ONLINE EXCLUSIVE

Q/ How does electronic fetal heart rate monitoring affect labor and delivery outcomes?

Craig Barstow, MD;
Robert Gauer, MD
Womack Army Medical Center Family Medicine Residency Program, Fort Bragg, NC

Barbara Jamieson, MLS
Medical College of Wisconsin, Milwaukee

EVIDENCE-BASED ANSWER

A/ **CONTINUOUS ELECTRONIC FETAL MONITORING (EFM) REDUCES THE RISK OF NEONATAL SEIZURE BY 50%** compared with intermittent auscultation (IA) (strength of recommendation [SOR]: **A,** systematic review of randomized controlled trials [RCTs]).

EFM increases the incidence of cesarean section by 66% and the incidence of operative vaginal delivery by 16% (SOR: **A,** systematic review of RCTs). It has no effect on the rates of cerebral palsy or neonatal mortality (SOR: **A,** systematic review of RCTs).

An estimate from a Cochrane meta-analysis suggests that a cohort of 628 women receiving EFM could expect to experience 1 less neonatal seizure and 11 more cesarean sections compared with IA controls.

Compared with intermittent auscultation, continuous electronic fetal monitoring reduces the risk of neonatal seizure by 50%.

Evidence summary

Continuous EFM is designed to detect early fetal hypoxia and thereby decrease neonatal morbidity and mortality compared with IA. IA is defined as auscultation of the fetal heart rate for at least 60 seconds every 15 minutes during the first stage of labor and every 5 minutes during the second stage of labor.

A decrease in seizures, but not deaths or cerebral palsy

A 2006 Cochrane systematic review examined 12 RCTs (with >37,000 women) that compared continuous EFM with IA.[1] Continuous EFM reduced the risk of neonatal seizure by 50% (relative risk [RR]=0.50; 95% confidence interval [CI], 0.31-0.80), but had no effect on the rate of neonatal death (RR=0.85; 95% CI, 0.59-1.23) or development of cerebral palsy (RR=1.74; 95% CI, 0.97-3.11).

Reduction of seizures was consistent across all trials. However, a subgroup analysis of high-risk pregnancies (advanced maternal age, diabetes mellitus, chronic hypertension, renal disease, preeclampsia, cardiac disease, renal disease, previous delivery of a low-birth-weight infant) didn't find a statistically significant decrease in seizures.

Cesarean deliveries rise, regardless of patient risk status

Continuous EFM raised the rates of cesarean delivery (RR=1.66; 95% CI, 1.30-2.13) and instrumental vaginal deliveries (RR=1.16; 95% CI, 1.01-1.32). The increased rate of cesarean section in the EFM group was consistent regardless of clinical risk status (low- vs high-risk women). One additional cesarean section was performed for every 58 women monitored continuously. For "high-risk" women, 1 additional cesarean section was performed for every 12 women monitored continuously.[1]

Cesarean section rates varied widely among the individual trials (2.3%-35%). Analysis suggested that studies with higher baseline rates showed the greatest increases with continuous EFM. The rate for all studies combined was just 4.3%; 69% of patients included in the meta-analysis were contributed by the Dublin trial, which had an average cesarean rate of 2.3%.[1] By comparison, the US Division of Vital Statistics reported a cesarean rate of 32.3% in 2008.[2]

CONTINUED

Electronic fetal monitoring increases the incidence of cesarean section by 66% and the incidence of operative vaginal delivery by 16%.

EFM reduces death from fetal hypoxia

A 1995 meta-analysis, including 9 of the Cochrane review studies with a total of 18,561 women, evaluated the additional outcome of death resulting from fetal hypoxia.[3] Compared with IA, EFM was associated with a 59% reduction in death from fetal hypoxia (RR=0.41; 95% CI, 0.17-0.98). Continuous EFM prevented 1 perinatal death per 1000 births. The reduction in perinatal mortality was offset by a 53% increase in cesarean deliveries and a 23% increase in operative vaginal deliveries.[3]

Recommendations

The American College of Obstetricians and Gynecologists (ACOG) doesn't recommend for or against continuous fetal heart rate monitoring in uncomplicated labor, recognizing either EFM or IA as acceptable in uncomplicated patients.[4] ACOG does recommend continuous EFM for women with high-risk conditions (suspected fetal growth restriction, preeclampsia, and type 1 diabetes mellitus).

The US Preventive Services Task Force doesn't support routine intrapartum EFM for low-risk woman. The Task Force found insufficient evidence for using EFM in high-risk pregnancies.[5]

The Royal College of Obstetricians and Gynaecologists and the Royal Australian and New Zealand College of Obstetricians and Gynecologists both recommend continuous EFM for high-risk women and IA for low-risk patients.[6,7] **JFP**

ACKNOWLEDGMENTS

The opinions and assertions contained herein are the private views of the authors and are not to be construed as official or as reflecting the views of the US Army Medical Department or the US Army at large.

References

1. Alfirevic Z, Devane D, Gyte GM. Continuous cardiotocography (CTG) as a form of electronic fetal monitoring (EFM) for fetal assessment during labour. *Cochrane Database Syst Rev.* 2006;(3):CD006066.
2. Hamilton BE, Martin JA, Ventura SJ. Births: preliminary data for 2008. *Natl Vital Stat Rep.* 2010;58(16):1-18.
3. Vintzileos AM, Nochimson DJ, Guzman ER, et al. Intrapartum electronic heart rate monitoring versus intermittent auscultation: a meta-analysis. *Obstet Gynecol.* 1995;85:149-155.
4. American College of Obstetricians and Gynecologists. ACOG Practice Bulletin. Clinical Management Guidelines for Obstetrician-Gynecologists, Number 106, July 2009 . Intrapartum fetal heart rate monitoring: Nomenclature, interpretation, and general management principles. *Obstet Gynecol.* 2009;114:192-202.
5. US Preventive Services Task Force. Screening for intrapartum electronic fetal monitoring. Rockville, MD: Agency for Healthcare Research and Quality; 1996. Available at: www.ahrq.gov/clinic/uspstf/uspsiefm.htm. Accessed March 7, 2010.
6. National Institute for Health and Clinical Excellence (NICE). *Intrapartum Care: Management and Delivery of Care to Women in Labour*. London: NICE; 2007.
7. The Royal Australian and New Zealand College of Obstetricians and Gynaecologists. Clinical Guidelines. Intrapartum Fetal Surveillance Guidelines. May 2006. Available at: www.ranzog.edu.au/publications/womenshealth.shtml. Accessed December 9, 2008.