

# Management of Intracranial Hemorrhage in the Anticoagulated Patient

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## KEYWORDS

- Anticoagulation • Antiplatelet • Intracranial hemorrhage • Intracerebral hemorrhage
- Subdural hemorrhage • Thrombosis

## KEY POINTS

- Anticoagulant drugs should be reversed emergently or urgently in all patients with intracranial hemorrhage and certainly in those requiring surgery.
- If surgery is not planned or can be delayed, then in selected patients who are in good neurologic condition and on short-acting or difficult-to-reverse anticoagulants, it may be reasonable to wait for spontaneous recovery from anticoagulation.
- There is a paucity of data to guide practitioners on whether to reverse antiplatelet drugs in patients with intracranial hemorrhage, but generally it is recommended to not administer platelets.
- Laboratory monitoring should guide the adequacy of reversal for all agents.
- The decision of when and whether to resume anticoagulant and antiplatelet drugs following intracranial hemorrhage requires individualized assessment of the risks of hemorrhage if they are resumed, estimated benefit of the drugs, and thromboembolic risk.

## INTRODUCTION

The use of antithrombotic agents, either antiplatelet or anticoagulant drugs, is increasing secondary to the increasing human longevity, diagnosis, and treatment of atrial fibrillation and prevalence of risk factors for atherosclerosis and thromboembolism.<sup>1</sup> There are 6 million Americans on anticoagulants or about 2% of the population, who are at increased risk of intracranial hemorrhage (Table 1).<sup>2</sup> Single or dual antiplatelet therapy (DAPT) is the standard of care for patients with acute coronary syndromes and for primary and

secondary prevention of cardiovascular events.<sup>3,4</sup> Anticoagulation also is standard of care for prevention and treatment of venous thromboembolism (VTE) in patients with atrial fibrillation at high risk of thromboembolism and in many patients with valvular heart disease.<sup>5,6</sup>

Intracranial hemorrhage may be traumatic or spontaneous. Almost all epidural hematomas are secondary to trauma, whereas all other types of intracranial hemorrhage (acute and chronic subdural hematoma [SDH], subarachnoid hemorrhage [SAH], intracerebral hemorrhage [ICH], intraventricular hemorrhage) may be traumatic or

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**Table 1**  
**Indications for anticoagulant and antiplatelet drugs**

<b>Generic Name</b>	<b>Indications</b>
Acetylsalicylic acid (aspirin)	Temporary relief of minor aches and pains. Actual most common uses are prevention of cardiovascular disease in men 45 to 79 years of age and women 55 to 79 years of age when benefits due to reduction in myocardial infarction outweigh risks of gastrointestinal bleeding. Includes acute myocardial infarction and those with prior myocardial infarction and angina. Prevention of cardiovascular events in patients with prior stroke or transient ischemic attack. Treatment of signs and symptoms of several rheumatologic diseases.
Dipyridamole	As an alternative to exercise for thallium myocardial perfusion imaging. Other indications are variable but may include in addition to aspirin or warfarin for some patients with prosthetic heart valves or other valvular heart disease and perioperatively in addition to aspirin in patients undergoing cardiac bypass.
Ticlopidine	Reduce the risk of thrombotic stroke in patients allergic to or who have failed on aspirin, prevent coronary artery stent thrombosis in combination with aspirin in the first 2 weeks after placement.
Clopidogrel	Reduce the risk of myocardial infarction and stroke in patients with non-ST segment elevation acute coronary syndrome or myocardial infarction, ST segment elevation myocardial infarction, recent myocardial infarction, stroke, or peripheral artery disease.
Prasugrel	Reduction of thrombotic cardiovascular events (including stent thrombosis) in patients with acute coronary syndrome who are to be managed with percutaneous coronary intervention as follows: patients with unstable angina or non-ST segment elevation myocardial infarction and patients with ST segment elevation myocardial infarction when managed with either primary or delayed percutaneous coronary intervention.
Ticagrelor	Reduce the risk of cardiovascular death, myocardial infarction, and stroke in patients with acute coronary syndrome or myocardial infarction.
Warfarin	Prophylaxis and treatment of venous thrombosis and its extension, pulmonary embolism. Prophylaxis and treatment of thromboembolic complications associated with atrial fibrillation and/or cardiac valve replacement. Reduction in the risk of death, recurrent myocardial infarction, and thromboembolic events such as stroke or systemic embolization after myocardial infarction.
Heparin	Acute treatment of venous thromboembolism, prevention of venous thromboembolism, treatment of acute coronary syndromes including percutaneous coronary interventions, ST segment elevation myocardial infarction, unstable angina/ST segment elevation myocardial infarction. Maintain patency of intravenous, peripheral venous and intra-arterial catheters.
Low molecular weight heparins (enoxaparin, dalteparin)	Prophylaxis and treatment of venous thromboembolism, treatment of angina and non-Q wave/non-ST segment elevation myocardial infarction in patients receiving aspirin, acute ST segment elevation myocardial infarction with or without percutaneous coronary intervention.
Dabigatran	To reduce the risk of stroke and systemic embolism in patients with nonvalvular atrial fibrillation. For the treatment of deep venous thrombosis and pulmonary embolism in patients who have been treated with a parenteral anticoagulant for 5 to 10 days. To reduce the risk of recurrence of deep venous thrombosis and pulmonary embolism in patients who have been previously treated. For the prophylaxis of deep venous thrombosis and pulmonary embolism in patients who have undergone hip replacement surgery.
Argatroban	Indicated as an anticoagulant in patients with or at risk for heparin-induced thrombocytopenia undergoing percutaneous coronary intervention.
Rivaroxaban	Reduce the risk of stroke and systemic embolism in patients with nonvalvular atrial fibrillation. For the prophylaxis of deep vein thrombosis, which may lead to pulmonary embolism in patients undergoing knee or hip replacement surgery.

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