

Effect of Various Anticoagulants On Commonly Used Coagulation Assays

Authored by Dorothy Adcock MD Chief Medical Officer LabCorp Diagnostics

Coagulation Assays	VKA (Influence)	UFH (Influence)	LMWH (Influence)	Rivaroxaban (Influence)	Apixaban (Influence)	Edoxaban (Influence)	Dabigatran (Influence)
PT	↑	no effect or ↑ ¹	=	↑	no effect or ↑ _(weak)	↑ _(weak)	↑
aPTT	↑	↑	no effect or ↑ _(weak)	↑	no effect or ↑ _(weak)	↑ _(weak)	↑
Fibrinogen (Clauss Method)	=	↓	=	=	=	=	= / ↓
Thrombin Time TT	=	↑	↑	=	=	=	↑
Factor Assays (clotting assays)	↓ (FIX;VII,X and II) no effect for the others	aPTT based: ↓ ² PT based: =	aPTT based: ↓ _(weak) ² PT based: =	↓ ²	↓ _(weak) ² / =	↓ ²	↓ ²
DDi, VWF: Ag, VWF: RCo	=	=	=	=	=	=	=
Anti-Xa Activity (UFH or LMWH)	=	↑	↑	↑	↑	↑	=
Antithrombin Activity FXa-based Assay	=	↓	=	↑ ³	↑ ³	↑ ³	=
Antithrombin Activity FIIa-based Assay	=	↓	=	=	=	=	↑ ³
Protein C Activity Clot-based Assay	↓	↑ ³	=	↑ ³	↑ ³	↑ ³	↑ ³
Protein C Activity Chromogenic Assay	↓	=	=	=	=	=	=
Protein S Activity Clot-based Assay	↓	↑ ³	=	↑ ³	↑ ³	↑ ³	↑ ³
Free Protein S Ag (Immunological Assay)	↓	=	=	=	=	=	=
Lupus Anticoagulant Testing: "sensitive" aPTT and dRVVT (screening, mixing, confirmation)	↑ ⁴	↑ ⁴	=	↑ ⁴	↑ ⁴	↑ ⁴	↑ ⁴
Resistance to Activated Protein C	↑ ⁵	↑ ¹	=	↑ ³	↑ ³	↑ ³	↑ ³
Reptilase Time	=	=	=	=	=	=	=

↑ increase ↓ decrease = no effect

¹ Would only be affected in the presence of UFH if the heparin neutralizer in the reagent was overwhelmed

² Factitiously low

³ Factitiously over estimated potentially leading to a falsely normal result

⁴ Factitiously positive, possible to misclassify as LA present

⁵ APTT- based APCR with added FV deficient plasma can be factitiously elevated or decreased ratio possible

VKA: Vitamin K Antagonist

UFH: Unfractionated Heparin

LMWH: Low Molecular Weight Heparin

Sources:

- Adcock D.M. Coagulation assays and anticoagulant monitoring, American Society of Hematology (2012)
- Douxflis J, et al, Practical guide for measurement and laboratory management of edoxaban, Thrombosis and Haemost (2016)
- Douxflis J, et al, Assessment of the impact of rivaroxaban on coagulation assays: Laboratory recommendations for the monitoring of rivaroxaban and review of literature, Thromb Res (2012)
- Douxflis J, et al, Practical guide for the monitoring of apixaban, Thromb Haemost (2013)
- Gosselin R, Grant R.P and Adcock D.M. Comparison of the effect of the anti-Xa direct oral anticoagulants apixaban, edoxaban, and rivaroxaban on coagulation assays. International Journal of Laboratory Hematology (2016)
- Mullier et al. Laboratory recommendations for monitoring dabigatran, Thrombosis and Haemostasis (2012)
- Adcock D.M., et al, Direct Oral Anticoagulants (DOACs) in the Laboratory: 2015 Review, Thrombosis Research (2015)

