How should we measure platelet count before central neuraxial blockade in parturients with thrombocytopenia?

Patients with low platelet counts are a concern to the obstetric anaesthetist as, although rare, there is a risk of a spinal epidural haematoma following central neuraxial blockade. Although conventional plasma-based tests are frequently used to guide central neuraxial blockade in patients with thrombocytopenia, interest in the use of viscoelastic haemostatic assays is increasing.

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Introduction

Thrombocytopenia is defined as a blood platelet count below 150 g/dl and complicates 7–10% of all pregnancies (Ciobanu et al, 2016). Common causes of low levels of platelets in pregnancy include gestational and immune-mediated thrombocytopenia, or thrombocytopenia associated with hypertensive disorders, such as pre-eclampsia. Thrombocytopenia is a concern to the obstetric anaesthetist as, although rare, there is a risk of a spinal epidural haematoma following central neuraxial blockade which can lead to cord compression. The exact minimum platelet count to ensure safe central neuraxial blockade is subject to much debate; however, many guidelines have chosen the threshold platelet count to be ≥70 g/dl (Bauer et al, 2021).

Although conventional plasma-based tests, such as coagulation screens and platelet values, are frequently used to guide central neuraxial blockade in patients with thrombocytopenia, interest is increasing in the use of viscoelastic haemostatic assays. These assays, which include rotational thromboelastometry and thromboelastography, have the potential to help the obstetric anaesthetist with decision making as they provide comprehensive, rapid and real-time data on coagulation and fibrinolysis (Selby, 2020). Considering this, how should platelet count be measured before central neuraxial blockade in an obstetric patient with thrombocytopenia?

Viscoelastic haemostatic assays

Viscoelastic haemostatic assays assess clot strength, formation and dissolution by measuring the effect of a continuously applied rotational force on whole blood. This rotational force is transmitted to either an optical detection system (rotational thromboelastometry), or an electromechanical transduction system (thromboelastography) (Selby, 2020). By using a whole blood global assay instead of a plasma-based assay, viscoelastic haemostatic assays are seen as more physiological and provide comprehensive insight into the activity of the fibrinolytic system, and interactions between the cellular and plasma components of whole blood. In addition, viscoelastic haemostatic assays only require small volumes of blood and allow serial testing to closely monitor the evolving clinical situation.

Viscoelastic haemostatic assays have the potential to guide safe anaesthesia in obstetric emergencies and it was reported that patients with platelet counts as low as 56 g/dl can safely receive central neuraxial blockade during pregnancy, provided viscoelastic haemostatic assay results are normal (Huang et al, 2014). Therefore, viscoelastic haemostatic assays allow more thrombocytopenic parturients access to the benefits of regional anaesthesia. This can be incredibly valuable in conditions such as rapidly evolving pre-eclampsia, where general anaesthetic can result in considerable maternal morbidity (Bauer et al, 2021).

Conventional plasma-based tests

Although viscoelastic haemostatic assays have several advantages, their use requires adequate training of staff to maintain high quality results. They also require regular use,

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calibration and knowledge of how to interpret the results, which consist of both numerical and graphical values. They are relatively expensive and currently the only available randomised control trial to justify the use of viscoelastic haemostatic assays in obstetrics is to guide blood product therapy in post-partum haemorrhage (Collins et al, 2017). In contrast, conventional plasma-based tests, such as platelet count and general coagulation screens, are widely available, relatively cheap and are able to perform batch analyses (enabling multiple samples to be tested at once). They have long been used to guide safe neuraxial blockade in patients with thrombocytopenia and technical advances have improved the accuracy of the platelet count. However, conventional plasma-based tests take much longer to perform and provide less pertinent data about coagulopathy. Furthermore, a large multicentre study showed that most analysers overestimated the platelet count in patients with severe thrombocytopenia (Segal et al, 2005) which questions the validity of these results in high-risk patients.

Conclusions

The decision about whether to proceed with central neuraxial blockade in an obstetric patient with thrombocytopenia occurs within a clinical context and often with time constraints. Overall, the risks of a spinal epidural haematoma with a central neuraxial blockade must be weighed against the consequences of withholding central neuraxial blockade and/or proceeding with general anaesthetic. Current guidelines focus mainly on conventional plasma-based tests, but evidence shows that using viscoelastic haemostatic assays may lead to improved decision making about the safety of central neuraxial blockade by providing a comprehensive picture of haemostasis. Furthermore, the real-time, rapid assessment of viscoelastic haemostatic assays is a major advantage in obstetrics and may allow more women to benefit from regional anaesthesia. Further large, multicentred, randomised control trials are needed regarding the use of viscoelastic haemostatic assays and conventional plasma-based tests in guiding safe central neuraxial blockade. Until then, a decision based on the patient's overall clinical condition, alongside shared decision making with obstetricians and the patient, should always be made in conjunction with these results.

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