

Neuraxial Anesthesia Considerations in an Obstetric Patient With Plasminogen Activator Inhibitor-1 Deficiency

Marie Ashley Villard-Wrobbel MD, Jason Srnec MD, Krystal Weierstahl DO
Department of Anesthesiology, Froedtert and Medical College of Wisconsin and Community Memorial Hospital, Menomonee Falls, WI

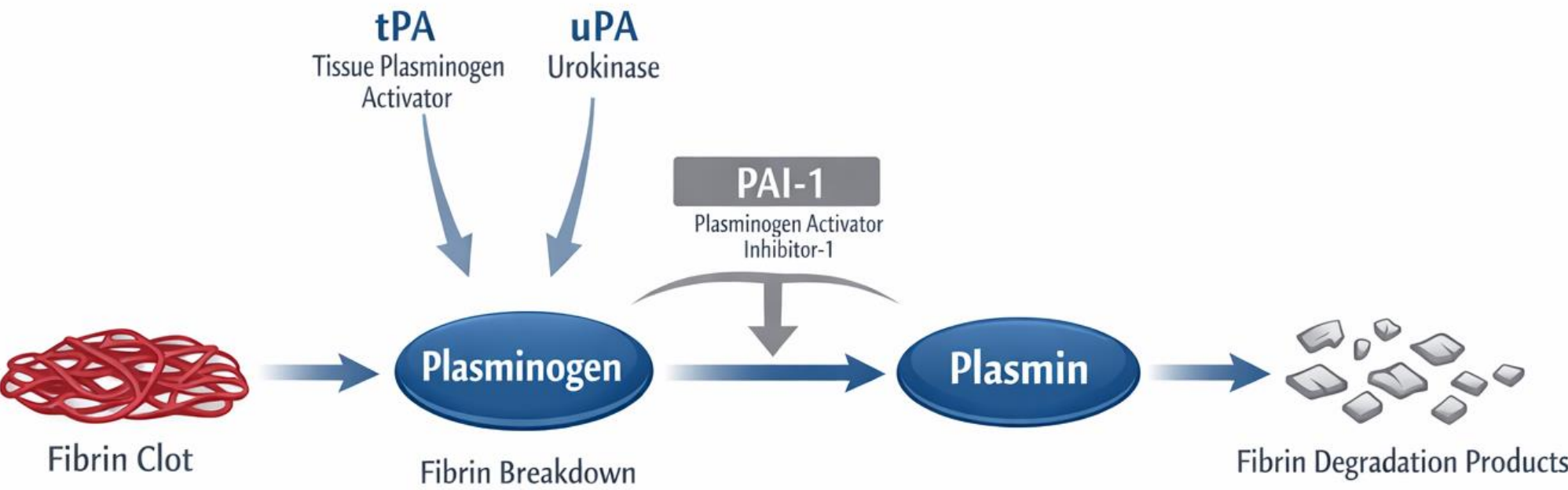
Background

- Plasminogen activator inhibitor-1 (PAI-1) deficiency is a rare inherited bleeding disorder marked by excessive fibrinolysis.
- Obstetric management is challenging, and the safety of neuraxial anesthesia remains uncertain due to the theoretical risk of spinal or epidural hematoma and lack of standardized guidelines.
- We report the anesthetic management of a 32-year-old primigravida with congenital PAI-1 deficiency presenting at 29+3 weeks with PPROM for delivery.

Case Report

- 32-year-old G1P0000 woman with a history of PAI-1 deficiency and supraventricular tachycardia status-post ablation, presented for delivery after PPROM at 29+3 weeks gestation.
- Patient reported a diagnosis of PAI-1 deficiency at age 12 and a history of menorrhagia treated with oral contraceptive pills.
- Following consultation with hematology, it was recommended that tranexamic acid (TXA) be administered prior to neuraxial placement and at time of delivery to mitigate potential hemorrhagic complications.
- Decision was made to proceed with epidural placement, and TXA 1000mg IV was administered prior to placement.
- Epidural placement was attempted twice using a 17-gauge Tuohy needle at the L3-L4 interspace.
- An additional dose of TXA 1000mg IV was administered at labor onset.
- Patient progressed to vaginal delivery of a vigorous infant.
- Placental blood clots consistent with abruption were noted, though uterine tone was firm; rectal misoprostol was administered prophylactically.
- Overall, the peripartum and postpartum courses were uncomplicated, with no evidence of neuraxial bleeding or neurologic sequelae.

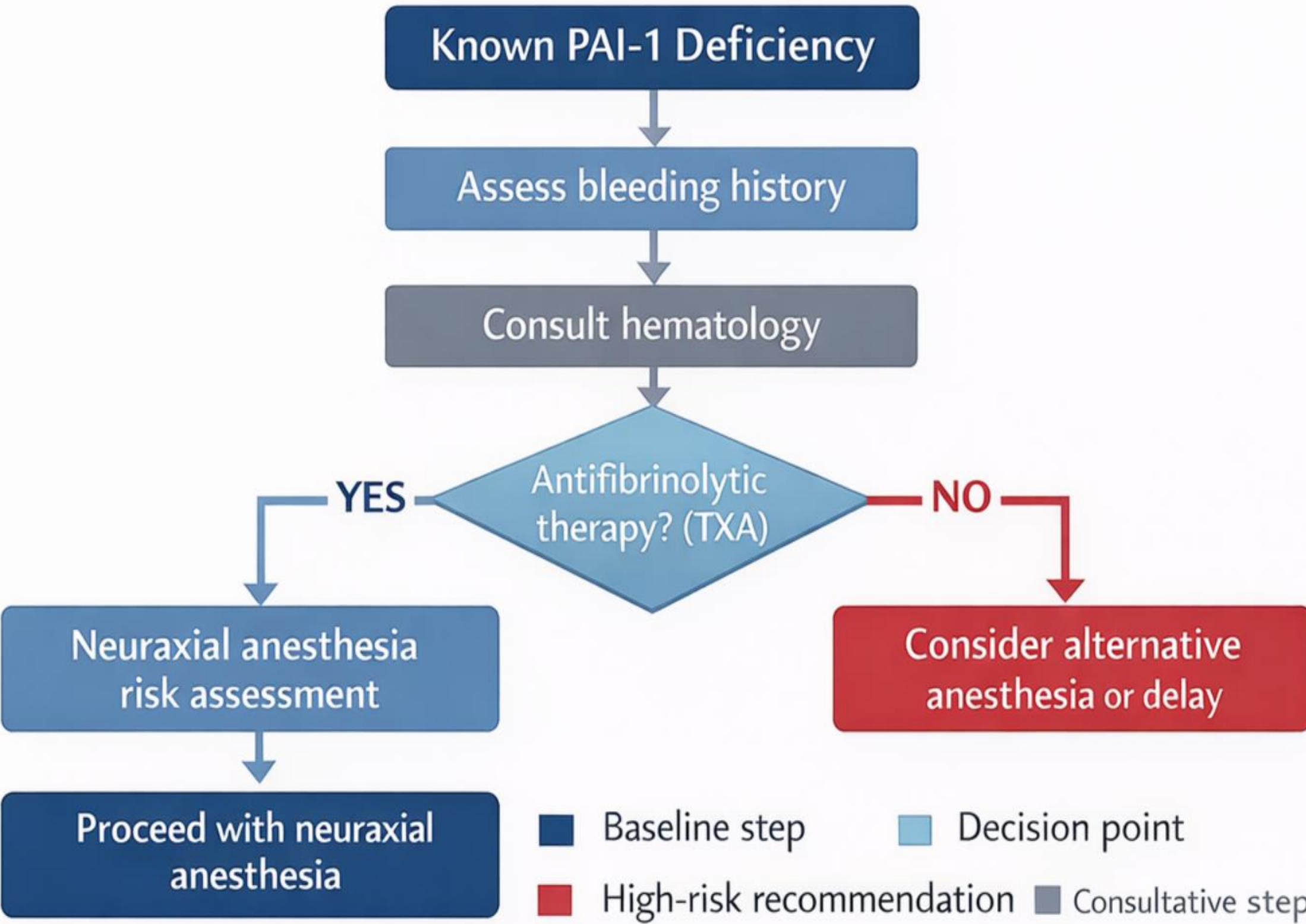
Fibrinolysis Pathway



Discussion

- PAI-1 deficiency poses anesthetic challenges due to the absence of established treatment recommendations and laboratory thresholds guiding neuraxial anesthesia.
- Current practice relies on expert consensus and case reports, suggesting neuraxial anesthesia may be considered on an individualized basis with multidisciplinary collaboration, antifibrinolytic support, and vigilant postoperative monitoring.
- Further studies are needed to develop evidence-based neuraxial guidelines for this rare bleeding disorder.

PAI-1 Deficiency: Neuraxial Anesthesia Algorithm



References

- Mehta R, Shapiro AD. Plasminogen activator inhibitor type 1 deficiency. *Haemophilia*. 2008 Nov;14(6):1255-60. doi: 10.1111/j.1365-2516.2008.01834.x. PMID: 19141166.
- Choi S, Brull R. Neuraxial techniques in obstetric and non-obstetric patients with common bleeding diatheses. *Anesth Analg*. 2009 Aug;109(2):648-60. doi: 10.1213/ane.0b013e3181ac13d1. PMID: 19608843.
- Peterson W, Martin R, Arnold D, Carvalho B, Cuker A, Gadsden J, Provan D, Rydz N, Shore E, Kuter D, Kouides P, Lavin M, James P, Engen D, Sholzberg M. Delphi consensus recommendations for neuraxial anesthesia in adults with platelet disorders and coagulation defects: communication from the ISTH SSC Subcommittee on von Willebrand Factor. *J Thromb Haemost*. 2025 Jun;23(6):2039-2049. doi: 10.1016/j.jtha.2025.01.019. Epub 2025 Feb 12. PMID: 39952359.
- Tanimura LK, Weddell JA, McKown CG, Shapiro AD, Mulherin J. Oral management of a patient with a plasminogen activator inhibitor (PAI-1) deficiency: case report. *Pediatr Dent*. 1994 Mar-Apr;16(2):133-5. PMID: 8015955.
- Ushma Jitendra Shah, Madan Narayanan, J Graham Smith, Anaesthetic considerations in patients with inherited disorders of coagulation, *Continuing Education in Anaesthesia Critical Care & Pain*, Volume 15, Issue 1, February 2015, Pages 26–31