

## CARDIOVASCULAR DISORDERS

Cardiovascular disorders, which are common causes of morbidity and mortality, often stem from blood vessel abnormalities. In turn, most vascular diseases result from the malfunction of endothelial cells or smooth muscle cells. Dysfunctional endothelium is considered a major factor in atherosclerosis, acute coronary syndromes (symptomatic myocardial ischemia, asymptomatic myocardial infarction [MI], and MI with or without ST-segment elevation), hypertension, and thromboembolic disorders. The main cause of endothelial dysfunction is injury to the blood vessel wall from trauma or disease processes. The injury alters the normal regulatory forces and leads to vasospasm, thrombosis, growth of the intimal layer of the blood vessel, rupture of atherosclerotic plaque, tissue ischemia and infarction, and dysrhythmias. Pathologic changes in the structure of the capillary and venular endothelium also result in the accumulation of excess fluid in interstitial space (edema), a common symptom of cardiovascular and other disorders.

Overall, cardiovascular disorders may involve any structure or function of the cardiovascular system. Because the circulatory system is a closed system, a disorder in one part of the system eventually disturbs the function of all other parts.

## DRUG THERAPY IN CARDIOVASCULAR DISORDERS

Cardiovascular disorders usually managed with drug therapy include atherosclerosis, heart failure, cardiac dysrhythmias, ischemia, myocardial infarction, hypertension, hypotension, and shock. Peripheral vascular disease and valvular disease are usually managed surgically. Blood disorders that respond to drug therapy include certain types of anemia and coagulation disorders.

The goal of drug therapy in cardiovascular disorders is to restore homeostasis or physiologic balance between opposing factors (eg, coagulant vs. anticoagulant, vasoconstriction vs. vasodilation). Cardiovascular drugs may be given to increase or decrease cardiac output, blood pressure, and heart

rate; to alter heart rhythm; increase or decrease blood clotting; alter the quality of blood; and decrease chest pain of cardiac origin. In addition, these drugs may be given for palliation of symptoms without alteration of the underlying disease process.



### Review and Application Exercises

1. How does the heart muscle differ from skeletal muscle?
2. What is the normal pacemaker of the heart?
3. In what circumstances do other parts of the heart take over as pacemaker?
4. What is the effect of parasympathetic (vagal) stimulation on the heart?
5. What is the effect of sympathetic stimulation on the heart and blood vessels?
6. How does low or high blood volume influence blood pressure?
7. List five chemical mediators produced by endothelial cells and their roles in maintaining cardiovascular function.
8. How does endothelial cell dysfunction contribute to cardiovascular disorders?

### SELECTED REFERENCES

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