Q: What is the significance of an isolated elevated activated partial thromboplastin time in the preoperative setting?

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A: The significance of an isolated elevated activated partial thromboplastin time (aPTT) depends on the patient's clinical history, so a thorough history is essential when considering such a finding as a marker for perioperative hemorrhagic risk. The preoperative consultation should address and document any personal or family history of spontaneous bleeding, hemostatic difficulties with any prior surgeries (including tooth extraction and childbirth), liver disease, malnutrition or malabsorption, and anticoagulant use or possible exposure, as well as physical exam findings suggestive of a bleeding disorder. In the absence of such a history or such findings, an elevated aPTT does not increase the perioperative risk of hemorrhage.

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An abnormal aPTT alone lacks predictive value

Historically, the aPTT was used to monitor known factor deficiencies within the intrinsic pathway—namely, hemophilia.[1] Now, however, this test is

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commonly used to assess bleeding risk in patients undergoing surgery. In the preoperative setting, a prolonged aPTT is encountered in up to 17.6% of blood samples sent.[2] An abnormal aPTT can be due to poor phlebotomy technique, erthrocytosis, or the in vitro phenomenon of the antiphospholipid antibody, and therefore is often of no hemostatic consequence.

Krishna and Lee[3] performed a meta-analysis of eight retrospective and four prospective studies of patients undergoing tonsillectomy to examine whether those with a prolonged aPTT had a higher rate of post-tonsillectomy bleeding relative to those with a normal aPTT. Tonsillectomy is an excellent surgical model to follow, as it poses a high hemostatic challenge, given the rich fibrinolytic environment of the oral pharynx. The positive predictive value of an abnormal aPTT for postoperative hemorrhage among the prospective trials in this analysis ranged from 0.00 to 0.14. Pooled analysis of the 3,384 patients in the prospective trials revealed an aggregate positive predictive value of 0.10.

Chee and Greaves[2] obtained similar findings in a systematic review of the literature addressing preoperative and preinvasive coagulation profiles for a variety of surgical procedures. They found no statistical difference in adverse event rates between patients with and without an elevated aPTT.

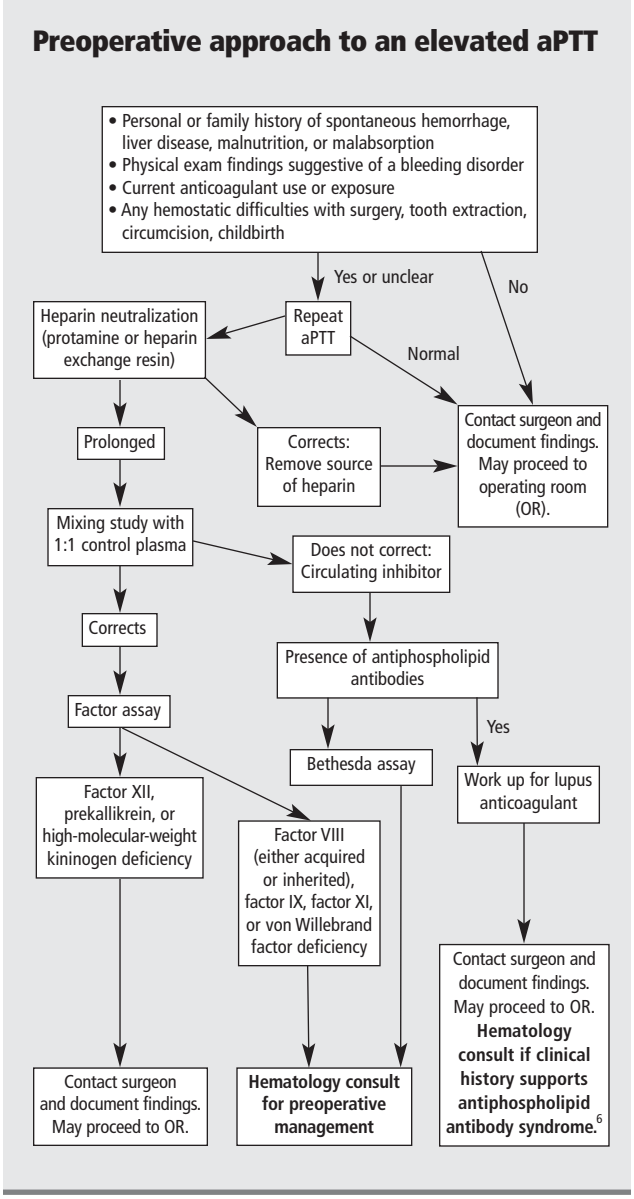
The clinical history: Evidence for its predictive value

To determine whether the clinical history would improve the predictive power of the aPTT, Suchman and Mushlin[4] conducted a retrospective study of 12,338 admissions for invasive procedures. Patients were assigned to one of four risk groups based on clinical history:

- Those with known coagulopathies
- Those with potential factor deficiency (liver disease, malnutrition, malabsorption)
- Those with trauma or active hemorrhage
- Those with low hemorrhagic risk (all others).

In low-risk patients, who constituted 92% of the overall sample, an abnormal aPTT had no ability to predict the risk of hemorrhage. When the abnormal aPTT value was used in conjunction with clinical risk group assignment, the predictive power of the aPTT was improved, although not significantly.

The usefulness of a thorough history was further supported in a prospective study of 100 consecutive patients referred for preoperative consultation regarding an isolated abnormal aPTT.[5] All patients underwent a thorough history and physical exam, after which they were stratified into groups based on clinical risk of bleeding: 14% of patients were determined to have had an artifactually prolonged aPTT; 36% of patients had a prolongation that posed no increased hemorrhagic risk; and the remaining 50% of patients had deficits that did pose potential hemostatic consequences. This last group was divided into clinical risk categories, and those in the highest-risk subgroup—patients with moderate or severe factor VIII, IX, or XI deficiencies, disseminated intravascular coagulation, or severe liver disease—all had a positive clinical history.



FIGURE

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Conclusions

No randomized controlled trials have focused on preoperative aPTT and surgical outcomes. Evidence from the medical and surgical literature suggests that an elevated aPTT, used independently, has no ability to determine which patients will bleed perioperatively.

In the preoperative setting, patients may proceed to surgery without delay if they have no personal or family history of hemorrhage or liver disease, no history of malnutrition or malabsorption, no physical exam findings suggestive of coagulopathy, and no history of hemorrhage with previous surgery. It is essential that this management decision be documented and that there be consensus with the perioperative team. In patients with a clinical history suggestive of hemorrhagic risk or an uncertain clinical history, an elevated aPTT should be fully investigated prior to surgery.

The algorithm presented in the **Figure** (see previous page) can be used to manage patients with an elevated preoperative aPTT.

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