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Uterine Hyperactivity after Intrathecal Injection of Fentanyl for Analgesia during Labor: A Cause of Fetal Bradycardia?

To the Editor—Subarachnoid opioids commonly are administered to parturients, particularly for analgesia early in labor.1 There have been a few reports of fetal bradycardia or heart rate deceleration with the use of these drugs, but no mechanism for such events has been identified.2 We would like to report several episodes of uterine hyperactivity in parturients associated in some instances with fetal bradycardia that followed intrathecal administration of fentanyl. A decrease in the fetal heart rate to 80–100 beats/min was noted in 7 of 30 consecutive women receiving 50 μg subarachnoid fentanyl along with epidural catheter placement for analgesia during labor. In an additional two patients, the fetal heart rate decreased into the 60–70 beats/min range. The heart rate alterations, which occurred in the absence of maternal hypotension, appeared within 30 min of intrathecal injection of fentanyl and lasted as long as 10 min. In all cases, the dura was punctured with a 25-G Whitacre needle passed through a 16-G Tuohy needle situated in the lumbar epidural space, with the patient in the sitting position. Excellent analgesia was achieved from the opioid in all patients, lasting approximately 2 h (range 1.25–4 h) before the need to inject local anesthetic through the epidural catheter.

Five of the nine patients with fetal bradycardia exhibited evidence of uterine hyperactivity by external tocodynamometry. In two of these nine patients, variable decelerations of fetal heart rate occurred before intrathecal fentanyl. One patient with an internal uterine pressure transducer had three contractions in rapid succession with incomplete relaxation between contractions 6–8 min after the fentanyl injection (although there was no fetal bradycardia in this patient). In a patient with no external uterine monitor (it had been removed for placement of the spinal/epidural while the patient was in the sitting position), there was a decrease in the fetal heart rate approximately 5 min after the subarachnoid injection. Palpation of the abdomen revealed a “rock-hard” uterus, and the fetal heart rate remained at 60 beats/min for approximately 3 min. The heart rate returned to 160 beats/min within 2 min of receiving an intravenous injection of 0.25 mg terbutaline, resulting in relaxation of the uterus. Most cases of bradycardia responded to terbutaline (0.1 mg intravenously or 0.25 mg subcutaneously) and/or resolved spontaneously within 5 min. Emergent cesarean section was performed in two cases when the bradycardia persisted beyond 5 min. In one of these cases, the newborn had a 1-min Apgar score of 3, but all neonates in this series had a 5-min Apgar score of 7 or better.

One patient had achieved cervical dilatation of 6 cm at the time of fentanyl injection, but all other patients were in early labor with a cervical dilatation of 3 cm. In five of the nine patients, labor was induced or augmented with oxytocin, but the infusion had been turned off for at least 10 min before the subarachnoid injection of fentanyl.

In summary, we have noted a high incidence of uterine hyperactivity in terms of frequency and strength of contractions or failure of the uterus to return to baseline tone after subarachnoid fentanyl. This phenomenon may explain the occasional reports of fetal bradycardia after subarachnoid opioids, especially fentanyl, because prolonged or intense uterine contractions may lead to decreased placental perfusion. The mechanism for such hyperactivity is unclear. It is possible that a rapid decrease in maternal catecholamines after analgesia is established may play a role, especially in the face of oxytocin stimulation. We have begun a prospective study to obtain more information regarding the frequency and significance of uterine hyperactivity after subarachnoid fentanyl. We would suggest that, if fetal bradycardia is noted after the subarachnoid administration of an opioid, the possibility of uterine hyperactivity should be considered, and appropriate action (tocolysis) taken if necessary.

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