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# Controversies in Obstetric Anesthesia

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Although it is sometimes difficult to narrow specific areas of controversy, several obstetric anesthesia subjects have recently become very controversial in the United States. Many of these controversies have been evaluated by the ASA Task Force and are discussed in the most recent Practice Guidelines, some of which will be reviewed in this lecture. I will discuss the following controversies:

1. Does epidural analgesia change the course of labor/increase the risk of cesarean delivery? What about “early” epidurals?
2. Should we continue to perform vaginal birth after cesarean delivery (VBAC) procedures? Does anesthesia really need to be in-house for these patients?
3. Is epidural-induced infection something that should concern us? Is there a need to reassess the role of disinfectants and use of face masks in reducing the risk of epidural-related infection?
4. Is there a need to improve teamwork and communication on the OB floor?

## The Influence of Epidural Analgesia on Labor

In the recent past, several papers proclaimed that epidural analgesia has a major effect on the progress of labor and that, in fact, the placement of epidural analgesia causes an increase in cesarean deliveries (1). This is not a new controversy, but it has recently been resurrected; the potential effect of epidural anesthesia on the progress of labor was first suggested in the 1970s. The question “does epidural analgesia cause an increase in cesarean section rate?” is very difficult to answer for many reasons. First, there is no such thing as a generic “epidural” block—different practitioners use different medications or combinations of medications, different concentrations of local anesthetics, extend the blocks differently, and aim for different levels of analgesia. Some use opioids, others do not; although most are now using continuous infusions, some use intermittent top-ups and some use epinephrine-containing solutions. Epinephrine added to a lidocaine solution, for example, may decrease

uterine activity (2). Patients are different also—primiparous versus multiparous, premature rupture of membranes or intact membranes, older versus younger patients, and private versus indigent patients. Obstetric care may also vary considerably from hospital to hospital and from obstetrician to obstetrician. This is well illustrated by the fact that oxytocin is used regularly by some obstetricians and almost never by others. To add to the confusion when evaluating a possible causal relationship between epidural analgesia and cesarean deliveries, obstetricians are never blinded as to whether their patients have received a labor epidural and their practice may differ if they know a patient has received an epidural. Also, how often do obstetricians request an epidural be placed as a last resort before deciding that a cesarean section is necessary? The problem with many studies that have evaluated the relationship between epidurals and cesarean section is that selection bias exists and there is no way to determine if the obstetrician was expecting to do a cesarean section because the progress of labor before the epidural in these cases may have been suboptimal. Moreover, perhaps the pain of dysfunctional labor is greater, and therefore women who are requesting epidurals early are having dysfunctional labor and would have needed a cesarean delivery regardless of whether they received an epidural. Although there have recently been several very well publicized reports that incriminated epidural analgesia, there are also several studies that have indicated that epidural analgesia does not affect the progress of labor. Several studies evaluating if the use of epidural analgesia causes an increased risk of cesarean section are those that examine hospitals before and after an “on-demand” epidural service was initiated. When researchers examined what happens when nothing at a hospital changes other than the addition of an epidural service, they have found that the cesarean section rate did not change after the epidural service was established. Recent studies reiterate that women who receive epidural analgesia report lower pain scores during labor as compared with women who receive IV meperidine analgesia and that epidural analgesia (as used today) does not increase cesarean delivery rate (3).

Depending on the type of neuraxial anesthesia provided, there might be an effect on uterine activity and a prolongation of labor. For example, the use of very high concentrations of bupivacaine (e.g., 0.5%) after a fluid bolus of several liters (a technique no longer routinely practiced), may have an impact on labor. Early studies demonstrated that the placement of lumbar epidural anesthesia may result in a transient decrease in uterine contractility (4). Although the use of epinephrine was considered the paramount factor by some authors, it has been suggested that this effect can occur without epinephrine administration (5). Regardless of whether a transient change in uterine contractility occurs, it has been demonstrated that the rate of cervical dilation is not typically delayed in parturients receiving neuraxial blockade. It has also been demonstrated that aortocaval compression can be a primary cause of changes in uterine activity after epidural anesthesia thus illustrating the importance of assuring left uterine displacement (6).

Some authors have suggested that epidural analgesia can actually help achieve a vaginal delivery, for example in the case of prolonged exhaustive labors (7). When Chestnut et al. (8) studied 0.0625% bupivacaine with fentanyl infusion (which is currently used by many practitioners), they found no effect on either the duration of the second stage of labor or the incidence of instrumental deliveries.

Many factors can necessitate a cesarean section. To incriminate an epidural anesthetic without looking at other confounding variables is inaccurate. For example, the age of patients has been shown to correlate with the incidence of cesarean section, with one study actually demonstrating that women aged 35 or older had cesarean deliveries twice as often as women aged 20–29 yr (9). However, stratification of data for age has not always been done in previously reported studies. Another factor too commonly excluded from analyses is the parturient's socioeconomic status, which may also impact on cesarean section rate. For example, one study has demonstrated that private patients had a much greater rate of cesarean delivery than did women attending a clinic (10).

Neuraxial analgesia is not only superior for pain relief, it may have other advantages and it appears that it need not be limited to women in active labor. A randomized trial of 750 nulliparous women at term who were in spontaneous labor and who were randomly assigned to receive intrathecal fentanyl or systemic hydromorphone found that neuraxial analgesia in early labor did not increase the rate of cesarean delivery and that it provided better analgesia and resulted in shorter duration of labor than systemic analgesia (11).

In summary, despite a growing amount of information suggesting that this controversy be formally retired, the issue has yet to be resolved among all obstetricians. Most evidence leads me to believe that in order to resolve this issue we must separate emotions and personalities from the data. When that occurs, it becomes clear that although the initiation of epidural analgesia may occasionally be associated with the necessity for cesarean section, epidural anesthesia is just one of many factors that all interact and by itself is not a risk factor for abdominal delivery.

### **VBAC: Should We Continue to Perform It and Does the Anesthesiologist Need to Be Present Throughout Labor?**

This controversy has been growing, with debates raging about whether the risk of uterine rupture in these women warrants the presence of an anesthesiologist, obstetrician, and nursing team who are “immediately available” to perform a cesarean delivery. Other questions pertaining to this issue include:

Should VBAC be offered at all and, if so, to whom? Which hospitals should offer VBAC?

If an anesthesiologist is present, should this be billed even if no epidural is placed?

Are there reasonable options if VBAC is not offered?

The source of this controversy comes in part from an ACOG Committee Opinion and Practice Bulletin (12) recommending that a team (including an anesthesiologist) must be “immediately available” to perform a cesarean delivery should the uterus rupture. This is in contradistinction to the usual “readily available” language used. The evidence chosen for this decision comes from several studies that suggested that the risk of uterine rupture in these patients is far greater than had been previously expected. Lydon-Rochelle et al. (13) for example, reported that uterine rupture occurred at a rate of:

1.6 per 1000 among women with repeated cesarean delivery without labor

5.2 per 1000 among women with spontaneous onset of labor

7.7 per 1000 women whose labor was induced without prostaglandins

24.5 per 1000 in women with prostaglandin-induced labor

An editorial accompanying this paper by Greene (14) stated “After a thorough discussion of the risks and benefits of attempting a vaginal delivery after cesarean section, a patient might ask, ‘But doctor, what is the safest thing for my baby?’ Given the findings of Lydon-Rochelle et al., my unequivocal answer is: elective repeated cesarean section.” This was followed by Committee Opinion Number 271 (12), which

further limited VBAC by stating “the risk of uterine rupture during VBAC attempts is substantially increased with the use of various prostaglandin cervical ripening agents for the induction of labor and their use for this purpose is discouraged.” This has had a major impact on the practice of obstetrics; the most recent data showed that last year 27.6% of all United States births were delivered by cesarean delivery, a marked rise of more than 6% over the 2002 level and 33% higher than the 1996 level, and that the rate of VBAC fell by 16% in the previous 2 yr (15). Several key obstetricians have reiterated that VBAC is an elective procedure and, in the event that a hospital cannot provide immediate availability of staff necessary to perform a cesarean delivery, that the patient can be transferred to another hospital or that an elective repeat cesarean can be performed. For example, in an editorial in the *New England Journal of Medicine*, Sachs et al. (16) stated “Trials of labor should not be mandated for women with prior cesareans and not be performed at all in facilities unable to perform emergency cesareans.” This issue has recently been further complicated by insurers who have now decided that they will not provide insurance coverage for obstetricians who perform VBAC.

## Is There a Need for Teamwork and Communication on the Labor and Delivery Suite?

The anesthesiologist providing care to patients on the Labor and Delivery Suite must be prepared to deal with numerous obstetric emergencies that may occur. This section of the lecture will review several obstetric emergencies and scenarios and address the importance of communication during management of these high-risk situations. Specific cases will be reviewed. In addition, preliminary results from an ongoing teamwork training study involving labor and delivery will be discussed.

In its 1999 report entitled, *To err is Human: Building a Safer Health System*, the Institute of Medicine (IOM) advocated for translating concepts of aviation team training and Crew Resource Management to improve patient safety (17). The IOM reissued this suggestion in its follow-up report in 2001 (18) and others, including AHRQ (Agency for Healthcare Research and Quality) and JCAHO have also supported this position. Crew Resource Management (CRM) training is becoming more popular outside of aviation, including in hospitals. However, a recent review suggested that although CRM training generally produced positive reactions, enhanced learning, and desired behavioral changes, they could not ascertain whether it has an effect on safety (19).

## Possible Benefits of Working as a Team

1. Patient satisfaction increases
2. Number of clinical errors decreases
3. Workplace morale improves

To improve teamwork and communication, new attitudes are necessary. They include the following:

1. Recognition that mistakes occur and that humans are not perfect.
2. Acknowledgment that we work better when we work in teams.
3. Acceptance that monitoring by others protects us all
4. Acknowledgment that teamwork does not occur naturally, that it takes effort.

Observational studies indicate that there are five features common to well-functioning teams. They are:

- Maintain team structure and climate
- Plan and problem solve
- Communicate
- Manage workload
- Improve team skills
- Increasing patient safety will require a concerted effort to change our current system. Teamwork training is one part of that change. In his classic review of how human factors impact on adverse events, Reason has suggested that human rather than technical failures now represent the greatest threat to complex and potentially hazardous systems, including the health care system (20).

## References

1. Thorp JA, Hu DH, Albin RM. The effect of intrapartum epidural analgesia in nulliparous labor: a randomized controlled, prospective trial. *Am J Obstet Gynecol* 1993;169:851–8.
2. Matadial L, Cibilis LA. The effect of epidural anesthesia on uterine activity and blood pressure. *Am J Obstet Gynecol* 1976;125:846–54.
3. Sharma SK, Alexander JM, Messick G, et al. Cesarean delivery: a randomized trial of epidural analgesia versus intravenous meperidine analgesia during labor in nulliparous women. *Anesthesiology* 2002;96:546–51.
4. Lowensohn RI, Paul RH, Fales S, et al. Intrapartum epidural anesthesia: an evaluation of effect on uterine activity. *Obstet Gynaecol* 1974;44:388–93.
5. Craft JB, Epstein BS, Coakley CS. Effect of lidocaine with epinephrine vs lidocaine (plain) on induced labor. *Anesth Analg* 1972;51:243–6.
6. Schellenberg JC. Uterine activity during lumbar epidural analgesia. *Am J Obstet Gynecol* 1977;127:26–31.
7. Maltau JM, Anderson HT. Epidural anaesthesia as an alternative to caesarean section in the treatment of prolonged exhaustive labour. *Acta Anaesth Scand* 1975;19:349–54.
8. Chestnut DH, Laszewski LJ, Pollack KL, et al. Continuous epidural infusion of 0.0625% bupivacaine with 0.0002% fentanyl during the second stage of labor. *Anesthesiology* 1990;72:613–8.
9. Edge VL, Laros RK. Pregnancy outcome in nulliparous women aged 35 or older. *Am J Obstet Gynecol* 1993;168:1881–5.
10. Neuhoff D, Burke S, Porreco R. Cesarean birth for failed progress of labor. *Obstet Gynecol* 1989;73:915–20.
11. Wong CA, Scavone BM, Peaceman AM, et al. The risk of cesarean delivery with neuraxial analgesia given early versus late in labor. *N Engl J Med* 2005;17:655–65.

12. ACOG Committee Opinion Number 271. Washington, DC: American College of Obstetricians and Gynecologists, April 2002.
13. Lydon-Rochelle M, Holt VL, Easterling TR, Martin DP. Risk of uterine rupture during labor among women with a prior cesarean delivery. *N Engl J Med* 2001;345:3–8.
14. Greene MF. Vaginal delivery after cesarean section—is the risk acceptable? *N Engl J Med* 2001;345:54–5.
15. Hamilton BE, Martin JA, Sutton PD, et al. Births: preliminary data for 2003. *Nat Vital Stat Rep* 2004;53:1–17.
16. Sachs B, Kobelin C, Castro MA, Frigoletto F. The risks of lowering the cesarean delivery rate. *N Engl J Med* 1999;340:54–7.
17. Institute of Medicine. *To err is human: building a safer health system*. Washington DC: National Academy Press, 1999.
18. Institute of Medicine. *Crossing the national chasm: a new health system for the 21st century*. Washington DC: National Academy Press, 2001:337.
19. Salas E, Burke CS, Bowers CA, Wilson KA. Team training in the skies: does crew resource management training work? *Hum Factors* 2001;43:641–74.
20. Reason J. Understanding adverse events: human factors. *Qual Health Care* 1995;4:80–9.

## Sterile Technique for Epidural Placement

Recently, a new controversy has arisen in obstetric anesthesiology—are facemasks necessary for the anesthesia care provider? The ultimate question, of course, is whether there is a need (or a way) to decrease the risk of infection resulting from neuraxial blocks. This would involve not only facemasks but other elements of aseptic technique as well as the use of different techniques and agents for antisepsis. Although there is much literature surrounding the risks associated with intravascular (central venous) catheters, there is conflicting evidence as regards the risk of infection after neuraxial block. Unfortunately, we know neither the numerator nor denominator when it comes to complications after neuraxial blocks, and the risk of developing complication is so rare that prospective studies become problematic. Although numerous anecdotal and case reports about infection after epidurals exist, there is little hard evidence on which to base guidelines or standards. Some countries, however, have written guidelines or standards to support various elements, including the use of facemasks. This lecture will review the current literature regarding infection after neuraxial block and will update you on possible involvement of the CDC in trying to quantify this issue and determine if policies are necessary.

### *Summary of Current Information*

1. The number of neuraxial blocks (epidurals, spinals, and combined spinal-epidurals) for labor and delivery has been dramatically increasing. It has been estimated that more than half of the deliveries in the United States are now accomplished with some form

of epidural analgesia and, in large teaching programs, the numbers are often close to 90%. In addition, the numbers of blocks for which a spinal component is included is also dramatically increasing, in part because of our use of spinal opioids in labor. Furthermore, as many epidurals are being placed earlier in labor, they are remaining *in situ* for longer periods of time. There have been several clinical reports of epidural/spinal infections recently. However, we have no idea as to the magnitude of this problem or if we can even call it a problem. Although there is no central depository to be able to specifically know either the numerator or denominator, there appear to be more anecdotal reports of catheter-related morbidity and mortality related to epidural or spinal related infection.

2. There are currently no official standards or guidelines for antisepsis as relates to initiating epidurals or spinals in the United States; however, some foreign countries require that hat and mask be worn, or that hands be washed, or in the most extreme case, that anesthesiologists wear surgical gowns. Although anesthesiologists performing these neuraxial blocks for surgery are forced to wear hats and masks because they are in the operating room, the same cannot be said for labor when these blocks are done in a labor room. Surveys of anesthesiologists in the United Kingdom and Australia have reported that many are not wearing masks or washing their hands before the procedure. In one survey, some practitioners even stated that they did not wear gloves. Those who do not wear masks argue that masks do not guarantee that oropharyngeal bacteria will not cause harm anyway and they suggest that there are also reports of meningitis in cases where the physician was wearing a mask.

3. There appears to be no standard as regards to disinfecting the skin of the back. Most United States anesthesiologists use povidone iodine (PI) and most of those using PI prefer single-use bottles or packets rather than multi-use bottles. But some use two swabs, some three; some let it dry whereas others wipe it off; and some continue to use multi-use bottles of PI (which have been shown to occasionally support bacterial growth). Some anesthesiologists use alcohol alone, some use alcohol plus PI and some use Dura-prep (an iodinated solution plus alcohol manufactured by 3M). Still others (and most Europeans) use chlorhexidine.

4. The number of reports in the non-anesthesia literature of infections related to neuraxial analgesia/anesthesia is somewhat disquieting. Most of these reports, however, have not made it into the anesthesia literature.

## Bibliography: Sterile Technique for Epidural Placement

- Baer ET. Iatrogenic meningitis: the case for face masks. *Clin Infect Dis* 2000;31:519–21.
- Browne IM, Birnback DJ. Unmasked mischief. *Anesth Analg* 2001;92:277–8.
- Dawson S. Epidural catheter infections. *J Hosp Infect* 2001;47:3–8.
- Dolinski S, Gerancher JC. Two suggestions to facilitate patient positioning in the performance of regional anesthesia. *Anesth Analg* 2000;90:500.
- Goodman NW. Evidence based medicine: cautions before using. In: Tramer M, ed. Evidence based resource in anaesthesia and analgesia. London: BMJ Books, 2000.
- Gorce P, Varlet C, Ouaknine B, Porriat JL. Meningitis after locoregional anesthesia. *Ann Fr Anesth Reanim* 2000;19:375–81.
- Kindler CH, Seeberger M, Staender SE. Epidural abscess complicating epidural anesthesia and analgesia: an analysis of the literature. *Acta Anaesthesiol Scand* 1998;42:614–20.
- Moen V. Meningitis is a rare complication of spinal anesthesia [in Swedish]. *Lakartidningen* 1998;95:631–2.
- Moen V, Irestedt L, Raf L. Review of claims from the patient insurance: spinal anesthesia is not completely without risks [in Swedish]. *Lakartidningen* 2000;97:5769–74.
- Panikkar KK, Yentis SM. Wearing of masks for obstetric regional anaesthesia: a postal survey. *Anaesthesia* 1996;51:398–400.
- Philips BJ, Ferguson S, Armstrong P. Surgical face masks are effective in reducing bacterial contamination caused by dispersal from the upper airway. *Br J Anaesth* 1992;69:407–8.
- Reihsaus E, Waldbaur H, Seeling W. Spinal epidural abscess: a meta-analysis of 915 patients. *Neurosurg Rev* 2000;23:175–204.
- Sato S, Sakuragi, T, Dan K. Human skin flora as a potential source of epidural abscess. *Anesthesiology* 1996;85:1276–82.
- Schneeberger PM, Janssen M, Voss A. Alpha-hemolytic streptococci: a major pathogen for iatrogenic meningitis following lumbar puncture. *Infection* 1996;24:29–33.
- Sellors JE, Cyna AM, Simmons SW. Aseptic precautions for inserting an epidural catheter: a survey of obstetric anaesthetists. *Anaesthesia* 2002;57:593–6.
- Trautmann M, Lepper PM, Schmitz FJ. Three cases of bacterial meningitis after spinal and epidural anesthesia. *Eur J Clin Microbiol Infect Dis* 2002;21:43–5.
- Videira RL. Aseptic practice and neuraxial blockade. *Anaesthesia* 2002;57:1233–4.