

Anticoagulation and Neuraxial/Peripheral Anesthesia



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KEYWORDS

- Anticoagulation • Coumadin • Direct thrombin inhibitors • Factor Xa inhibitors
- Antiplatelet • Neuraxial • Regional

KEY POINTS

- We empower the anesthesiologist considering a regional technique to engage patients in an informed discussion about hemorrhagic risks and complications preprocedurally.
- As we await an update from American Society of Regional Anesthesia regarding the novel anticoagulants (NAGs), we have summarized the available evidence for NAGs.
- Although these authors cannot make any decisive recommendations, we have presented the most relevant information to make an informed decision.
- This article discusses different methods for monitoring anticoagulant and antiplatelet effects of these medications.
- The half-lives and pharmacokinetic data presented in this article reflect these parameters in patients with normal renal and hepatic function, unless otherwise stated.

INTRODUCTION

Although rare, hemorrhagic complications after the administration of regional anesthesia are among the most dreaded adverse outcomes in anesthesiology. The existing American Society of Regional Anesthesia (ASRA) guidelines regarding management of patients on antithrombotic therapies have made recommendations specifically for neuraxial techniques with consideration for the most catastrophic hemorrhagic complication, spinal hematoma with paralysis. Erring on the side of patient safety,

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many anesthesiologists have extended these recommendations when considering peripheral nerve blocks as well. Although some clinicians may feel that this is too restrictive, especially with the use of improved technology (ie, ultrasound-guided techniques), there is insufficient evidence in the literature to make recommendations separately for peripheral nerve blocks.

It is the intent of the authors of this review article to provide a valuable reference for the anesthesiologist managing a patient on anticoagulant medications and considering a regional technique. We have provided the mechanisms of action for the most popular anticoagulants and novel anticoagulants (NAGs), as well as present a comprehensive review of the literature of this topic since the ASRA third edition guidelines from 2010. Related to many new developments in recent years, it is expected that new guidelines will be available in the near future. However, at this time, we present the current literature with the understanding that upcoming guidelines may ultimately change some current clinical recommendations. An up-to-date, evidence-based literature search has, therefore, been conducted to provide the latest evidence in clinical practice.

POTENTIAL ADVANTAGES OF REGIONAL ANESTHETIC TECHNIQUES

Regional anesthesia may be a useful choice, both as a primary anesthetic technique to replace general anesthesia and as well as a component of multimodal care, in providing intraoperative and postoperative analgesia. In the decision to select regional anesthesia, either as an adjunct or an alternative to general anesthesia for the properly selected candidate regional anesthesia, affords numerous benefits to the patient and anesthesia provider.

Traditionally, regional anesthesia has gained popularity related to beneficial evidence regarding perioperative morbidity and mortality in specific patient populations. Those patients who receive regional anesthesia are associated with a smaller incidence of cardiac dysrhythmias, venous thromboembolic events (VTE) and pulmonary complications postoperatively when compared with those patients receiving general anesthesia for similar procedures.¹⁻³

The advantages extend to the operative environment itself. For example, in the orthopedic surgery literature, regional anesthesia has been shown to be associated with significantly less blood loss, in addition to fewer VTEs and respiratory complications.⁴ This is noted in both pediatric and adult populations.

In a multicenter, observational study of 307 neonates undergoing general anesthesia with supplemental neuraxial anesthesia, Long and colleagues⁵ found that none experienced any long-term or permanent sequelae as a result of neuraxial techniques. The authors suggest that this means of analgesia may be safe in the complex care of this delicate population, which may be an effective technique to avoid the potentially undesirable long-term effects on cognitive and motor development that are linked with poorly treated postoperative pain.

Lou and colleagues⁶ found in a retrospective chart review of 99 patients undergoing free flap breast reconstruction that general anesthesia supplemented with epidural anesthesia was associated with significantly decreased pain scores at 2 and 24 hours postoperatively, and that the mean arterial pressure was significantly more elevated in the group that did not receive epidural anesthesia. Notably, intraoperative sufentanil administration and the incidence of postoperative nausea and vomiting were significantly decreased in the group that received epidural anesthesia. Although it did not attain statistical significance, flap failure was 0% in the epidural anesthesia-supplemented group and 4.3% in the general anesthesia group. It is plausible that the vasodilatory

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