In Response
Risk-Based Guidance on Thrombotics is Essential!

In Response:

We appreciate the letter from Miller, Schneider, and McCormick in reference to the American Society of Interventional Pain Physicians (ASIPP) guidelines (1) of antithrombotics and anticoagulants of interventional techniques. Rightfully, they have described multiple factors and cautioned withholding antithrombotic and antiplatelet agents for interventional spine procedures and the need for further risk stratification. We agree, yet in a large principle, that lumbar transforaminal epidural injections, not necessarily steroid injections as steroids are not used all the time, should be classified as low risk rather than moderate risk. We attempted to do this based on the literature; however, there was dissent among the authors. We were unable to reach a unanimous consent; consequently, we classified as moderate risk. However, our table of recommendations clearly shows for low risk and moderate risk interventional techniques the wording, "may continue" for aspirin, antiplatelet agents, and antiplatelet aggregate inhibitors. Further, ASIPP guidelines also recommend for low-risk procedures international normalized ratio (INR) of < 3 and may continue thrombin inhibitors, anti-xa agents, thrombolytic agents, GPIIb/IIIa inhibitors, and other agents such as fondaparinux. In contrast, the American Society of Regional Anesthesia and Pain Medicine (ASRA) guidelines (2) recommend stopping nonsteroidal anti-inflammatory drugs (NSAIDs), any product containing aspirin, even for low risk procedures, and further, they do not include caudal epidural injections in low-risk procedures. Essentially, multiple authors felt that facet joint interventions and lumbar transforaminal epidural injections, however, we were unable to reach consensus on this issue.

To elaborate on the issue of guidance and the risk, Miller et al in their letter point out accurately that the risk of thrombotic events are higher than the risk of bleeding, as it is well-known that interventional procedures are not emergency interventions and there is always debate in reference to their effectiveness (3-9), cost utility (10-13), and use (14-18). As ASIPP guidelines show, the majority of the epidural hematomas were related to patients either not on anticoagulant therapy (N = 19) or anticoagulants discontinued (N = 11), with a total of 30 in this group; whereas, there were only 8 reports in which anticoagulants were continued. This clearly illustrates discordance in recommendations of various guidelines. In fact, Manchikanti et al (19) initially pointed out the issues related to antiplatelet and anticoagulant therapy discontinuation and associated risks. Consequently, they conducted an assessment of practice patterns of perioperative management of antiplatelet and anticoagulant therapy in interventional pain management. This survey also showed significant thromboembolic events that were 3 times more frequent than bleeding complications, with 162 thromboembolic events and 55 serious bleeding complications. However, one of the drawbacks of this assessment was that it was not a prevalence study, it was only a retrospective survey of practice patterns.

Manchikanti et al (20) also performed a prospective evaluation of bleeding risk of interventional techniques in chronic pain. They showed that approximately one-fourth of patient encounters were receiving some type of antithrombotic therapy. Among these, approximately 55% or 1,711 encounters, antithrombotic therapy was continued during the interventional techniques, whereas for 45% or 1,376 encounters antithrombotic therapy was discontinued. They showed no significant difference between the 2 groups irrespective of whether antithrombotic therapy was discontinued or continued. In this study, cervical epidural injections were also performed with continuation of aspirin as well as clopidogrel and combinations of aspirin and other antithrombotics. Overall, this prospective assessment showed no incidents of epidural hematoma with any of the procedures. Further, they also have published multiple manuscripts as quoted in ASIPP guidelines that were not related to continuation of antithrombotic therapy.

We also understand and appreciate a need for an evidence-based guideline on management of antithrombotic therapies in the setting of interventional spine procedures that include risk stratification according to procedure-specific risk of epidural hematoma, thrombotic risk of thrombotic or antithrombotic therapy is withheld for a given procedure, and patient-specific risk assessment that accounts for factors influencing

Table 1. *Technique-related bleeding risk factors and corresponding score.*

Risk factors associated with technique	Score
Proximity to significant vascular structures	1
Proximity to significant neurological structures	1
Target in a confined space	1
Use of a sharp, rather than blunt needle to reach target	1
Multiple passages	1
Contrast not used, if applicable	1
Fluoroscopy not used, if applicable	1
Aspiration not performed or presence of blood at needle hub	1
Needle size: larger than 20 gauge	1
Continuous, not single shot procedure	1

Source: Raj PP, et al. Bleeding risk in interventional pain practice: Assessment, management, and review of the literature. *Pain Physician* 2004; 6:3-51 (21).

Table 2. *Technique-related bleeding risk score (TBR) and risk stratification*

Overall score	0-4	5-6	7-10
Overall risk stratification	Low	Medium	High

Source: Raj PP, et al. Bleeding risk in interventional pain practice: Assessment, management, and review of the literature. *Pain Physician* 2004; 6:3-51 (21).

the occurrence of a thrombotic event if antithrombotic therapy is withheld. We believe that we considered these risks in ASIPP guidelines. If fact, we believe that ASIPP guidelines are not only evidence-based, but a step forward compared with ASRA guidelines. Meanwhile, we would like to reiterate to Miller et al and other interventional pain physicians of a current opinion and excellent manuscript published in *Pain Physician* in 2004 by Raj et al (21), which included essentially the same points as is described in the letter by Miller et al. Raj et al (21) extensively reviewed issues related to bleeding risk including physiology of coagulation, clinical assessment of bleeding risk, tests for clotting function, various drugs and their pharmacology and clinical relevance, acquired and congenital coagulation disorders, antiplatelet medications, antithrombotics, procedure-associated bleeding complications, technique-specific bleeding risk factors, technique-related bleeding risk score and stratification, and overall risk stratification. In this manuscript (21), as shown in Table 1, they described technique-related bleeding risk factors and corresponding score. Table 2 shows technique-related bleeding risk score and risk stratification. Table 3 shows patient-related bleeding risk factors and corresponding scores. Table 4 shows patient-related bleeding risk score. Table 5 shows overall significant bleeding risk in interventional pain practice and risk stratification.

Raj et al (21) described succinctly various issues 15 years ago that Miller et al are proposing in this letter; however, it was felt to be a cumbersome assessment mode by some, consequently, it was not used in present ASIPP guidelines. It will be worthwhile to use the risk stratification as described by Raj et al (21) or a modified version with simplification in the future. Based on risk stratification described by Raj et al (21), lumbar transforaminal epidural injections fall into low risk.

In summary, various authors of the guidelines and multiple previous publications are of the opinion of continuation of antithrombotics for all procedures except with specific patient risk factors with addition of risk stratification. The emerging literature may resolve these dilemmas and direct interventional pain physicians in the right path; however, the majority of the resistance seems to come from academic centers along with ASRA guidelines.

Table 3. *Patient-related bleeding risk factors and corresponding scores.*

Hemostasis	Modifying factors	Score
Normal	None	2
Normal	History of self-limited, transient bleeding disorder	4
Normal	Normal coagulation studies despite the intake of medications that theoretically may affect hemostasis	6 (nutraceuticals, serotonin reuptake inhibitors)
Normal	Normal coagulation studies after discontinuation of known anticoagulants (the score may be modified, depending on when the drug was stopped relative to the period of drug effect)	6-10 6 (e.g., warfarin was stopped 5 days earlier, aspirin was stopped 7-10 days earlier, heparin infusion held for >6 hours) 8 (e.g., aspirin was stopped 3 days earlier) 10 (e.g. warfarin was stopped 2 days earlier, heparin infusion was stopped 4 hours earlier) 6-10 (e.g., factor or blood product replacement therapy in specific acquired and congenital bleeding disorders)
Abnormal	Active consumption of anticoagulants that cannot be held (the score may be modified based on the specific anticoagulant and abnormal coagulation studies)	10 (low dose aspirin, NSAIDS) 12 (subcutaneous heparin, low dose coumadin (INR<1.4), medium-high dose aspirin, ticlopidine, clopidogrel) 14 (low molecular weight heparin, coumadin (INR 1.5-2, Gp IIb/Gp IIIa inhibitors) 16 (intravenous heparin bolus, coumadin (INR 2-3)) 16-18 (thrombin inhibitors) 18 (high dose intravenous heparinization and warfarin, INR >3). 20 (thrombolytics)
Abnormal	Known history of medical bleeding disorder (the score may be modified if there is a history of easy bruisability, deep versus superficial bleeding episodes, or spontaneous versus traumatically-induced bleeding episodes)	10 (thrombocytopenia >80,000) 12 (thrombocytopenia <80,000, idiopathic thrombocytopenic purpura, renal failure-uremia) 12-14(von Willebrand disease, depending severity) 14 (vitamin K deficiency 14-18 (Hemophilia A and B depending on severity of factor deficiency) 14-18 (liver disease, depending on severity)
Abnormal	Known history of significant bleeding with procedures but cause not identified	18
Abnormal	Major hemorrhage due to incompetent coagulation system	20 (disseminated intravascular coagulation)

Source: Raj PP, et al. Bleeding risk in interventional pain practice: Assessment, management, and review of the literature. *Pain Physician* 2004; 6:3-51 (21).

Table 4. *Patient-related bleeding risk score (PBR).*

Overall score	2-8	10-12	14-16	18-20
Overall severity	Mild	Moderate	Severe	Very Severe

Source: Raj PP, et al. Bleeding risk in interventional pain practice: Assessment, management, and review of the literature. *Pain Physician* 2004; 6:3-51 (21).

Table 5. *Overall significant bleeding risk score in interventional pain practice (OBR) and risk stratification.*

Overall score	2-7	8-14	15-20	21-30
Overall risk	Low	Medium	High	Very High

Source: Raj PP, et al. Bleeding risk in interventional pain practice: Assessment, management, and review of the literature. *Pain Physician* 2004; 6:3-51 (21).

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