UW Medicine

UNIVERSITY OF WASHINGTON MEDICAL CENTER

Department: Transplant Institute	**Guideline:** Kidney Transplant Anticoagulation
Effective: 12/13/24	**Revised:** 12/26/24

Purpose: To recommend a decision-making process for management of anticoagulation in waitlisted kidney transplant recipients at the University of Washington. To establish a unified programmatic approach that reduces clinical practice variation and provides a platform from which to evaluate the quality of clinical care. The Transplant Institute at the University of Washington Medical Center employs evidence-based medicine and adheres generally to accepted best practices, established clinical protocols, guidelines, and regulatory requirements to provide clinically appropriate services. Clinical judgement is required when applying guidelines, but any guideline deviation shall be defended in the medical record.

KIDNEY TRANSPLANT CANDIDATES Scope: those being considered for listing for a *deceased donor* kidney transplant. For living donor kidney recipients, see general UW *Peri-Procedural Anticoagulation* guidelines.	**Screening**	The medication list for patients referred for transplant should be screened for the presence of anticoagulants (see list in appendix)
	Patient counseling	All patients should be instructed to notify the transplant program immediately if there are changes made to their anticoagulant plan (i.e. starting or stopping anticoagulant medications)
	Evaluation	All patients on any kind of anticoagulant (oral anticoagulant, heparin-like, or antiplatelet) should have careful evaluation of whether anticoagulation is still indicated. When possible, in the setting of weak or unclear evidence of benefit, anticoagulation should be stopped and may be re-considered post-transplant.
	Single antiplatelet agent	No barrier to listing
	Dual antiplatelet therapy (DAPT)	• May be listed status 7 until their DAPT can be de-escalated to single antiplatelet agent. • Duration varies by indication and provider. • Discuss balance of risk/benefit of prolonged therapy vs. risk of delayed transplant with prescribing provider.
	Antiplatelet + direct oral anticoagulant (DOAC)	Patients on antiplatelet + DOAC should have their DOAC changed to warfarin before listing
	Warfarin alone or with single antiplatelet	No barrier to listing
	DOAC alone	May be listed while on DOAC only if all the following specific criteria are met to minimize the risk of peri-operative bleeding • DOAC is apixaban • If indication is VTE, dose has been reduced to maintenance dose of 2.5mg BID

		• If indication if atrial fibrillation (AF), dose is reduced to 2.5mg BID unless patient-specific PK studies have demonstrated the need for 5mg BID • Not on concomitant relevant P-gp or CYP3A4 interacting drugs • Trough anti-Xa for apixaban level (APIXN1) is <100 ng/mL (approximate median level observed in patients on 5mg BID with intact renal function enrolled in ARISTOTLE study)[1,2] • Absence of anatomical or other risk factors for excessive bleeding
	Changes to anticoagulation	Decisions to start, stop, switch, or adjust the dose of anticoagulants are highly individualized and, in most cases, should be made by the prescriber of the anticoagulant, in collaboration with the UW Transplant Team. These guidelines are not intended to suggest the UW Transplant Team will be assuming management of waitlisted patients' anticoagulation.
PERIOPERATIVE MANAGEMENT	**Background:** At UW the average time between phone call and anesthesia start is ~20 hours, with a range of 12-36 hours. For patients on apixaban, effort should be made to ensure an adequate length of time has elapsed since their last apixaban dose to allow for drug clearance to minimize the risk of excessive bleeding. **When called for transplant:** Patients should be instructed to hold anticoagulants until meeting with admitting provider and record the last time they took their anticoagulant dose.	
	Antiplatelet therapy	No specific precautions. Consider platelet transfusion if needed.
	Warfarin	**Check INR at presentation:** • If INR <1.5, no delay necessary • If 1.5-<3, consider FFP if needed, if indication is AF, consider vitamin K 2.5mg po x1 • If 3-4.5, consider FFP if needed, if indication is AF, consider vitamin K 1mg iv x1 • If 4.5-10, give vitamin K 2mg iv x1, 2 units FFP, recheck q6 hours and repeat if needed, if INR has reduced to <3, proceed, if not able to achieve in timeframe available based on the organ, transplant not recommended, investigate why INR was supratherapeutic and address with outpatient anticoagulation clinic managing the patient. Collaboration with outpatient anticoagulant clinic is essential to monitor subsequent effect of attempted reversal. • If >10, transplant not recommended, investigate why INR was supratherapeutic and address with outpatient anticoagulation clinic managing the patient
	Apixaban	**If last dose within 72 hrs of presentation, check anti-Xa for apixaban level (APIXN1) at presentation:** • If <50 ng/mL, no delay necessary • If 50-100 ng/mL, weigh risk vs. benefit, consider delay if feasible to allow drug to fall below 50 ng/mL before

		incision. Dialysis may reduce this time window slightly. Half-life in those with CrCl <25 ml/min is ~18 hours. • If >100 ng/mL, transplant not recommended, stop apixaban, consider switch patient to warfarin (in collaboration with prescriber). ***This should be rare given above listing criteria***
	Unexpected bleeding, non-life threatening	• Consider DDAVP 0.3 mcg/kg iv x1 in setting of uremia and bleeding as this may address platelet dysfunction • **Warfarin:** consider vitamin K 2mg iv x1, consider FFP, repeat every 6 hours as needed • **Apixaban:** consider FFP, consider dialysis
	Life threatening bleeding (see UW *Guidelines for Reversal of Anticoagulants)*	• Consider DDAVP 0.3 mcg/kg iv x1 in setting of uremia and bleeding as this may address platelet dysfunction • **Warfarin:** give vitamin K 10mg iv x1 AND 4-factor PCC (Kcentra) 2000 units, may repeat for additional dose of 500 units after 15 min if INR remains >1.5 • **Apixaban:** give 4-factor PCC (Kcentra) 2000 units • ***Andexxa (andexanet alfa)*** *is not currently on formulary, but may be added in future based on new data for hemorrhagic stroke. Even if added to formulary, this agent is not recommended for kidney-transplant related bleeding due to increased risk for thrombosis compared to 4FPCC*
RESUMING ANTICOAGULATION AFTER SURGERY	Indication of VTE treatment / history	• Restart anticoagulation in 3-7 days after surgery. • If delaying >7 days, consider placement of IVC filter. • Use VTE prophylaxis (i.e. heparin 5000 units subq q12h) when not on full anticoagulation • If using warfarin, consider bridge therapy unless VTE history was single VTE >12 months ago
	Indication of stroke prevention	• Restart anticoagulation in 3-7 days after surgery. • If using warfarin, see UW *"Risk Stratification and Recommendations for Bridge Therapy in Patients on Warfarin"* to determine if bridging is necessary
	Antiplatelet agents	• Restart antiplatelet as soon as practical for patients with history of PCI to reduce risk of perioperative MI (see POISE-II trial)[3] • For other indications, defer until 3-7 days after surgery
FOLLOW-UP	In the post-kidney transplant setting, the management of anticoagulants should adhere to recommendations similar to those with chronic kidney disease, with special consideration of dynamic renal function and drug-drug interactions in this population	

References:

1. Zeitouni M, Giczewska A, Lopes RD, et al. Clinical and Pharmacological Effects of Apixaban Dose Adjustment in the ARISTOTLE Trial. *J Am Coll Cardiol*. 2020;75(10):1145-1155. doi:10.1016/j.jacc.2019.12.060
2. Eliquis (apixaban) [prescribing information]. Princeton, NJ: Bristol-Myers Squibb Company; April 2021.
3. Biccard BM, Sigamani A, Chan MTV, et al. Effect of aspirin in vascular surgery in patients from a randomized clinical trial (POISE-2). *Br J Surg*. 2018;105(12):1591-1597. doi:10.1002/bjs.10925

For more information about UW Medicine Anticoagulation Guidelines, please refer to the UW Medicine Anticoagulation Services Website