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Medications in Dermatology, Part 3: Systemic Anticoagulants and Cutaneous Side Effects

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Drug Category	Generic Name (Brand Name [Manufacturer]) ^a	Mechanism of Action	Route of Administration	FDA-Approved Indications	Cutaneous Side Effects	Notes ^b
Antiplatelets	Abciximab (ReoPro [Janssen Biologics BV]), eptifibatid (Integrilin [Merck & Co, Inc]), tirofiban (Aggrastat [Medicure Inc])	Glycoprotein IIb/IIIa inhibition	Intravenous infusion	Patients undergoing PCI	None	Can inactivate platelets for up to 15 days after cessation
	Clopidogrel bisulfate (Plavix [Bristol-Myers Squibb/Sanofi Pharmaceuticals Partnership]), prasugrel (Effient [Daiichi Sankyo, Inc, and Lilly USA, LLC]), ticlopidine (Ticlid [Hoffman-La Roche])	Irreversibly inhibits a receptor called P2Y ₁₂ , an adenosine diphosphate chemoreceptor on platelet cell membranes	Oral	Prevention of vascular ischemic events; treatment of both NSTEMIs and STEMI; prevention of thrombosis after placement of intracoronary stent	Thrombotic thrombocytopenic purpura, fixed drug eruption, lichenoid drug eruption	Concomitant use of clopidogrel with PPIs (eg, omeprazole) can decrease antiplatelet effects
	Ticagrelor (Brilinta [AstraZeneca])	P2Y ₁₂ platelet inhibitor	Oral	Reduce thrombotic events in patients with ACS, unstable angina, STEMI, and NSTEMIs	None	To be taken in conjunction with low-dose aspirin
	Epoprostenol (Veletri [Actelion Pharmaceuticals US, Inc]), treprostinil (Remodulin [United Therapeutics Corporation])	Prostaglandin analogues	Intravenous or subcutaneous injection	Prevent thrombosis in pulmonary arterial hypertension	None	
Aspirin	COX inhibitor	Oral	Prevention of cerebrovascular events; recurrent cardiovascular events; acute MI during unstable angina	Fixed drug eruption, erythema nodosum, erythema multiforme, lichenoid drug eruption		

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Anticoagulants	Warfarin sodium (Coumadin [Bristol-Myers Squibb Company])	Inhibition of vitamin K–dependent clotting factors (II, VII, IX, X)	Oral	DVT and PE prophylaxis	Skin necrosis, blue toe syndrome, bullous and urticarial eruptions	Metabolized by cytochrome P450 enzymes; high potential for drug interactions
	Heparin	Inactivates thrombin and factor Xa	Subcutaneous injection or intravenous infusion	Atrial fibrillation; disseminated intravascular coagulation; prevention of clotting in arterial and heart surgery; prophylaxis and treatment of VTE, PE, and arterial embolism	Skin necrosis, thrombocytopenia, baboon syndrome	
	Low-molecular-weight heparins: enoxaparin sodium (Lovenox [Sanofi US]), dalteparin sodium (Fragmin [Eisai Inc]), tinzaparin sodium (Innohep [LEO Pharmaceutical Products]), fondaparinux sodium (Arixtra [GlaxoSmithKline])	Activates antithrombin III, inhibits factor Xa	Subcutaneous injection	Prophylaxis of DVT; inpatient treatment of acute DVT with or without PE; outpatient treatment of acute DVT without PE; prophylaxis of ischemic complications of unstable angina and non-Q-wave MI; treatment of acute STEMIs	Angioedema, urticaria, calcinosis cutis, AGEF, thrombocytopenia	
	Dabigatran etexilate (Pradaxa [Boehringer Ingelheim Pharmaceuticals, Inc])	Thrombin inhibitor	Oral	Atrial fibrillation	None	
	Rivaroxaban (Xarelto [Janssen Pharmaceuticals, Inc]), apixaban (Eliquis [Bristol-Myers Squibb Company])	Factor Xa inhibitor	Oral	Atrial fibrillation	None	
Thrombolytics	Bivalirudin (Angiomax [The Medicines Company])	Direct thrombin inhibitor	Intravenous infusion	Patients with unstable angina undergoing PTCA or PCI; patients at risk of HIT undergoing PCI	None	Reversible thrombin inhibitor with a short half-life; FDA approved for use with aspirin

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Miscellaneous	Fish oil	Prevents coagulation factors from entering circulation	Oral	None	None	Used off label for cardiovascular disease
	Vitamin E	Prevents carboxylation and activation of vitamin K-dependent clotting factors	Oral	None	None	
	Garlic	Organosulfur compounds inhibit platelet aggregation in a dose-dependent manner	Oral	None	Irritant dermatitis	Platelet effects are irreversible
	Ginseng	Ginsenosides inhibit platelet aggregation in vitro	Oral	None	None	
	Ginkgo	Terpenoids and flavonoids inhibit platelet-activating factor	Oral	None	Irritant/allergic contact dermatitis	
	Saw palmetto	Inhibits COX	Oral	None	None	Mechanism of action not completely understood but likely is multifactorial
	Feverfew	Inhibits platelet aggregation	Oral	None	None	Additive anticoagulant effects with antiplatelet agents and warfarin sodium

Abbreviations: FDA, US Food and Drug Administration; PCI, percutaneous coronary intervention; NSTEMI, non-ST-segment elevation myocardial infarction; STEMI, ST-segment elevation myocardial infarction; PPI, proton pump inhibitor; ACS, acute coronary syndrome; COX, cyclooxygenase; MI, myocardial infarction; DVT, deep vein thrombosis; PE, pulmonary embolism; VTE, venous thromboembolism; AGEF, acute generalized exanthematous pustulosis; PTCA, percutaneous transluminal coronary angioplasty; HIT, heparin-induced thrombocytopenia.

^aOnly includes medications that currently are FDA approved for use in the United States; experimental medications or those recently withdrawn from the market are not listed.

^bAs a rule, anticoagulants should not be discontinued prior to dermatologic surgery.

Practice Questions

- 1. Which vitamin supplement has shown anticoagulant properties and therefore may lead to postoperative complications in surgical patients?**
 - a. vitamin B₁
 - b. vitamin B₁₂
 - c. vitamin C
 - d. vitamin D
 - e. vitamin E
- 2. Which of the following anticoagulants is considered a cyclooxygenase inhibitor?**
 - a. aspirin
 - b. dabigatran etexilate
 - c. heparin
 - d. low-molecular-weight heparin
 - e. warfarin sodium
- 3. Which of the following coagulation factors is not vitamin K dependent?**
 - a. factor II
 - b. factor V
 - c. factor VII
 - d. factor IX
 - e. factor X
- 4. Which anticoagulant has a potentially serious interaction with proton pump inhibitors?**
 - a. bivalirudin
 - b. clopidogrel sulfate
 - c. fish oil
 - d. heparin
 - e. warfarin sodium
- 5. Which of the following anticoagulants is not administered orally?**
 - a. apixaban
 - b. dabigatran etexilate
 - c. ticagrelor
 - d. tinzaparin
 - e. warfarin sodium

Fact sheets and practice questions will be posted monthly. Answers are posted separately on www.cutis.com.