# Combined Spinal-Epidural Technique Should be Offered to All Laboring Parturients

## CON

Combined spinal epidural analgesia (CSE) has become an increasingly popular technique for providing labor analgesia. By using an intrathecal opioid (usually fentanyl or sufentanil) in combination with a small dose of local anesthetic (bupivacaine 1.25 - 2.5 mg), excellent analgesia is provided with minimal motor block. In many institutions, parturients who have received CSE are allowed to ambulate during labor. The onset of analgesia is more rapid with CSE compared to conventional epidural analgesia[1]. These unique characteristics of CSE make it the ideal labor analgesia technique in some situations. In multiparous patients who request analgesia in the advanced stages of labor, its more rapid onset clearly makes it the superior technique. Often when a conventional epidural is performed in these patients, adequate pain relief is not obtained before delivery occurs. Some parturients desire the ability to get out of bed and ambulate after receiving labor analgesia. CSE is an excellent choice for these patients([2]). Conventional epidural analgesia with very low doses of local anesthetic and fentanyl have also been used successfully in ambulatory laboring patients([3]).

As the use of CSE for labor has increased, some anesthesiologists now advocate its use in all routine laboring parturients requesting labor analgesia. They argue that its purported advantages (more rapid analgesia onset, improved quality of analgesia, decreased motor block) justify replacing epidural analgesia with this technique in all but some high-risk patients. The current literature does not support this assertion.

Epidural labor analgesia has a long record of safety. CSE is a new procedure that has been used on a routine basis to provide labor analgesia for less than a decade. Large scale studies looking at the safety of this technique are lacking. In fact, current information in the literature suggests that we should approach this technique with caution. It should not be offered to all routine laboring parturients but rather should be reserved for specific clinical situations, such as the patient in advanced labor and the patient who desires to ambulate during labor.

Significant adverse effects have been reported with CSE labor analgesia. Rostral spread of intrathecally administered opioids within the CSF can lead to respiratory depression or respiratory arrest. Fentanyl and sufentanil are the most frequently used opioids for CSE labor analgesia. Prospective, randomized studies in laboring patients have found that significant increases in end-tidal $CO_2$ occur after intrathecal administration of both of these drugs. The ventilatory response is dose-related. However, in the study of sufentanil, increases in $CO_2$ occurred with sufentanil 5 mcg[4], which is currently one of the most commonly used doses for labor analgesia. In the dose-response study of fentanyl, increases in end-tidal CO2 occurred with all doses that provided effective analgesia[(5)]. The increase was progressive over time, with the maximal increase occurring at the last time period studied, 30 minutes after administration.

Since the introduction of CSE labor analgesia in the early 1990's, at least six cases of respiratory depression or respiratory arrest have been reported[6,7,8,9,10]. These cases have occurred both in patients who had received systemic narcotics earlier in labor[6,7] as well as in patients who had received no other analgesics([8,9,10]. Respiratory arrest occurred as late as twenty-three minutes after intrathecal injection[10]. Together with the fentanyl dose-response study that showed the maximal increase in end-tidal CO2 occurred 30 minutes after drug administration, this is particularly concerning, since many anesthesiologists have already left the patient's bedside twenty-five to thirty minutes after completion of the procedure.

Infectious complications can also occur after CSE. No study has reported an increased incidence of meningitis or epidural abscess after CSE labor analgesia. However, it seems significant that since the introduction of this technique less than a decade ago, at least five cases of meningitis following CSE for labor have been reported[11]. In contrast, a retrospective study of 505,000 epidural anesthetics in obstetrics found no infectious complications[12] and another study of 300,000 obstetric epidurals reported 3 cases of meningitis[13]. Case reports of epidural abscess and meningitis after epidural labor analgesia do exist[14,15,16]). However, given the long history of labor epidural use in the developed world, the number of reported cases seems extremely small compared to five cases associated with CSE in the just the past seven years.

Other minor adverse effects occur after the administration of intrathecal opioids for labor analgesia. The most common is pruritus. Proponents of the use of CSE in all routine laboring parturients argue that this side effect is minor and can be decreased by using a smaller dose of opioid. The fentanyl dose-response study did find a dose-response relationship between fentanyl and pruritus. However, at all effective analgesic doses the incidence of pruritus was greater than 50%([5]. Other studies have not found a decreased incidence of pruritus with smaller doses[17,18]. When adverse effects of epidural versus CSE labor analgesia were compared, the incidence of pruritus was 1.3% for epidural and 41.4% for CSE[19]. While this is not a serious adverse effect, it can be a very annoying problem for the patient in labor. Some patients who have had severe itching have reported that they would rather have pain than the itching they experienced. Options for treatment of the pruritus include diphenhydramine, which can cause drowsiness, or an opioid antagonist, which could also affect the duration or quality of the patient's analgesia.

Another problem that has been associated with CSE labor analgesia is fetal bradycardia. It has been hypothesized that the rapid, profound analgesia provided by CSE causes a sudden drop in endogenous catecholamine levels that leads to uterine hypertonus, compromised uteroplacental perfusion, and ultimately fetal bradycardia[20]. Proponents of the routine use of CSE believe this is a transient phenomenon that does not affect obstetric outcome. A large retrospective study did report no difference in emergency cesarean delivery rates between patients who received CSE compared to those who received systemic or no pain medication[21]. However, a prospective, randomized study found that 8 of 352 women who received intrathecal sufentanil required emergency cesarean delivery within one hour of drug administration because of fetal bradycardia,

while none of the patients who received intravenous meperidine required emergency cesarean delivery within an hour of drug administration[22]. Although no significant difference was found, a small retrospective comparison of intrathecal fentanyl and conventional epidural analgesia found an incidence of worrisome FHR changes after initiation of analgesia in 12% of parturients who received intrathecal fentanyl and 6% of those who received epidural analgesia. The author stated that a much larger study was needed to determine if a true, clinically significant difference exists between the groups([23]. Clearly, the association between CSE analgesia and fetal bradycardia needs to be investigated further before we can claim that this is not a significant problem.

Another concern associated with CSE is the presence of an untested epidural catheter. Until the intrathecal analgesia resolves one to two hours later, the anesthesiologist can not be certain that the epidural catheter is functioning adequately. In the vast majority of cases, the epidural catheter will function satisfactorily. In a retrospective study, the incidence of failed catheters was smaller when a CSE technique was performed compared to an epidural technique[24]. However, the epidural catheter will not be adequate in all cases. Discovery of an inadequate epidural catheter and its subsequent replacement will be delayed with a CSE technique. If cesarean delivery is required before the intrathecal analgesia wears off, unanticipated catheter failure could lead to the need for general anesthesia, which carries significantly greater risk than regional anesthesia for the parturient. Therefore, CSE labor analgesia should be avoided in patients at increased risk for cesarean delivery and especially in those patients in whom general anesthesia could be especially troublesome (morbidly obese, anticipated difficult airway).

Proponents of the routine provision of CSE labor analgesia to all parturients often cite the following advantages of this technique over standard epidural analgesia: more rapid onset of analgesia, superior quality of analgesia, and less motor block. As mentioned previously, onset of analgesia is significantly more rapid. However, prospective randomized studies comparing CSE and epidural labor analgesia do not support the claims that analgesia is superior and motor block is less. One study compared epidural analgesia using bupivacaine 0.0625% with fentanyl and epinephrine to CSE using intrathecal fentanyl 25 microgram + bupivacaine 2.5 mg. Patient satisfaction with the analgesia did not differ between groups. In addition, the degree of motor blockade did not differ between the groups when such a low concentration of local anesthetic was administered epidurally[1]. In a large study of 761 parturients, patients were randomized to receive either epidural or CSE analgesia. Patients receiving epidural analgesia were dosed initially with bupivacaine 0.25% and then placed on an infusion of 0.125% bupivacaine + fentanyl 2 mcg/ml. Patients receiving CSE analgesia received intrathecal sufentanil 10 mcg followed by an epidural infusion of bupivacaine 0.0625% + fentanyl 2 mcg/ml. Patients' assessment of adequacy of analgesia did not differ between the groups nor did their overall satisfaction with the analgesic technique[25].

In conclusion, CSE labor analgesia has become increasingly popular over the past decade. It provides excellent labor analgesia with a more rapid onset than conventional epidural analgesia. In selected patients, such as multiparous patients in advanced labor, it is the technique of choice. However, some concerns about the technique have arisen that

have not been fully addressed by the data that currently exist. At this time, therefore, we should not offer CSE labor analgesia to all routine laboring parturients.

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