

A 58-year-old woman is brought to the emergency department 4 hours after the sudden onset of left-sided facial, arm, and leg weakness. She has hypertension treated with a diuretic. She reports the sensation of a fluttering heart for 1 week. Her pulse is 125/min and irregular, and blood pressure is 135/80 mm Hg. Physical examination shows a left-sided facial droop. There is flaccid weakness of the left upper and lower extremities. An ECG shows a rapid, irregular ventricular rate with no discernable P waves. Which of the following therapies would best improve function of the weakened muscles over the next 3 hours?

- A. Acetylcholine agonist
- B. Acetylcholine antagonist
- C. Antifibrinolytic
- D. Fibrinolytic
- E. Procoagulant

Correct Answer: D.

This patient with a likely thromboembolic cerebral infarction (stroke) from atrial fibrillation would benefit from fibrinolytic therapy. Strokes occur due to ischemic or hemorrhagic loss of blood supply to the brain and manifest as focal neurological deficits related to the dysfunction of the affected brain region. Approximately 80 to 85% of strokes are ischemic, commonly arising from thromboembolic disease, for which atrial fibrillation is a major risk factor. Atrial fibrillation typically presents with palpitations, fatigue, lightheadedness, and mild dyspnea if symptomatic. On ECG, atrial fibrillation demonstrates irregularly irregular RR intervals without discernible P waves. Prolonged atrial fibrillation leads to left atrial hemostasis and increases the risk of thrombosis. A thrombus from this patient's left atrium likely embolized to the right internal carotid artery supplying the right precentral gyrus, resulting in left-sided hemiparesis. Alteplase (tissue plasminogen activator) is a fibrinolytic medication utilized in ischemic strokes that binds to fibrin clots and converts plasminogen to plasmin, which lyses clots. If given early (generally within 3 to 4.5 hours after onset of the event), alteplase may promote neurological recovery.

Incorrect Answers: A, B, C, and E.

Acetylcholine agonists (Choice A) and antagonists (Choice B) are unlikely to be helpful in lysing this patient's thromboembolic clot, as the interaction of acetylcholine with the coagulation cascade is poorly defined. Acetylcholine agonists (eg, bethanechol) may improve cognition in patients with dementia, decrease heart rate, improve gut peristalsis, increase bladder contraction, and increase exocrine gland secretions. Acetylcholine antagonists (eg, benztropine) typically increase heart rate, decrease gut and bladder activity, and worsen cognitive function. They also act on muscle at the motor end-plate; however, this patient's weakness results from central nervous system dysfunction without pathology at the muscle fiber itself.

Antifibrinolytic (Choice C) therapy (eg, tranexamic acid) displaces plasminogen from fibrin clots to promote hemostasis during intraoperative bleeding, heavy menstrual bleeding, and traumatic hemorrhage. Procoagulant (Choice E) therapy (eg, protamine, coagulation factors) increases activation of the coagulation cascade. Both antifibrinolytic and procoagulant therapy would not lyse this patient's clot and may lead to further thrombosis.

Educational Objective: Patients with atrial fibrillation are at risk for thromboembolism due to left atrial hemostasis, which may result in ischemic strokes. Strokes manifest as focal neurological deficits related to the dysfunction of the affected brain region. Ischemic strokes are treated with fibrinolytic therapy, which promotes neurological recovery.