

Review: Are obstetrical personnel required for intraoperative fetal monitoring during nonobstetric surgery?

Horrigan, TJ, Villarreal, R, Weinstein L. Are Obstetrical Personnel Required for Intraoperative Fetal Monitoring during Nonobstetric Surgery? *Journal of Perinatology* 1999 19(2)124-126

Question: Does the literature supports the practice of electronic fetal heart rate (FHR) monitoring during nonobstetric surgery?

Data Sources: Search of articles published from 1966-1995 using MEDLINE with key words "surgery", "fetal monitoring", "fetal heart rate monitoring", and "uterine monitoring"

Study Selection: All articles retrieved using the search strategy were included in the review. The authors very briefly reviewed the findings.

Main Results: Twelve articles were identified describing a total of 17 cases. For general surgical procedures, five articles describing the monitoring of nine pregnancies were described. One case noted transient fetal tachycardia associated with maternal oxygen desaturation. One case noted transient fetal bradycardia that improved with maternal repositioning. Five cases of loss of variability (2/5 fetal bradycardias) following induction of anesthesia were noted with no maternal changes detected. The authors made no comment as to pregnancy progression or fetal outcome after these surgeries. Seven articles reporting monitoring of eight patients undergoing great vessel or cardiac surgery were described. Each case noted "significant FHR bradycardia". In each of these cases, the pregnancies continued "to term" and resulted in "grossly normal infants".

Conclusions: After a brief discussion of the risks to the fetus of nonobstetric surgery ("hypoxia is the essential fetal risk") and potential causes of fetal bradycardia in general, the authors conclude that "The maternal and fetal physiology during pregnancy will protect the fetus from all but the most serious hypoxic insults during surgery...Twenty years' experience has yielded no documented evidence that obstetric personnel are required to monitor FHR changes during nonobstetric surgical procedures." The authors note that careful attention to maternal physiology during surgical procedures will obviate the need to monitor and attend to the fetus separately.

Commentary: Internists with interest and expertise in obstetric medicine may be asked to comment on the need for fetal and/or uterine monitoring during nonobstetric surgery. A letter to the editor by Kendrick JM and Neiger R (*Journal of Perinatology* 2000 4:276-278) rebuts the conclusions of the Horrigan et al. Kendrick and Neiger cite additional studies of interest: reproductive outcomes of 5405 cases of nonobstetric surgery during pregnancy (Mazze and Kallen) and eighteen additional cases describing intraoperative monitoring and interventions prompted by FHR or uterine changes. The incidence of premature birth following nonobstetric surgery was increased by 46% and fetal losses of up to 35% were reported in cases of positive diagnostic laparotomy in Mazze and Kallen's 1989 review. Several of the eighteen cases described in more detail noted interventions which would not have been undertaken if FHR/uterine monitoring had not been in place: 5/10 noncardiac patients developed uterine activity; 3/10 required intraoperative tocolysis for uterine quiescence. A prolonged FHR deceleration was noted before a 20% maternal blood loss was discovered during cholecystectomy (FHR improved with maternal ephedrine). Fetal bradycardia developed in 6/7 cardiac cases at initiation of cardiopulmonary bypass, improving with increasing perfusion pressures and with good fetal outcomes. Kendrick and Neiger report 2 additional cases in which fetal bradycardias during cardiac surgery did not respond to attempts to improve maternal oxygenation and uterine perfusion, both with adverse fetal outcomes. They also cite an additional review by Pomini et al. of open-heart surgery during pregnancy in which improved fetal mortality from 20.2% to 12.5% was attributed to fetal monitoring. Kendrick and Neiger note that in addition to hypoxia, the fetus is at risk for preterm labor, particularly with second- and third-trimester surgeries. They recommend that intraoperative fetal monitoring be "be individualized...and should never compromise the maternal condition". Obstetric nurses rather than physicians could be used in

this capacity. They also suggest that presence of obstetric personnel in the operating room could enhance compliance with basic interventions such as maternal left lateral decubitus positioning. Drs. Horrigan, Villarreal, and Weinstein declined to respond to Kendrick and Neiger's letter.

The major risks to the fetus during maternal surgery are those of hypoxia and preterm delivery. Intraoperative monitoring does have the potential, as noted by Kendrick and Neiger, to detect adverse maternal conditions before they are apparent with routine maternal monitoring. Whether detection and correction of FHR changes or uterine activity intraoperatively will ultimately affect fetal outcome or prevent preterm delivery, has not been proven, but has been suggested. It is unclear from these articles whether significant FHR changes that fail to respond to maternal measures occur in the presence or absence of detectable maternal desaturation/hypotension/blood loss, etc. Furthermore, the risks to the fetus could stem from the surgical/anesthetic procedure, or from the condition prompting surgical intervention, or both. The absence of significant portion of the literature on this matter in Horrigan et al's article biases their conclusion that fetal monitoring is not supported by the literature.

I conducted an informal poll of three hospitals in my community regarding intraoperative fetal monitoring. Standard of care in these facilities (which perform approximately 5-15 nonobstetric operations on pregnant patients per year) is to record fetal heart tones pre- and post-operatively; generally no electronic or intraoperative monitoring is undertaken. For thoracic or cardiac procedures in which the effect on maternal physiology is likely to be greater, intraoperative FHR/uterine monitoring is performed on a case-by-case basis. Immediate post-op fetal status is reportedly good with this protocol, but I have no data on the ultimate obstetric outcomes (preterm delivery, neonatal morbidity/mortality). There are no policies at these facilities for maternal positioning separate from routine patient positioning protocols. Anesthesiologists are in general responsible for the protocols in place and decisions regarding monitoring of individual patients.

Individualization of intraoperative monitoring appears to be a reasonable approach in the absence of further data in this area. Further study is needed before definitive recommendations can be made.

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