Editorial

Anaesthetists should adopt a patient-centric approach to labour analgesia and embrace the combined spinal-epidural

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For many pregnant people, labour analgesia is an essential part of the childbirth experience. Nevertheless, parturients frequently report inadequacies or delays in obtaining analgesia [1]. Neuraxial labour analgesia is associated with a 14% decrease in the risk of severe maternal morbidity [2], and increasing its utilisation may contribute to improving maternal health outcomes. From the perspective of patients, achieving desired pain relief, satisfaction with pain management and experiencing a short time to achieve pain relief (reported to be of particular importance by postpartum people), is what they value from their labour analgesia choices [3].

Initially, the most apparent benefit of the combined spinal-epidural (CSE) technique was the reduction of the interval between epidural catheter placement and effective labour analgesia. It also started the `walking epidural´ revolution where only opioids were given intrathecally for early labour analgesia initiation without limiting mobility and even allowing ambulation. This was more relevant in the previous era of higher concentration local anaesthetic epidural solutions. With modern low-concentration epidural local anaesthetic regimens, every epidural is potentially an ambulatory epidural. Nevertheless, for some obstetric anaesthetists, CSE became the standard approach to provide rapid and reliable labour analgesia at all stages of labour, and the superior analgesia it provided over standard epidurals was undeniable [4–6]. However, inconclusive evidence due to heterogeneous studies suggested that CSE analgesia might cause maternal hypotension and uterine tachysystole, resulting in non-reassuring fetal heart rate tracings, though without increasing the caesarean delivery rate [7, 8]. Consequently, patients' desire for fast and effective pain relief might have been dismissed and CSE has not been universally adopted for labour analgesia.

With that in mind, the dural puncture epidural (DPE) technique was proposed as an alternative which offers unrefuted advantages over a standard epidural without the purported risk of non-reassuring fetal heart rate tracing [9, 10]. The DPE technique involves locating the epidural space with an epidural needle, then passing a spinal needle through the epidural needle to create a dural puncture with confirmation of cerebrospinal fluid (CSF). Unlike a CSE, no medications are administered through the spinal needle; it is withdrawn and the epidural catheter threaded into the epidural space. Through the catheter, traditional volumes of dilute local anaesthetic with or without an opioid are administered. Translocation of medication from the

epidural space into the CSF through the dural puncture has been hypothesised to be advantageous over traditional epidurals because of faster onset of analgesia and better sacral analgesia but without the possible complications implicated with CSE.

In recent years, the Obstetric Anaesthetists' Association developed core quality indicators in obstetric anaesthesia to support local quality improvement activities and shape institutional quality barometers [11]. The only metric targeting the quality of labour analgesia was the proportion of epidurals that provided adequate pain relief within 45 min of placement. In 2018, the Society for Obstetric Anaesthesia and Perinatology (SOAP) developed the Center of Excellence designation to recognise institutions that show excellence in obstetric anaesthesia care and to set a benchmark for expected care for pregnant people [12]. The SOAP Center of Excellence criteria include the regular provision of CSE for labour analgesia in its consideration for institutions applying for the designation. Nonetheless, defining the quality of labour analgesia is complex and there is no validated tool designed for this purpose.

In light of these challenges, the findings of a randomised study by Zang et al. regarding the quality of labour analgesia following initiation of analgesia with DPE compared with CSE [13] are of interest. The rationale for this study was to evaluate the two approaches to labour analgesia initiation with the most contemporary approach for epidural analgesia maintenance and apply a comprehensive assessment of the quality of labour analgesia. People in labour who requested neuraxial labour analgesia were allocated randomly to CSE with intrathecal bupivacaine (2 mg) and fentanyl (10 μg) or DPE with epidural ropivacaine and fentanyl (20 ml ropivacaine 0.1% plus 2 $\mu g.ml^{-1}$ fentanyl). Epidural analgesia was maintained with patient-controlled epidural analgesia (PCEA) (10 ml bolus, PCEA lockout 10 min) with programmed intermittent epidural boluses started 30 min after initiation (8 ml ropivacaine 0.1% with 2 $\mu g.ml^{-1}$ fentanyl every 45 min). The primary outcome measure was the quality of labour analgesia, which was defined as a composite of five components: an asymmetric block 30 min after initiation; any epidural top-up interventions; catheter adjustments or replacement; and failed conversion to neuraxial anaesthesia for caesarean delivery [13]. Any one of these components indicated the poor quality of labour analgesia. There were no significant differences in the primary composite outcome defined by the authors as ``*poor block quality composite*'' when at least one of five outcome measures was present (33% of patients allocated to CSE vs. 25% of those allocated to DPE; p = 0.486). Of note, a large number of patients (in both groups) received a top-up intervention for breakthrough pain. In other words, more than a quarter of all patients in this study had some component of poor-quality labour analgesia, and neither DPE nor CSE was superior in this regard.

Patient requests for supplemental analgesia, beyond self-administered PCEA boluses, can be used as a marker of quality of labour analgesia. This depends on many factors, including obstetric factors not reported by Zang et al., such as fetal head presentation and chorioamnionitis, and how the PCEA feature is explained to and used by patients [13]. In addition, how the transition from profound intrathecal analgesia to less dense epidural analgesia is explained and understood by patients can trigger requests for supplemental analgesia [14]. Reporting when the top-ups were given might have elucidated whether these were related to the transition from CSE analgesia to epidural analgesia (occurring earlier in the course of labour analgesia) or whether DPE was not providing as effective analgesia throughout labour and delivery (top-ups occurring at a later stage).

We commend Zang et al. for their focus on the quality of labour analgesia; nevertheless, we suggest these results are predictable given the method of labour analgesia delivery being compared and the metric to determine quality labour analgesia. As previously stated, the major benefit of CSE analgesia, and that desired by patients, is efficient and rapid achievement of pain relief. The spinal solution used by Zang et al. [13] is meant to deliver rapid and effective analgesia but not prolonged analgesia; that is the purpose of the epidural catheter. One might argue that the bupivacaine dose (2 mg) is a relatively lower dose than what many obstetric anaesthetists use in current practice (i.e. bupivacaine 2.5 mg), and that waiting 30 min to start the epidural medications after CSE initiation is possibly too great an interval, thereby creating a gap or trough in labour analgesia. This occurs at that point where the intrathecal portion is becoming less effective and the epidural portion has not yet become effective, essentially a crossover of the modality's analgesia effectiveness. Either way, and despite these possible shortcomings, the median pain score results 15 min after initiation were significantly lower in patients allocated to the CSE group compared with the DPE group. This confirms that CSE labour analgesia works effectively, delivering desired pain relief in a timely manner. Similar to Chau et al., patients allocated to CSE achieved lower pain scores promptly and more efficiently than DPE or traditional epidural groups [10]. In addition, as the primary outcome did not assess the quality of pain relief in the first 30 min, we

may have missed one of the most significant benefits of CSE and one that matters to patients [3].

A well-functioning, quality epidural catheter is a lifeline of the anaesthetists caring for parturients on their labour and delivery unit, treating pain, reducing the need for general anaesthesia in the event of an operative delivery and ultimately reducing maternal morbidity [2]. To reduce epidural catheter failures, confirming the catheter is in a suitable location has been a topic of interest for many years. As both techniques in the study by Zang et al. [13] pierced the dura and confirmed CSF flow, the presumed benefit of a more ideally placed epidural catheter and, subsequently, more reliable analgesia and catheter function at caesarean delivery, would be expected to be similar for both. Both techniques provided epidural catheters with comparable rates of asymmetric blocks, requiring replacement for analgesia or caesarean, or requiring an adjustment in labour. The composite outcome metric of the quality of labour analgesia used in this study might have shown differences in outcomes between traditional epidural placement and CSE or DPE but was unlikely to determine differences between the two techniques with a dural puncture. Zang et al. have substituted the quality of the procedure for the quality of labour analgesia [13].

Quality of provided labour analgesia should focus ideally on patient-reported outcomes and experience metrics, rather than solely on interventions aiming to manage possible suboptimal analgesia and/or poorly functioning epidural catheters. With a patient-centric approach, the onset of analgesia, quality of analgesia during the first and second stages of labour, and satisfaction with interventions should be measured. In the study by Zang et al., the onset of analgesia was only captured partially, interventions were reported but the overall dose of local anaesthetics used (albeit not a patient-centred outcome) was not, which might have yielded interesting data to compare the two techniques [13].

We commend Zang et al. [13] for providing more evidence that techniques piercing the dura are equally safe. The most frequent barrier to the widespread use of CSE analgesia is the fear of increased incidence of adverse effects. The proclivity of patients for better labour analgesia continues to be dismissed despite a lack of conclusive evidence suggesting that CSE analgesia results in a greater frequency of non-reassuring fetal heart rate tracings that may be consequential to the health of the newborn. Zang et al. [13] did not observe any significant differences between the CSE and DPE in the incidence of fetal heart rate changes; pruritus following initiation of analgesia with intrathecal fentanyl 10 μg; maternal hypotension; or motor block (a concern with intrathecal bupivacaine). Administering a balanced (local anaesthesia and opioid), low-dose CSE enables rapid-onset analgesia with minimal adverse effects. If there are not fewer adverse effects with DPE, and analgesia is achieved sooner with CSE, in a patient-centric world, we must conclude that CSE is superior to DPE. The question at hand is should we continue to compare these two techniques? If DPE has no analgesic advantage over CSE and with no increase in adverse outcomes for mother or baby, we would suggest that we can finally say that CSE is simply the superior technique to initiate labour analgesia. One question remains: will this move the needle, and will anaesthetists now adopt and embrace CSE for labour analgesia without apprehension?

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References

1. Yurashevich M, Carvalho B, Butwick AJ, Ando K, Flood PD. Determinants of women's dissatisfaction with anaesthesia care in labour and delivery. *Anaesthesia* 2019; **74**: 1112–20. https://doi.org/10.1111/anae.14756.
2. Guglielminotti J, Landau R, Daw J, Friedman AM, Chihuri S, Li G. Use of labor neuraxial analgesia for vaginal delivery and severe maternal morbidity. *JAMA Netw Open* 2022; **5**: e220137. https://doi.org/10.1001/jamanetworkopen.2022.0137.
3. Harding A, George RB, Munro A, Coolen J, Snelgrove-Clarke E, Carvalho B. Patient preferences for outcomes associated with labor epidural analgesia. *Cureus* 2022; **14**: e22599. https://doi.org/10.7759/cureus.22599.
4. Van de Velde M, Teunkens A, Hanssens M, Vandermeersch E, Verhaeghe J. Intrathecal sufentanil and fetal heart rate abnormalities: a double-blind, double placebo-controlled trial comparing two forms of combined spinal epidural analgesia with epidural analgesia in labor. *Anesth Analg* 2004; **98**: 1153–9. https://doi.org/10.1213/01.ANE.0000101980.34587.66.
5. 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; **352**: 655–65. https://doi.org/10.1056/NEJMoa042573.
6. Gambling D, Berkowitz J, Farrell TR, Pue A, Shay D. A randomized controlled comparison of epidural analgesia and combined spinal-epidural analgesia in a private practice setting: pain scores during first and second stages of labor and at delivery. *Anesth Analg* 2013; **116**: 636–43. https://doi.org/10.1213/ANE.0b013e31827e4e29.
7. Mardirosoff C, Dumont L, Boulvain M, Tramer MR. Fetal bradycardia due to intrathecal opioids for labour analgesia: a systematic review. *BJOG* 2002; **109**: 274–81. https://doi.org/10.1111/j.1471-0528.2002.01380.x.
8. Hattler J, Klimek M, Rossaint R, Heesen M. The effect of combined spinal-epidural versus epidural analgesia in laboring women on nonreassuring fetal heart rate tracings: systematic

review and meta-analysis. *Anesth Analg* 2016; **123**: 955–64. https://doi.org/10.1213/ANE.0000000000001412.
9. Cappiello E, O'Rourke N, Segal S, Tsen LC. A randomized trial of dural puncture epidural technique compared with the standard epidural technique for labor analgesia. *Anesth Analg* 2008; **107**: 1646–51. https://doi.org/10.1213/ane.0b013e318184ec14.
10. Chau A, Bibbo C, Huang CC, et al. Dural puncture epidural technique improves labor analgesia quality with fewer side effects compared with epidural and combined spinal epidural techniques: a randomized clinical trial. *Anesth Analg* 2017; **124**: 560–9. https://doi.org/10.1213/ANE.0000000000001798.
11. Bamber JH, Lucas DN, Plaat F, et al. The identification of key indicators to drive quality improvement in obstetric anaesthesia: results of the Obstetric Anaesthetists' Association/National Perinatal Epidemiology Unit collaborative Delphi project. *Anaesthesia* 2020; **75**: 617–25. https://doi.org/10.1111/anae.14861.
12. Carvalho B, Mhyre JM. Centers of Excellence for Anesthesia care of obstetric patients. *Anesth Analg* 2019; **128**: 844–6. https://doi.org/10.1213/ANE.0000000000004027.
13. Zang H, Padilla A, Pham T, et al. Combined spinal-epidural vs. dural puncture epidural techniques for labour analgesia: a randomised controlled trial. *Anaesthesia* 2024. Epub. https://doi.org/10.1111/anae.16433.
14. Goodman SR, Smiley RM, Negron MA, Freedman PA, Landau R. A randomized trial of breakthrough pain during combined spinal-epidural versus epidural labor analgesia in parous women. *Anesth Analg* 2009; **108**: 246–51. https://doi.org/10.1213/ane.0b013e31818f896f.