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## Combined Spinal-Epidural (CSE) Labor Analgesia: Optimal Practice in the New Millennium

Epidural labor analgesia has continuously evolved over the last 40 years. Among the many advances, several particularly stand out. Developments in polymer chemistry allowed strong and flexible multi-orifice epidural catheters to be manufactured. The study of local anesthetic-opioid synergy has shown that very low concentrations of local anesthetics can affect labor analgesia when combined with a lipophilic opioid. This, in turn, decreases local anesthetic toxicity risks and parturient motor blockade. Other advances led to improved maternal safety. After tragic misadventures with unrecognized intravascular epidural catheters (bupivacaine cardiotoxicity) and intrathecal catheters (total spinal anesthesia and cauda equina syndrome), multiple improvements were made. Epidural "test dosing" became mainstream practice, and multi-orifice catheters proved to be much more sensitive at identifying blood or CSF with catheter aspiration.

One of the most recent advances in obstetric labor analgesia is combined spinal-epidural analgesia. Systematic comparison of the CSE technique versus the conventional epidural technique has led us to a number of conclusions.

### CSE labor analgesia:

1. Produces faster onset of labor analgesia. In fact, research authored by my esteemed opposer in this debate clearly demonstrates that women receiving conventional epidural analgesia (compared to CSE) during labor have higher pain scores until one hour after initiation of labor analgesia.<sup>1</sup> As a result of this speed of onset, patient satisfaction is higher with CSE.<sup>2</sup> An hour can be a very long time during hard labor!
2. Produces minimal motor blockade. Unlike conventional labor analgesia, extremely fast and effective labor analgesia can be established without the onset of muscle weakness. Because fast-onset lipophilic opioids are administered directly into the CSF, spinal cord mu-opioid receptor binding is nearly immediate, resulting in labor analgesia. To promote analgesia synergy and prolong duration, small doses (1.5-2.5 mg) of bupivacaine are frequently added to the intrathecal lipophilic opioid.
3. Yields fewer failed epidurals during labor.<sup>3</sup> This superiority of CSE has many ramifications. In addition to unnecessary patient suffering, a failed labor epidural adds substantial manpower costs. Replacement of a failed epidural is time consuming for the anesthesiologist and the labor nurse, and involves additional equipment costs.
4. Yields fewer unintentional dural punctures ("wet-taps") with the epidural needle.<sup>4</sup> These studies were performed in teaching hospitals, where epidural insertion is often attempted by trainees. When confronted by an unclear "loss of resistance" during attempted epidural catheter placement, options include placing a catheter at this depth (high failure rate) or advancing the epidural needle (high dural puncture rate). With CSE, one simply inserts the spinal needle via the epidural needle, and confirms if the epidural needle tip is close to the dura.
5. Is associated with fewer instrumental vaginal deliveries.<sup>5</sup> Perhaps due to decreased motor block or faster labor, CSE appears to increase the spontaneous vaginal delivery rate relative to conventional epidural labor analgesia.

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6. Is associated with faster cervical dilation.<sup>6</sup> Tsen and colleagues randomized parturients to either CSE or conventional labor analgesia. Cervical dilation rates were considerably more rapid with CSE compared to conventional epidural analgesia. Faster cervical dilation may have other benefits, including decreased maternal fever.
7. Produces fewer failed epidural anesthetics at the time of C-section.<sup>3,7</sup> Failed epidural anesthesia for an unscheduled intrapartum Cesarean delivery can be very troubling. Fetal stress or distress may be ongoing, and general anesthesia may be necessary. The increased success rate with initiating the prior labor block with the CSE technique may be due to confirmed proximity to the dura as well as facilitated drug diffusion through the dural rent.
8. Has economic advantages. Although the CSE technique does involve the cost of a long (120 mm) pencil-point spinal needle (\$6.82 at our institution), this cost is clearly insignificant in the cost of parturition. CSE has the potential for cost savings, including fewer failed epidural labor blocks (equipment and manpower costs) and fewer failed epidural anesthetics at the time of Cesarean delivery (manpower and OR time costs).

From all of the aforementioned advantages of CSE, I believe that it should be abundantly clear that CSE labor analgesia is the preferred technique to initiate labor analgesia.

### Table 1: Advantages of CSE over Conventional Labor Epidural

1. Faster onset of labor analgesia
2. Improved patient satisfaction
3. Minimal motor block
4. Fewer failed epidural catheters
5. Fewer unintentional dural punctures
6. Less instrumental deliveries
7. Faster cervical dilation

### Table 2: Initiating CSE Labor Analgesia: A Vermont Perspective

1. We use 0.0625% bupivacaine with fentanyl 2 mcg/ml as the epidural infusate.
2. Intrathecal injection is 3-4 ml of the above solution. Make intrathecal injection with aperture of spinal needle aimed cephalad.
3. Place epidural catheter and perform aspiration test. Consider performing a lidocaine-epinephrine test dose.
4. Begin patient controlled epidural analgesia with the above solution. I use the following pump settings: initial bolus 6 ml, 10 ml/hr continuous infusion, 8 ml demand dose, 10 minute lockout, 34 ml/hr maximum dose.

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## Combined Spinal-Epidural (CSE) Labor Analgesia Should Not be Routinely Chosen for Labor Analgesia

I routinely use CSE analgesia in my clinical practice because it produces rapid onset labor analgesia and I believe the technique improves efficiency. Patients prefer it over epidural analgesia if they have had a previous epidural to compare it with. However, the CSE technique is not without disadvantages.

Suggested disadvantages of the technique include an unproven epidural catheter and the increased risks for a spinal catheter, a high spinal block, a post dural puncture headache, fetal bradycardia, meningitis, metal flakes within the CSF and increased costs. Nearly all of these risks are theoretical and have been found to occur no more frequently with CSE techniques than with epidural techniques in clinical studies. However, the concern that the epidural catheter is unproven is real and may increase overall risk in a subset of laboring patients.

Approximately 20% of epidural catheters associate with inadequate labor analgesia. Since CSE anesthetics produce spinal analgesia in nearly 100% of laboring patients lasting up to two hours, it may take that long to recognize inadequate analgesia associated with the epidural catheter portion of the CSE technique. It is theorized that the CSE technique reduces the incidence of inadequate epidural analgesia by verifying a midline needle insertion when CSF is detected and in turn making a midline epidural catheter insertion more likely. However, a recent abstract suggests the incidence of inadequate epidural analgesia is similar with both techniques. In the majority of patients, an unproven epidural catheter poses little problem as the epidural catheter can simply be manipulated or replaced when inadequate analgesia is recognized. But in patients at risk for an urgent cesarean section there may be little time to "mess" with an epidural catheter and certainly insufficient time to replace it should the need for cesarean section occur during the spinal portion of the CSE. An unproven epidural catheter will potentially increase the risk of a failed epidural block and may necessitate the conversion to general anesthesia. General anesthesia increases both maternal and fetal risk. Thus, a preferable solution is to initiate labor analgesia in these patients through an epidural catheter. Adequate epidural anesthesia for cesarean section is more likely to be achieved with a proven epidural catheter. Therefore, it is my opinion that CSE techniques should be precluded in laboring patients at high risk for an urgent cesarean section. This includes patients with morbid obesity, severe preeclampsia, history of placenta previa or an abruption, multiple gestation, abnormal presentation, serious medical conditions, and those attempting VBAC. These patients should routinely have labor analgesia initiated through an epidural catheter.

It has been argued that CSE techniques do not actually improve the efficiency of labor analgesia and that they may actually increase workload. Arguments include: the time taken to prepare the CSE solutions offsets any gains in onset of labor analgesia, bicarbonated local anesthetic solutions administered epidurally rival onset times of CSE solutions administered spinally, patients become so accustomed to the profound spinal analgesia from the CSE that they are subsequently more likely to call for supplemental analgesia for anything less than complete epidural analgesia, and practitioners would rather deal with inadequate labor analgesia

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immediately following insertion than deal with it 2-3 hours after a CSE anesthetic. As a result of these concerns, it has been suggested epidural techniques should be routinely used for the vast majority of laboring patients with CSE techniques reserved for select patients such as the multiparous patient presenting in an advanced stage of labor.

The arguments made in the previous paragraph dwell into the "art of medicine" and reflect personal preferences that cannot be easily elucidated in clinical studies. In truth, it probably makes little clinical difference in the majority of patients if they have labor analgesia initiated using CSE or epidural techniques. In these patients, I would defer to the individual preference of the practitioner. However, medical practice should be predicated upon maximizing benefits and reducing risks when possible. With respect to CSE and epidural techniques for labor analgesia, the benefits of CSE do not outweigh the risks in patients at risk for an urgent cesarean section. In this subset of patients, epidural analgesia techniques are recommended since a tested and proven epidural catheter will likely reduce the risk of requiring a general anesthetic because of inadequate epidural anesthesia. In all other laboring patients, let preferences reign!

## Resident/Fellow Scholarships:

We thank the Board of Directors for their continued support of resident/fellow meeting attendance. Each of the following individuals will receive a monetary scholarship to help defer the cost of attending the 2004 Annual Fall Meeting.

**Jeff C. Gadsden, MD** - *Interscalene Brachial Plexus Block Results in Superior Postoperative Analgesia Compared to GA Plus Wound Infiltration as Sole Technique for Outpatient Rotator Cuff Surgery*

**Ashish P. Gulve, MBBS, MD** - *Intrathecal Baclofen for Treating Dystonia of Complex Regional Pain Syndrome Type 1*

**Leon Margolin, MD, PhD** - *Gelatinase A Inhibition Attenuates Extracellular Matrix Remodeling and Cell Proliferation and Migration in Rats. Relevance to the Pathogenesis and Management of Chronic Pain*

**Kathirvel Subramaniam, MD** - *The Effect of Adding Low Dose Ketamine to Standard Practice Analgesia after Major Spine Surgery in Patients with Chronic Therapeutic Opioid Intake*

**Tony Tsai, MD** - *High Injection Pressure Predicts Delayed Neurologic Recovery After Intraneural Injection in Canine Sciatic Nerve*

**Rainer Vogel, MD** - *Effect of Sympathectomy on Streptozotocin Induced Neuropathic Pain in Rats*

**Congratulations!**

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### References:

1. D'Angelo R, Anderson MT, Philip J, Eisenach JC. Intrathecal sufentanil compared to epidural bupivacaine labor analgesia. *Anesthesiology* 1994; 80:1209-15.
2. Colis RE, Davies DW, Aveling W. Randomised comparison of CSE and standard epidural analgesia in labour. *Lancet* 1995; 345:1413-6.
3. Eappen S, Blinn A, Segal S. Incidence of epidural catheter replacement in parturients: a retrospective chart review. *Int. J Obstet Anesth* 1998;7:220-5.
4. Norris MC et al. Complications of labor analgesia: epidural versus CSE techniques. *Anesth Analg* 1994;79:529-37.
5. Nageotte MP, Larsen D, Rumney PJ, et al. Epidural analgesia compared with combined spinal epidural analgesia during labor in nulliparous women. *N Engl J Med* 1997;337:1715-9.
6. Tsen LC, Thue B, Datta S, Segal S. Is combined spinal-epidural analgesia associated with more rapid cervical dilation in nulliparous patients when compared to conventional epidural analgesia? *Anesthesiology* 1999;91:920-5.
7. Norris MC, Fogel ST, Dalamn H, et al. Labor epidural analgesia without an intravascular test dose. *Anesthesiology* 1998;87:864-9.

## Resident's Report

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### Just my thoughts...

#### References:

1. Bridenbaugh L. Are anesthesia resident programs failing regional anesthesia? *Reg Anesth* 1982;7:26-28.
2. Kopacz DJ, Bridenbaugh LD. Are anesthesia residency programs failing regional anesthesia? The past, present, and future. *Reg Anesth* 1993;18:84-87.
3. Kopacz DJ, Neal JM. Regional anesthesia and pain medicine: residency training – the year 2000. *Reg Anesth Pain Med.* 2002 Jan-Feb; 27(1): 9-14