Letters to the Editor

Role of Platelet Concentration in Bleeding Complications of Interventional Techniques

To the Editor:

The authors of the recent publication, "Responsible, safe, and effective use of antithrombotics and anticoagulants in patients undergoing interventional techniques: American Society of Interventional Pain Physicians (ASIPP) Guidelines" (1) have received queries pertaining to the recommended absolute platelet count necessary to perform interventional pain procedures. Similar to other society guidelines (2), the ASIPP guidelines did not provide specific recommendations regarding platelet requirements for procedures. The authors discussed the recommended international normalized ratio for low, medium, and high-risk procedures, but did not provide recommendations for platelet count.

We acknowledge the omission was an important one, which we hope will be corrected during the next update. In reference to platelet count, the normal concentration of platelets in the blood is between 140,000 and 445,000 per µL. The platelet count is an extremely important routine investigation, as platelet deficiency, thrombocytopenia will increase bleeding tendency (3,4). Thrombocytopenia is defined as a platelet count of < 150,000 per µL. Further, platelet counts may be misleading as a platelet count performed by an automated cell counter may erroneously read a low platelet count due to pseudothrombocytopenia. Consequently, pseudothrombocytopenia may occur owing to formation of platelet clumps with clumping occasionally occurring in blood samples that are drawn in ethylenediaminetetraacetic acid anticoagulant tubes (4). Thus, to avoid such errors in the diagnosis, a peripheral blood smear should be examined, and a repeat blood sample should be redrawn in tubes containing a different anticoagulant, such as citrate of heparin (5).

There is no literature in reference to thrombocytopenia and spinal interventional techniques; however, there is significant discussion in the literature and reports of epidural hematoma related to neuraxial anesthesia, specifically in parturients with thrombocytopenia (6-9). Goodier et al (6) reported no cases of spinal hematoma in 102 thrombocytopenia parturients receiving epidural analgesia or 71 receiving spinal anesthesia. Their design included a multicenter retrospective cohort study to estimate the risk for spinal-epidural hematoma in parturients with a platelet count of < 100,000 per µL receiving neuraxial anesthesia, and the risk of complications in thrombocytopenic parturients who received general anesthesia. Including data from previous published series with a total of 499 patients, the exact binomial 95% confidence interval (CI) for the risk of spinal-epidural hematoma was 0% to 0.6%. Lee et al (7) published the results of risk of epidural hematoma after neuraxial techniques in thrombocytopenic parturients in a report from the Multicenter Perioperative Outcomes Group. They stratified patients by platelet count, and those requiring surgical decompression were also identified. They also performed a systematic review and risk estimates with those from the existing literature. The results showed 573 parturients with a platelet count of < 100,000 µL who received neuraxial techniques across 14 institutions. In addition, a total of 15,024 parturients were identified after combining the data from the systematic review. There were no cases of epidural hematoma requiring surgical decompression. The upper bound of the 95% CI for the risk of epidural hematoma for a platelet count of 0 to 49,000 µL was 11%, for 50,000 to 69,000 µL was 3%, and for 70,000 to 100,000 µL was 0.2%. Levy et al (9) described results of a retrospective analysis of neuraxial block for delivery among women with low platelet counts. They reported that during the study period, 471 of 45,462 women or 1% had a low platelet count or < 100,000 per µL. The rate of neuraxial block was significantly higher in women with platelet counts of 70,000 to 99,000 per µL with 71% when compared with women with platelet counts of 50,000 to 69,000 per µL and 0 to 49,000 per µL, 39% and 28%, respectively. There were no cases of spinal epidural hematoma or any other neurologic complications recorded among the 308 women who received neuraxial blocks in this cohort. They concluded that the risk of hematoma is low if the platelet count

Table 1. *Classification of interventional techniques based on the potential risk for bleeding.*

Low-Risk Procedures	Intermediate-Risk Procedures*	High-Risk Procedures*
1. Trigger point and muscular injections (including piriformis injection) 2. Peripheral joints 3. Peripheral nerve blocks 4. Sacroiliac joint and ligament injections and nerve blocks 5. Caudal epidural injections 6. Ganglion impar blocks	1. Facet joint interventions (intraarticular injections, nerve blocks and radiofrequency neurotomy) 2. Lumbar transforaminal epidural injections at L4, L5, S1 3. Lumbar intradiscal procedures 4. Hypogastric plexus blocks 5. Lumbar sympathetic blocks 6. Peripheral nerve stimulation trial and implant 7. Pocket revision and implantable pulse regenerator/ intrathecal pump replacement 8. Caudal percutaneous adhesiolysis 9. Lumbar percutaneous disc decompression (L4/5 or below) 10. Lumbar vertebral augmentation (below L4) 11. Intervertebral spinous prosthesis 12. Lumbar discography 13. Lumbar interlaminar epidural injections at L5-S1	1. Cervical, thoracic, and high lumbar (above L4-L5) interlaminar epidurals 2. Cervical, thoracic and lumbar above L3 transforaminal epidural injections 3. Spinal cord stimulator trial and implant 4. Percutaneous adhesiolysis with interlaminar or transforaminal approach 5. Percutaneous disc decompression (above L4/5) 6. Sympathetic blocks (stellate ganglion; thoracic splanchnic, celiac plexus) 7. Thoracic and cervical intradiscal procedures 8. Vertebral augmentation, lumbar (above L4), thoracic and cervical 9. Intrathecal catheter and pump implant 10. Interspinous prosthesis and MILD®

*Patients with high risk of bleeding (e.g., old age, history of bleeding tendency, concurrent uses of other anticoagulants/antiplatelets, liver cirrhosis or advanced liver disease, and advanced renal disease) undergoing low or intermediate-risk procedures should be treated as intermediate or high risk, respectively.

Source: Kaye AD, et al. **Responsible, safe, and effective use of antithrombotics and anticoagulants in patients undergoing interventional techniques: American Society of Interventional Pain Physicians (ASIPP) guidelines.** Pain Physician 2019; 22:S75-S128 (1

is < 100,000 per μL, specifically between 70,000 and 99,000 per μL.

Consequently, the obstetric literature shows that maternal thrombocytopenia defined as a platelet count < 150,000 per μL is not uncommon among the term pregnant women with a prevalence of 6% to 11.6% in the third trimester. Thus, thrombocytopenia is considered a relative contraindication to neuraxial analgesia because of the unknown risk of hematoma. There are limited data suggesting that epidural hematoma in obstetric patients appear to be rare, possibly because of the physiologic hypercoagulability of pregnancy and the generally high compliance of the epidural space in parturients (10-13). Further, the American College of Obstetricians and Gynecology Thrombocytopenia in Pregnancy Practice Bulletin concluded that neuraxial techniques are acceptable in parturients with platelet counts > 80,000 per μL. In contrast to estimated overall risk of epidural hematoma associated with neuraxial techniques in obstetric patients to be approximately 1 in 200,000, the risk of epidural hematoma in thrombocytopenic parturients following neuraxial techniques seems to be nonexistent, although its understanding is still evolving (13,14).

Therefore, based on our literature review, the generally accepted absolute platelet count for general surgery procedures, including open and laparoscopic techniques, is > 50,000 μL (3). Neurosurgical, ocular, and inner ear surgeries typically recommend a platelet count of > 100,000 μL. The recommended platelet count for epidural or spinal anesthesia is > 80,000 μL. Pursuant to these generally accepted levels, for low to medium-risk procedures the authors recommend a platelet count of > 80,000 μL, and for high-risk procedures we recommend a platelet count of > 100,000 μL. The categorization of procedures by risk level are shown in Table 1. Of note, patients with high risk of bleeding who are undergoing low or intermediate-risk procedures should be treated as intermediate or high risk. However, as stated in guidelines, these recommendations are not intended to replace clinical judgement and should not supplant individual interpretation of each scenario based on patient-specific pharmacology and medical history.

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