Anticoagulation monitoring and management

Australian Red Cross Lifeblood

Life-threatening urgent situations

Drug	Present	Drug level	Reversible	Recommendations
Vitamin K antagonist **Warfarin**	INR	INR	Yes	**Prothrombinex-VF (mg/kg)[1] (+Vit K)** Initial INR: 1.5–2.5 / 2.6–3.5 / 3.6–10.0 / > 10.0 Target INR: 0.9–1.3: 30 / 35 / 50 / 50 Target INR: 1.4–2.0: 15 / 25 / 30 / 40
Unfractionated heparin (UFH)	APTT	APTT	Yes	**Protamine** Maximum dose 50 mg, 1 mg per 100 units of unfractionated heparin intravenously, at a maximum rate of 5 mg/minute. Where the amount of unfractionated heparin to be reversed = cumulative dose in preceding 3 hours.
Low molecular weight heparin (LMWH) **Enoxaparin**	+/- APTT	anti Xa assay	Partial (60–75%)	**Protamine** Maximum dose 50 mg, maximum rate 5 mg/minute < 8 hours post dose: 1 mg per 100 units enoxaparin intravenously 8–12 hours post dose: 0.5 mg per 100 units enoxaparin intravenously
Dabigatran	APTT and TT	Dilute TT	Yes	**Idaracizumab** 5 g intravenously (2x2.5 g/50 mL), by bolus injection or infusion
Rivaroxaban	PT[2]	Modified anti Xa assay specific for Rivaroxaban	No	Consider pro-haemostatic agents: Prothrombinex-VF, FEIBA
Apixaban	+/- PT[2]	Modified anti Xa assay specific for Apixaban	No	Consider pro-haemostatic agents: Prothrombinex-VF, FEIBA

Prothrombinex-VF (mg/kg)[1] (+Vit K):

Initial INR	1.5–2.5	2.6–3.5	3.6–10.0	> 10.0
Target INR: 0.9–1.3	30	35	50	50
Target INR: 1.4–2.0	15	25	30	40

Non-urgent surgery

A patient's thrombotic risk should guide the urgency of recommencing anticoagulation.

Drug	Preoperative: Low bleeding risk procedure	Preoperative: Major bleeding risk procedure	Postoperative: Low bleeding risk procedure	Postoperative: Major bleeding risk procedure
Vitamin K antagonist	Withhold from D-5 Commence LMWH when INR < 2 (if indicated)	Withhold from D-5 Commence LMWH when INR < 2 (if indicated)	Restart D1 in conjunction with UFH/LMWH (if indicated and appropriate)[3]	Restart D1 in conjunction with UFH/LMWH (if indicated and appropriate)[3]
Unfractionated heparin	6 hours prior	6 hours prior	Resume after 6-8 hours	Resume after 24-48 hours[3]
Low molecular weight heparin	24 hours prior	24 hours prior	Resume after 12- 24 hours	Resume after 48–72 hours[3]
Dabigatran	**CrCl > 80:** 24 hours prior **CrCl > 50:** 24–48 hours prior **CrCl > 30:** 48–72 hours prior	**CrCl > 80:** 48 hours prior **CrCl > 50:** 48–72 hours prior **CrCl > 30:** 96 hours prior	Resume after 24 hours	Resume after 48–72 hours[3]
Rivaroxaban/ Apixaban	**CrCl > 50:** 24 hours prior **CrCl > 30:** 48 hours prior	**CrCl > 50:** 48–72 hours prior **CrCl > 30:** 72 hours prior	Resume after 24 hours	Resume after 48–72 hours[3]

1. If Prothrombinex-VF is not available, use fresh frozen plasma (FFP) 10–15 mL/kg for warfarin reversal. Vitamin K should be co-administered.
2. PT sensitivity to DOACs will vary according to local laboratory reagents. In some laboratories the PT will be insensitive to DOACs.
3. Prophylactic anticoagulation may be appropriate in the interim.

References

- Clinical Excellence Commission, 2018, Guidelines on Perioperative Management of Anticoagulant and Antiplatelet Agents. Sydney: Clinical Excellence Commission
- Clinical Excellence Commission, 2017, Non-vitamin K Antagonist Oral Anticoagulant (NOAC) Guidelines, Updated July 2017
- Therapeutic Guidelines Ltd. eTG complete [UPDATED June 2017]; Available from: https://tgldcdp.tg.org.au.acs.hcn.com.au.
- Tran HA, Chunilal SD, Harper PL, Tran H, Wood EM, Gallus AS. An update on consensus guidelines for warfarin reversal. The Medical Journal of Australia. 2013;198(4).

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