Obstetric Neuraxial Anesthesia Contraindicated? Really? Time to Rethink Old Dogma

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Neuraxial anesthesia is the "gold standard" for safe, effective pain relief during labor and delivery. Most women in labor who desire this form of pain relief, and have access to qualified providers, are indeed able to receive it. Legitimate medical contraindications are unusual. Nonetheless, concern does exist in some circumstances. In this issue of *Anesthesia & Analgesia*, 2 articles address 2 common situations wherein anesthesiologists may have concerns about the safety and efficacy of neuraxial techniques for labor analgesia and for cesarean delivery anesthesia. The results of these studies provide some reassurance of the safety and efficacy of neuraxial procedures in patients with mild thrombocytopenia and prior spine surgery.

Goodier et al.[1] address the very common and controversial issue of the minimal platelet count required for the safe administration of neuraxial anesthesia. This multisite, retrospective analysis of 102 epidural and 71 spinal procedures in women with platelet counts <100,000/mm^3 showed no instances of spinal or epidural hematoma. Combining the data from this study with those of previously published similar studies, and using standard zero numerator calculations, the investigators estimate with 95% confidence that the true incidence of spinal or epidural hematoma is <0.6% in the setting of platelet count <100,000/mm^3. Although an incidence <1 in 1500 is reassuring, the level of risk most patients are willing to accept depends on the seriousness of the complication under consideration, and spinal hematoma can lead to very serious consequences. Spinal hematoma, and the possible serious consequences thereof, is indeed a feared outcome. One can never say "zero risk," but these data are suggestive that the actual risk, even for this feared complication, is low. Goodier et al.[1] expanded their analysis by calculating a stratified level of risk based on the severity of thrombocytopenia. Not surprisingly, the confidence in their estimates diminished as platelet count decreased because there were many fewer patients with extreme degrees of thrombocytopenia.

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Clinicians concerned about the risks of neuraxial techniques for obstetric patients with thrombocytopenia must also consider the risks of avoiding neuraxial anesthesia. Goodier et al.[1] noted a 6.5% rate of serious complications (1 aspiration, 3 instances of prolonged intubation, and 1 hemoptysis) in their cohort of patients with thrombocytopenia who did not receive neuraxial anesthesia and who received general anesthesia instead.

The threshold platelet count to ensure safe neuraxial analgesia is one of the most commonly asked questions among anesthesiologists and obstetricians as well as various medical consultants. Can we resort to national societal guidelines for guidance? Unfortunately, no. The American Society of Anesthesiologists Practice Guidelines for Obstetric Anesthesia state: "A specific platelet count predictive of neuraxial anesthetic complications has not been determined. The anesthesiologist's decision to order or require a platelet count should be individualized and based on a patient's history, physical examination, and clinical signs. A routine platelet count is not necessary in the healthy parturient."[2] Other societies such as the American Society of Regional Anesthesia and Pain Medicine and the Society for Obstetric Anesthesia and Perinatology, and even hematology societies, despite extensive guidance on a wide variety of other issues related to altered coagulation (both intrinsic and pharmacological), are no more specific about the platelet number threshold for safe neuraxial techniques. The reason is that we just do not know! I recall as a resident in the 1980s, we used an absolute cutoff value of 100,000/mm^3.

Today, most clinicians, myself included, agree that we can go lower, probably much lower, and still provide safe anesthesia, but just how much lower is not clear. My own institution does not have a formal definitive cutoff value of platelet count for neuraxial anesthesia, but our clinicians are generally comfortable above approximately 70,000/mm^3. Risk–benefit ratios in the setting of low platelet count may be considered a flexible platelet count range. For example, >70 to 80,000/mm^3, neuraxial anesthesia is generally considered safe. In the range or 50 to 70,000/mm^3, a more careful assessment of the individual patient-related circumstances must be considered, and <50,000/mm^3, the risk–benefit ratio usually, but not always, favors avoidance of neuraxial anesthesia. Perhaps, in conjunction with clinical circumstances, a platelet count of <100,000/mm^3 should be considered an early trigger for further screening. However, this is just a modest proposal. Our confidence in these numbers and consequences thereof, especially at the lower end of the

range, is very low. There may be situations (e.g., emergent cesarean delivery in a preeclamptic patient with a full stomach and nonreassuring airway) in which risk of general anesthesia is sufficiently high that single-shot spinal anesthesia is safer than general anesthesia, despite extreme degrees of thrombocytopenia. Different experts may offer different specific thresholds for these ranges, but most agree about the general idea of a stratified risk–benefit analysis.

A related, and probably even more important matter, is platelet function. Goodier et al.[1] only examined platelet count; there were no attempts made to quantify platelet function. The American Society of Anesthesiologists guidelines cited earlier imply that consideration of "history, physical examination, and clinical signs" is a meaningful surrogate marker for platelet function.[2] For example, most clinicians, myself included, will have a different level of concern in a patient with a platelet count of 70,000/mm^3 with severe preeclampsia and extensive bruising than in an asymptomatic patient with the same platelet count with long-standing and stable idiopathic thrombocytopenic purpura. Perhaps our emphasis on platelet count is because this parameter is easy to measure. In other words, we measure what we can, not what really matters. Assessment of platelet function is complex. Various quantitative methods of platelet function analysis, including, but not limited to, thromboelastography and other tools for platelet function analysis, are not widely available, appreciated, or even understood by many clinicians. In the future, increasing emphasis on platelet function, rather than an absolute count, will enable more sophisticated clinical decision-making.

We know that the occurrence of epidural hematoma in parturients is exceedingly rare. A "perfect storm" of platelet dysfunction in the setting of rapidly declining platelet counts and traumatic technique may be required for this devastating complication to evolve. Thus, extremely large numbers of patients in this clinical setting will need to be studied to further define risk. Goodier et al.[1] conclude with a call for a national registry of procedures performed in thrombocytopenic patients. However, given the relatively low incidence of significant (i.e., severe) thrombocytopenia, as noted by Goodier et al.,[1] and reluctance of some clinicians to perform neuraxial anesthesia in these patients, such a registry may not be forthcoming in a near timeframe.

Another common clinical scenario in which neuraxial techniques are often controversial is the patient with a history of surgical correction of scoliosis. In this issue of *Anesthesia & Analgesia*, Bauchat et al.[3] studied 41 women in labor with a history of surgical correction of scoliosis, in whom neuraxial analgesia was attempted. Some clinicians consider neuraxial anesthesia to be relatively or even absolutely contraindicated in these patients. Previous reports indicate a success rate for neuraxial techniques of approximately 50% in this patient population.[4] Bauchat et al.[3] asked 2 important questions. (1) Can it be done? and (2) Does it work? Their 41 patients were compared with a control group of 41 healthy women who received the next neuraxial procedure by the same trainee who attempted the anesthetic on the surgically corrected back. Their findings are very reassuring.

The answer to the question "Can it be done?" is a resounding "yes," but it is usually more difficult than in a nonsurgically instrumented back. Satisfactory analgesia on the first attempt was achieved in 88% of the spinal instrumentation group. No failures were noted in the healthy group. The mean time to complete the procedure was longer (6.5 vs 4.6 minutes) in the spinal surgery group, and there were more needle redirections, more need to change to another intervertebral space, and more need to turn over the procedure to a more experienced practitioner. Nonetheless, a 12% failure rate is significantly less than the approximately 50% failure rate often quoted in older studies in this patient population. Ultrasound guidance was not used, and the possible assistance of ultrasound in this patient population remains to be evaluated.

Regarding "Does it work?," the answer also seems to be "yes." Hourly bupivacaine consumption and the ability to achieve satisfactory pain relief did not differ between the instrumented and the healthy back groups. Thus, if you can site the epidural catheter correctly in the epidural space, and usually you can, it seems to work in an appropriate manner.

So why were Bauchat et al.[3] able to achieve such a high success rate in this challenging patient population when others have not? Perhaps they are just really good at what they do. Could a slightly different needle design compared with previous years have contributed to their success? Unlikely, because needles have not changed much over the years. An intriguing possibility is that newer spinal surgical correction techniques have evolved in a manner that increases the likelihood of successful neuraxial anesthesia. As noted by Bauchat et al., newer surgical techniques may spare the lower lumbar segments and epidural space and achieve better spinal derotation while preserving midline access to the epidural space. This may allow for a more accessible epidural space and less scar tissue within the space compared with older surgical approaches. Only a small percentage of the patients in this investigation had operative notes available to confirm the specific surgical procedure; thus, ascribing their success rates to changing spinal surgical techniques remains speculative at present. Nonetheless, these results are very reassuring that at least one should offer and attempt neuraxial labor analgesia in patients who have had scoliosis surgery if desired by the patient. It may be more difficult to do, but usually it can be done. No longer should these patients be denied an attempt at neuraxial analgesia simply because they have had surgical spinal instrumentation.

Recent literature supports the use of neuraxial anesthesia in a variety of other clinical situations previously considered relative or absolute contraindications. Examples include the following:

a. Not too long ago, any type of neuraxial anesthesia was considered risky in patients with severe preeclampsia, and even more recently, even spinal anesthesia was considered something to approach with caution. The fear was that the sympathetic block would result in profound and refractory maternal hypotension with adverse consequences to the mother and baby. Good evidence now shows that both epidural and

spinal anesthesia can be used with a high degree of safety in the setting of severe preeclampsia. In fact, maternal hemodynamic perturbations seem to be less profound in mothers with preeclampsia compared with healthy pregnant women.[5]

b. Many patients with severe, complex cardiac disease have been denied neuraxial anesthesia, especially for cesarean delivery. Now, an innovative modification referred to as the "sequential combined spinal–epidural" allows safe use with minimal hemodynamic alteration in mothers with even the most severe cardiac conditions.[6]

c. Many patients with multiple sclerosis have been denied neuraxial anesthetic techniques for fear of local anesthetic-induced exacerbation of this neural demyelinating condition. Current evidence indicates that such fear is likely unfounded, and these patients can receive neuraxial anesthesia if they so desire.[7]

d. Many obstetric patients with Chiari malformation type 1, decompressed or not, have been denied neuraxial anesthesia for fear of dural puncture-induced alteration in cerebrospinal fluid pressure and/or flow and the potential neurologic consequences. Such a complication is largely theoretical, and multiple recent reports indicate that in most circumstances, these patients can indeed safely receive neuraxial techniques. Obviously, a case-by-case approach, with appropriate caution, is warranted. However, the general fear among some clinicians, both anesthesiologists and our neurological and neurosurgical colleagues, regarding neuraxial anesthesia does not seem to be evidence-based.[8,9]

A common theme in all these conditions is echoed by the findings of Goodier et al.,[1] who noted serious complications related to general anesthesia. All these conditions are ones for which the risks of general anesthesia, including laryngoscopy and endotracheal intubation, may very well outweigh any either real or theoretical risks of neuraxial anesthesia.

This is all good news for women who wish to receive neuraxial techniques for childbirth. Although we still do not know the absolute lower limit of platelet count that is "safe," it does seem to be lower than the commonly quoted threshold of 100,000/mm^3, and platelet function must be considered. Patients with surgical instrumentation of their spine can indeed be offered neuraxial analgesia, and most of the time, it works. Anesthesiologists need to maintain a healthy respect for various medical conditions that may impart risk related to neuraxial anesthesia. However, many medical conditions that were deemed relative or absolute contraindications to the use of neuraxial anesthesia (often with minimal or no evidence) have now been shown to be compatible with safe neuraxial use. The findings reported in this issue of *Anesthesia & Analgesia* by Goodier et al.[1] and Bauchat et al.[3] are such examples. A cautious approach is always prudent. However, when patients with relative contraindications to a neuraxial technique are encountered, updated outcome data and the alternate risks of general anesthesia must be considered.

DISCLOSURES

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