Combined Spinal Epidural or Traditional Epidural Technique: Who Wins?

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N euraxial analgesia is a popular method for providing pain relief to laboring parturients. Lumbar epidural analgesia has evolved over the past 20 years. The combined spinal–epidural technique (CSE) has gained popularity due to its more rapid onset of analgesia with minimal motor blockade. However, there is a considerable amount of debate in the literature and among anesthesiologists as to whether lumbar epidural or CSE analgesia provides superior pain relief during labor and delivery.

While there are several published, prospective studies addressing this issue, the studies, not surprisingly, were performed at academic institutions. To address this debate in a private practice setting, Gambling et al., in this issue of Anesthesia & Analgesia, report the results of a randomized trial in which pain scores during the first and second stages of labor and at delivery were compared in women randomized to receive epidural or CSE analgesia. The authors collected data from 800 parturients (398 epidural and 402 CSE) over a 2.5-year period. In addition to pain scores, the investigators also evaluated epidural catheter replacement rates, number of supplemental epidural top-up doses, and patient-controlled epidural analgesia usage.

The authors found that women in the CSE group received complete analgesia on average 11 minutes faster, had slightly better typical first stage pain scores, and received fewer top-up boluses than women in the epidural group. Neither was the epidural catheter replacement rate between the 2 groups statistically different, nor were second stage and delivery pain scores. These findings support the 2007 Cochrane review that analyzed 2658 women in 19 randomized trials to show that laboring women receiving CSE analgesia had a faster onset of analgesia and a lower need for rescue analgesia, but overall satisfaction was similar between the CSE versus epidural groups.

These results, however, have not been universally reported. Nageotte et al. randomized 761 nulliparous laboring women to receive epidural or CSE analgesia. Although overall satisfaction scores among groups did not differ, the CSE group required more top-up boluses than the epidural group. However, the CSE group received a lower concentration of bupivacaine through a continuous infusion than the epidural group, which may partially explain their results. Goodman et al. randomized 100 parous laboring women to receive a CSE or epidural technique. They found no difference in number of top-up boluses between groups. However, pain scores during the first 30 minutes were lower in the CSE group compared with the epidural group. Epidural catheter replacement rate was not evaluated.

The inconsistent results may be explained, in part, by the lack of a standard CSE or epidural technique. Many prior studies, both prospective and retrospective, differ in many factors such as drug availability or preferences of a particular hospital or provider. For example, in the current article, the epidural group received 10 mL of 0.125% bupivacaine with 2 µg/mL fentanyl in 2 divided doses through the epidural needle, followed by 5 mL of the same solution through the epidural catheter to initiate analgesia. At our academic institution (Wake Forest University), traditional epidural analgesia is initiated with separate intrathecal and IV test doses using 2% lidocaine injected through the epidural catheter with an interval of at least 5 minutes. While both analgesic methods are acceptable, they each have their own advantages.

The findings of this article highlight the fact that both CSE and epidural analgesia are excellent analgesic option during labor. The article provides support to the view that epidural catheters function better for labor analgesia if placed by a CSE approach compared with a traditional epidural approach when both are performed by experienced anesthesiologists. Grondin et al. compared epidural catheter efficacy using air versus saline loss-of-resistance techniques to identify the epidural space while initiating CSE analgesia. Epidural catheter replacement rate, a secondary outcome, was lower if cerebrospinal fluid was observed in the spinal needle. In a retrospective study, Pan et al. analyzed 19,259 deliveries in our academic setting, and also showed that the overall failure and catheter replacement rates were significantly lower in the CSE group compared with the epidural group. These results make sense; epidural catheters are likely to be correctly sited in the epidural space if we are able to confirm dural puncture with a spinal needle using a CSE technique. Although the study by Gambling et al. was not powered to compare
the incidence of failed catheters between the 2 groups, the overall rate of catheter placement was only 1.2% in the CSE group and 2% in the epidural group. These low numbers likely reflect the experience of the anesthesiologists placing these catheters compared with less experienced trainees. Thus, we hypothesize that for epidural catheters placed at academic centers by relatively inexperienced trainees, the CSE technique may be associated with a lower catheter replacement rate than with a traditional epidural technique.

However, what we do not know at the time of initial catheter insertion for labor analgesia is whether or not the catheter will function more reliably for surgical anesthesia if placed traditionally or as part of a CSE technique. Using retrospective data, Lee et al.7 found that catheters placed by a CSE technique had a lower failure rate for cesarean delivery, yet Norris found that CSE and epidural techniques had similar failure rates for surgical anesthesia. A majority of catheter failures occur subsequent to the time of initial placement, sometime during the course of labor. Findings from the Gambling et al.2 study and the literature do not allow us to determine whether there is a difference in the timing of required catheter replacement between the traditional epidural and CSE techniques. Some anesthesiologists argue against performing a CSE technique in the belief that they will recognize epidural catheter failure much earlier with a traditional epidural technique (especially if the patient is considered high risk for labor failure and potential urgent or emergent cesarean delivery). Although this argument may seem intuitive, it is not supported by evidence. If a laboring patient has a high risk for cesarean delivery in the first 1 to 2 hours after catheter placement, one could argue that a tested epidural catheter may be the preferred technique. However, the literature also supports the fact that a catheter placed after confirming return of cerebrospinal fluid is more reliable than traditionally placed epidural catheters, and such a catheter would have the same chance of success according to the findings of Gambling et al.,7 or even less chance of failure according to other studies.5,7 Yet another equally compelling argument is that anesthesia for a patient at very high risk for imminent cesarean delivery should be delayed for a single-shot spinal to eliminate the risk of catheter failure altogether. Further studies are needed to address the likelihood and, more specifically, the timing of epidural catheter failure between CSE and traditional epidural analgesia as labor progresses. Even with an initially functioning epidural catheter in an obse parulent with a difficult airway, the catheter can migrate during the course of labor, or provide inadequate analgesia as labor and its associated pain progresses, and may end up failing for surgical anesthesia a few hours after initial placement and adequate pain relief.

Some anesthesiologists reserve CSE analgesia for parous women and parturients with fast labors and a high intensity of pain. It is interesting that Gambling et al.2 showed that nulliparous women had higher pain levels than parous women, a finding that has been reported previously.9,10 thus CSE analgesia should arguably be also used for nulliparous women. Another risk of the CSE technique is the higher incidence of early fetal bradycardia or fetal heart rate abnormalities after the intraheal dose. While the etiology is not known, much of the existing evidence suggests that the phenomenon and difference are probably real.11,12 Although Gambling et al.2 and other studies have found no difference in other adverse fetal or neonatal outcomes as a result of the fetal bradykardia, these studies were typically not designed to measure these outcomes. As a result, one could argue a more rational reason for not using a CSE technique should be fetal factors, such as the presence of fetal heart rate abnormalities or fetal compromise, rather than other maternal risks for cesarean delivery.

The Gambling et al.2 article does not definitively answer all questions raised in the debate of whether traditional epidural or CSE analgesia is superior for labor analgesia, but the study adds meaningful evidence to the debate by examining the use of the 2 techniques in a private practice setting with experienced anesthesiologists. Importantly, whether an anesthesiologist practices at an academic institution or a private practice hospital, this article challenges us to consider the evidence behind our clinical practices.

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REFERENCES