics, pediatrics, and pediatrics (23,24).

In the past, midwives were frequently sued for medical malpractice between 1990 and 2010 as they actively carried out their duties according to legislation (25,26). After these years, physicians have taken on more responsibility due to the performance-based earnings of physicians, especially in obstetric cases. In particular, midwives fulfill their duties and responsibilities defined in the legislation, such as monitoring the birth process, evaluating electronic fetal monitoring, performing vaginal examinations, and evaluating and reporting risky situations. However, it is known that physicians carry out the practice of expected delivery specified in the legislation. In

the absence of physicians, midwives perform this practice in urgent cases. Although criminal lawsuits are filed individually in the legal sense, it is known that compensation lawsuits are filed simultaneously in cases of medical malpractice claims. Compensation lawsuits are often filed against institutions where health professionals work, but they can also be filed against individual physicians due to compulsory Professional Liability Insurance since 2010. In the obstetrics field, such lawsuits are increasingly being directed towards physicians. It's worth noting that midwives and nurses tend to take out Professional Liability Insurance less frequently on their own initiative. Given the high-risk nature of the nursing profession, it is crucial for nurses and midwives in close contact with patients to have professional liability insurance to secure compensation claims (27).

The requirements for compulsory professional liability insurance for midwives vary from country to country. This insurance helps to improve professional standards, ensure patient safety, and provide protection in case of professional errors. In some European countries, midwives are mandated to have professional liability insurance, as in the case of UK and Germany. In Australia and Canada, the requirement varies by state or territory, such as in Victoria and Ontario. In the USA, while it's not a legal requirement for midwives to have professional liability insurance, many still choose to have it (28,29).

In the study by Gündoğmuş et al. (25), it was found that between 1993 and 1998, midwives received the most complaints (52%) out of 59 medical malpractice claims evaluated by the Supreme Health Council. Physicians followed with 29% and nurses with 19%. Another study by Safran (30) analyzed medical malpractice claims against nurses and midwives from 1992 to 2002. It was revealed that midwives were the most frequently sued, accounting for 23.2% (371 cases) of malpractice cases. Additionally, midwives were found to be at fault in 23% of the cases in which they were sued.

It was stated that malpractice lawsuits related to midwives frequently included medical malpractice claims such as deficiency in evaluating problems and complications related to pregnancy, inadequacy in the follow-up of the pregnant woman and fetus, failure to report adverse conditions to the physician on time, intervention outside of standard care during delivery (using vacuum extractor, faulty episiotomy, excessive and incorrect use of oxytocin, etc.) (25). In Elbüken's (26) study, it was reported that 52.9% of the medical malpractice claims arising from failure to fulfill the obligation of care and attention and causing death due to inexperience in profession and art were made by the nurse-midwife group. Midwives were the most complained, with a rate of 87.5% due to failure to fulfill standard care.

The worldwide accepted approach to EFM is that it will prevent cerebral palsy and neurological birth injuries, which are at the heart of medical malpractice litigation in obstetrics. This approach has created a crisis in medical malpractice litigation in obstetrics. This crisis has been exacerbated by the opinions of obstetric experts who have delivered neurologically intact newborns in the United States and who have testified in court as experts in obstetrics that if the physicians on trial had been more careful and better trained, there would have been no newborns born with neurological damage. The EFM has made "failure to diagnose and treat fetal asphyxia" the most common claim in obstetric medical malpractice cases (31).

When assessing cases handled by the Turkish judiciary, it is evident that there are several instances of inadequate monitoring and neglect in medical care. These include the failure to consistently evaluate

pregnant women's progress through EFM, overlooking signs of fetal distress such as 'late deceleration,' and insufficient communication and collaboration among the medical team. These lapses in care can have significant implications for the well-being of both the pregnant woman and the unborn child (32,33).

Again, in one of the cases reflected in the judiciary, an acquittal verdict was given by the court for a baby with hypoxic-ischemic encephalopathy findings based on the opinion of the FMI that, according to the available findings and documents, no fault was attributed to the physicians and midwives who delivered the baby. During the appeal process, the Supreme Court overturned the acquittal verdict, emphasizing that the actions of the defendants should be evaluated within the scope of the crime of misconduct by negligence under Article 257/2 of the Turkish Penal Code, as the records of EFM were not available, the midwife did not perform EFM examinations at regular intervals, and the FHR was not written. The FMI has ruled that only 5% of neurological damage in infants can occur as a result of conditions that occur during birth and that babies can be born hypoxic even in cases where birth follow-up is regular. EFM examinations are standard, and causality cannot be established between the actions of health professionals and the outcome because EFM follow-ups and relevant documents are not included in the file. In line with these and similar opinions, courts frequently acquit health professionals. However, it is noteworthy that the Supreme Court frequently overturns these decisions during the appeal process, mainly due to the need for medical records and documents. It is emphasized that within the scope of the duty of care of healthcare professionals, records regarding diagnosis and treatment should be kept accurately and regularly and that the defendants are liable for failure to keep the records regularly. It is stated that the Supreme Court criticizes the expert reports submitted in the files, finds them inadequate and that the reports do not contain sufficient explanations to answer the claims of the parties and to reveal whether the defendants showed sufficient care and attention in diagnosis and treatment, and that a judgment cannot be established based on these reports to determine whether the defendants are at fault. For this reason, it is noteworthy that additional expert reports are requested due to the inadequacy of the expert report or to resolve the contradiction between the reports, and this situation significantly prolongs the litigation process (34).

Today, it is seen that the practices carried out under the name of transformation in health reflect negatively on health professionals. The impact of factors such as performance practices, working conditions of health professionals, facilities, and technical infrastructure available in the institution where health professionals work on the health system should be addressed. From this point of view, it is a critical point that should always be taken into consideration that system-oriented factors, rather than only person-based errors, may also form the basis or cause of medical malpractice claims (18).

Medicolegal Evaluation of Electronic Fetal Monitoring

If midwives and nurses are not competent in EFM, interpretation errors in EFM and failure to promptly notify the physician of problems in the fetus may lead to severe physiological damage or even death in the newborn. This situation highlights the legal responsibility of both the midwife and nurse who are caring for the patient alongside the physician (8).

When we look at the cases in Turkey in which neurological damage occurred in the baby after birth, resulting in disability and death, it is seen that EFM is presented and evaluated as the most critical evidence

together with all the follow-up and practices performed during labor. However, it is reported that there is significant confusion in the field of expertise regarding the application and interpretation of EFM, and there is significant debate among health professionals, lawyers, and patients about whether it has any value(13). Several evidence have been presented suggesting that EFM unnecessarily increases the cesarean section rate and provides no benefit in preventing neurologic injury or perinatal mortality. A publication of the American College of Obstetricians and Gynecologists states that EFM has no benefit over intermittent auscultation of fetal heart sounds but recommends its use in high-risk pregnancies (13,35).

When the scientific basis of EFM is evaluated, it is stated that inter/intra-observer reliability is poor, with a false positive rate of fetal distress prediction of more than 99% (36). In a research study, it was discovered that raters' classifications were modified in 18% (n= 5) of cases for normal tracing, 29% (n= 8) for suspicious tracing, and 11% (n= 3) for pathological tracing (37).

Despite the ongoing debate about its reliability, role, and benefits, EFM will remain an essential part of obstetric care in the future. However, because of the controversy over its reliability, expert opinions in litigation must consider how the standard of care is defined and the standards against which health professionals are judged. This way, the minimum standard a health professional should adhere to is expressed. An application such as EFM, the reliability of which is also controversial, may be interpreted differently by expert witnesses in files related to medical malpractice claims. It should be remembered that there is no one standard of care for evaluating the results (38).

Implication for Practice

Healthcare institutions should prioritize ongoing education and competency assessments for midwives and nurses in EFM to ensure accurate interpretation and early detection of fetal distress. Detailed documentation and timely communication among healthcare providers are essential for patient safety and legal protection, as clear records enhance transparency. Establishing standardized protocols for EFM can promote consistent practices. Additionally, creating support systems for providers can reduce stress and boost confidence in decision-making. Collaborative interpretation of EFM readings among midwives, nurses, and obstetricians fosters a team-based approach, minimizing individual errors.

CONCLUSION

EFM is crucial for ensuring fetal well-being during labor. It provides essential evidence in medical evaluations and legal contexts, requiring healthcare professionals to be well-trained. Clear protocols and guidelines are necessary to support consistent and accurate use of EFM, minimizing the risk of errors and litigation. Ongoing debate about its reliability and interpretation calls for further research to establish standardized criteria, improve consistency, and develop more advanced technologies. Moreover, proper orientation for midwives and nurses, along with establishing an organizational culture that encourages reporting of medical errors without hesitation, is vital for promoting and enhancing patient safety. Written guidelines should be readily available for easy access when applying these standards. It is also important for nursing and midwifery students to be trained in this area according to the standards established during their undergraduate education.

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Conflict of Interest

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