

If you don't peep, you may shriek! Ultrasound for regional anesthesia in preeclampsia

Despite the strides in the maternal healthcare delivery systems, hypertensive disease of pregnancy claims a greater proportion of maternal mortality related to childbirth, competing with maternal hemorrhage. In the developed world it is the leading cause of maternal death in some countries.^[1] Multiple etiological theories have been proposed, hence the best strategy right now seems to be to prevent target organ damage and avoid interventions which are associated with a higher risk of complications.

One source of morbidity and mortality in this disease is the intervention to provide labor pain relief or anesthesia for cesarean section (CS). Coagulopathy and thrombocytopenia associated with severe preeclampsia and HELLP (Hemolysis, Elevated Liver enzymes, and Low Platelet count) syndrome make the performance of regional anesthesia a high risk procedure. As documented by Huang *et al.*, general anesthesia for CS delivery when compared with neuraxial anesthesia in preeclamptic women is associated with increased risk of stroke.^[2] Apart from the higher risk of airway management entailed in a pregnant woman, patients with preeclampsia carry a higher risk of difficult airway management secondary to airway edema and risk of bleeding into the airway. Avoidance of general anesthesia under these circumstances seems to be intuitive. Provision of neuraxial anesthesia at the earliest appropriate time in a parturient diagnosed with preeclampsia before signs and symptoms of HELLP syndrome set in may help obviate the need for general anesthesia if emergent delivery is indicated.

Of most concern, related to performance of neuraxial procedure in preeclamptic patients is the development of epidural hematoma. Incidence of this complication is so low that it is difficult to comment on the relative risk of developing an epidural hematoma when the coagulopathy is from severe preeclampsia compared to another cause. There are many clinical situations where if a more precise and safe method of

conducting a regional technique was available; the physician may choose to employ this technique over a decision to resort to any other way of providing labor pain relief or general anesthesia.

Ultrasound may provide extra help to the anesthesiologists. Development of more compact and affordable ultrasound machines that match the imaging quality of larger units has made point-of-care ultrasonography an invaluable tool in diagnostic and therapeutic realms.^[3] In this issue Saravanan *et al.*,^[4] suggest use of this tool to make the clinician's job easier and patient care safer for this challenging group of patients. A noninvasive method of estimating the site, direction and depth of insertion of the epidural needle has been shown to decrease the number of attempts needed to find the epidural space.^[5] Theoretically this may be extrapolated into a belief that decreasing the number of attempts required for a successful regional block will lead to a decreased chance of injuring a vessel in the epidural space, thus decreasing the incidence of epidural hematoma. As the incidence of epidural hematoma is so low that conduction of a randomized controlled trial is near impossible, it can be theorized that any technique that reduces the number of attempts needed to perform a successful regional anesthetic will be helpful in decreasing the incidence of complications. Whether that will translate into decrease in the anxiety of the physician enough that he/she will feel comfortable deciding to perform regional anesthesia in patients with borderline coagulation status which they would not have attempted otherwise! This in turn will lead to decrease in the need of emergent general anesthesia thereby decreasing the overall morbidity and mortality related to this condition.

Analysis of this thought process indicates some flaws. Firstly, ultrasound does not help visualize vessels in the epidural space *per se*, so does not help the practitioner avoid the injury to these vessels, which is the basis of the bleeding leading to hematoma formation. Secondly, degree of coagulopathy and thrombocytopenia that precludes regional anesthesia is not well-defined. So, increment of benefit accrued by attempting a new technique that may reduce the risk of that technique marginally is also marginal and open to the interpretation of the clinician. Thirdly, most of the physicians are not familiar with the use of ultrasound in general and for regional anesthesia technique in particular. Education and training will have to be provided before physicians can

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feel comfortable using this modality. First step seems to be acceptance of ultrasound for regional anesthesia in general, to learn and get comfortable with this technique, before performing it on a higher risk population. It is imperative that future research focuses on the safety outcomes in regard to reduction in complications and ease of epidural placement with the use of ultrasound in these high risk obstetric parturients.

In conclusion, ultrasound guided performance of regional anesthesia is an attractive option for high risk parturient as in preeclampsia, but its benefit has to be quantified as yet. As in other fields of medicine ultrasound has proven itself to be a valuable diagnostic and therapeutic adjunct in providing improved patient care, its use may reduce the morbidity and mortality associated with hypertensive diseases of pregnancy.

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