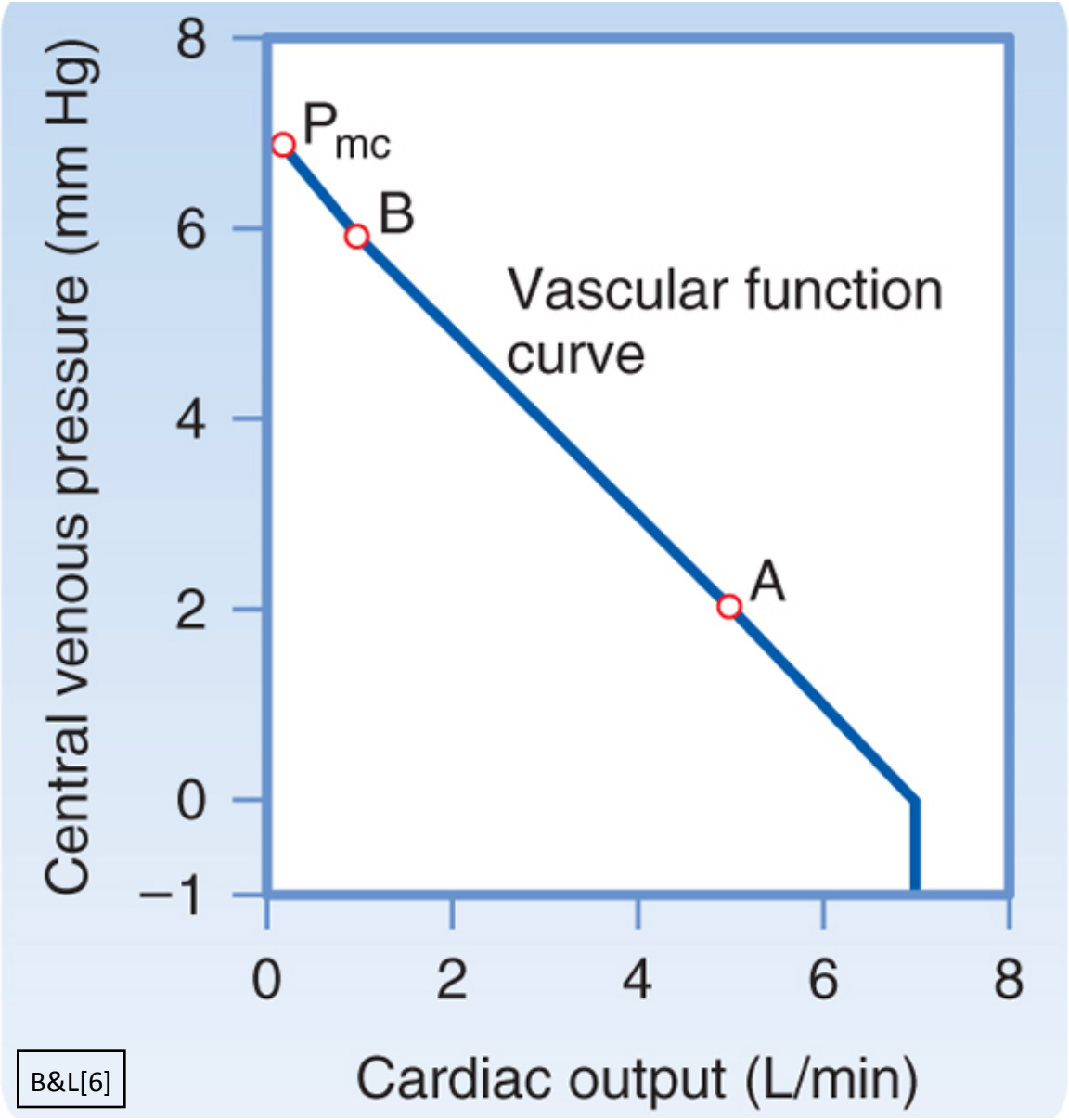

Figure 19-3 Changes in central venous pressure produced by changes in cardiac output. The mean circulatory pressure (or static pressure), P_{mc}, is the equilibrium pressure throughout the cardiovascular system when cardiac output is 0. Points B and A represent the values of venous pressure at a cardiac output of 1 and 5 L/min, respectively.

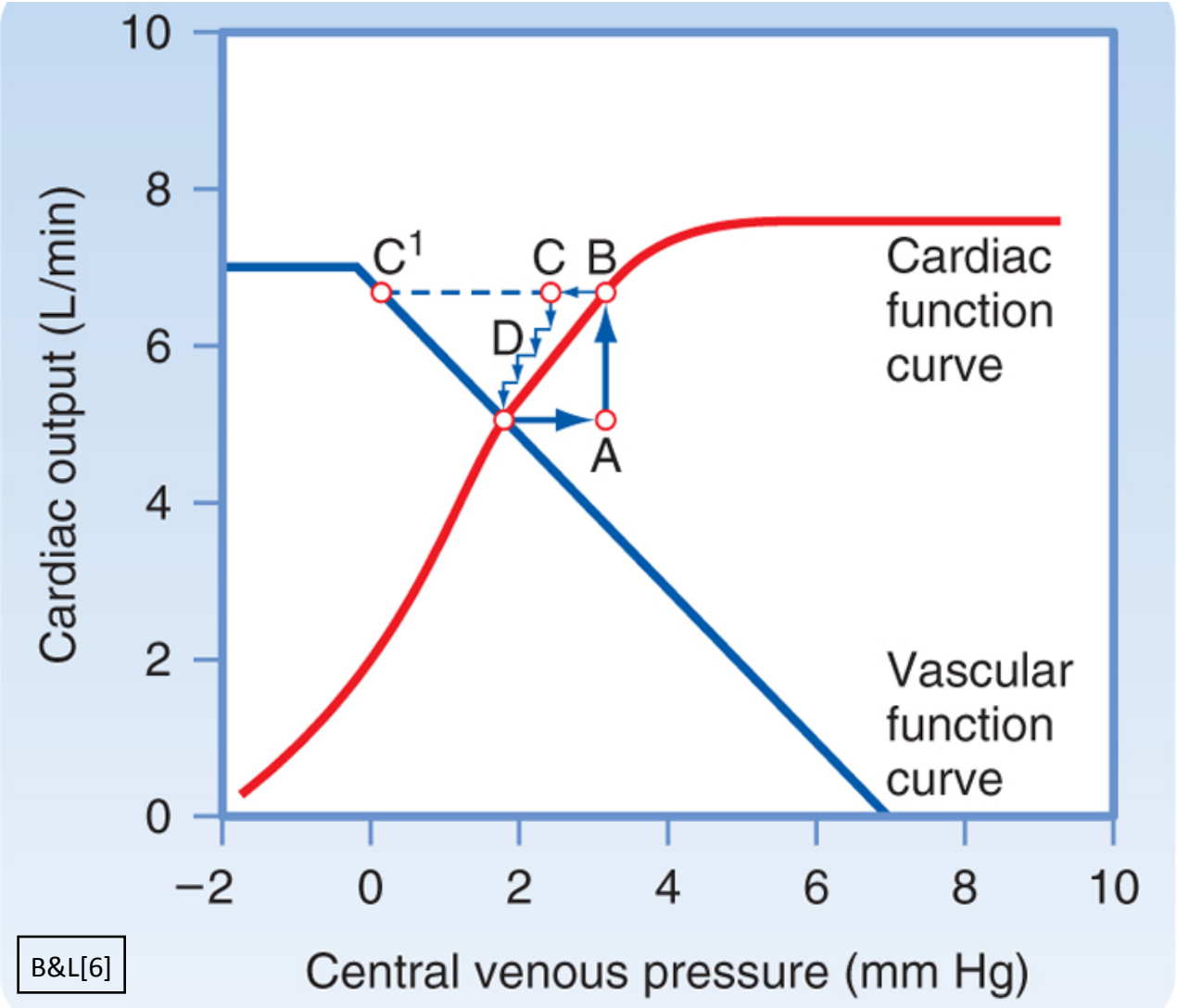

Figure 19-6 Typical vascular and cardiac function curves plotted on the same coordinate axes. Note that to plot both curves on the same graph, the x and y axes for the vascular function curves had to be reversed; compare the assignment of axes with that in Figures 19-3, 19-4, and 19-5. The coordinates of the equilibrium point, at the intersection of the cardiac and vascular function curves, represent the stable values of cardiac output and central venous pressure at which the system tends to operate. Any perturbation (e.g., a sudden increase in venous pressure to point A) institutes a sequence of changes in cardiac output and venous pressure that restore these variables to their equilibrium values.

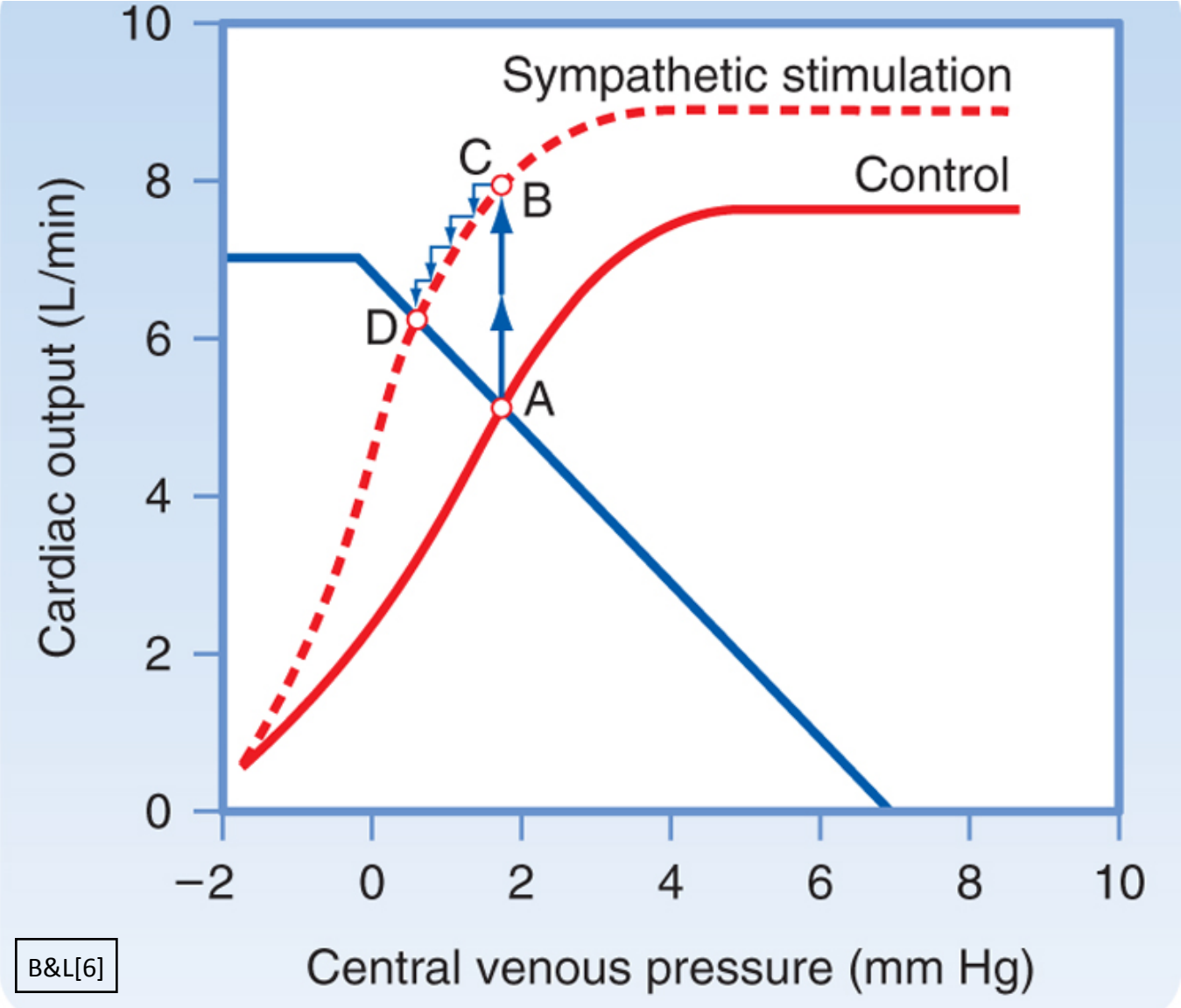

Figure 19-7 Enhancement of myocardial contractility, as by cardiac sympathetic nerve stimulation, causes the equilibrium values of cardiac output and central venous pressure (Pv) to shift from the intersection (point A) of the control vascular and cardiac function curves (continuous curve) to the intersection (point D) of the same vascular function curve with the cardiac function curve (dashed curve) that represents the response to sympathetic stimulation.

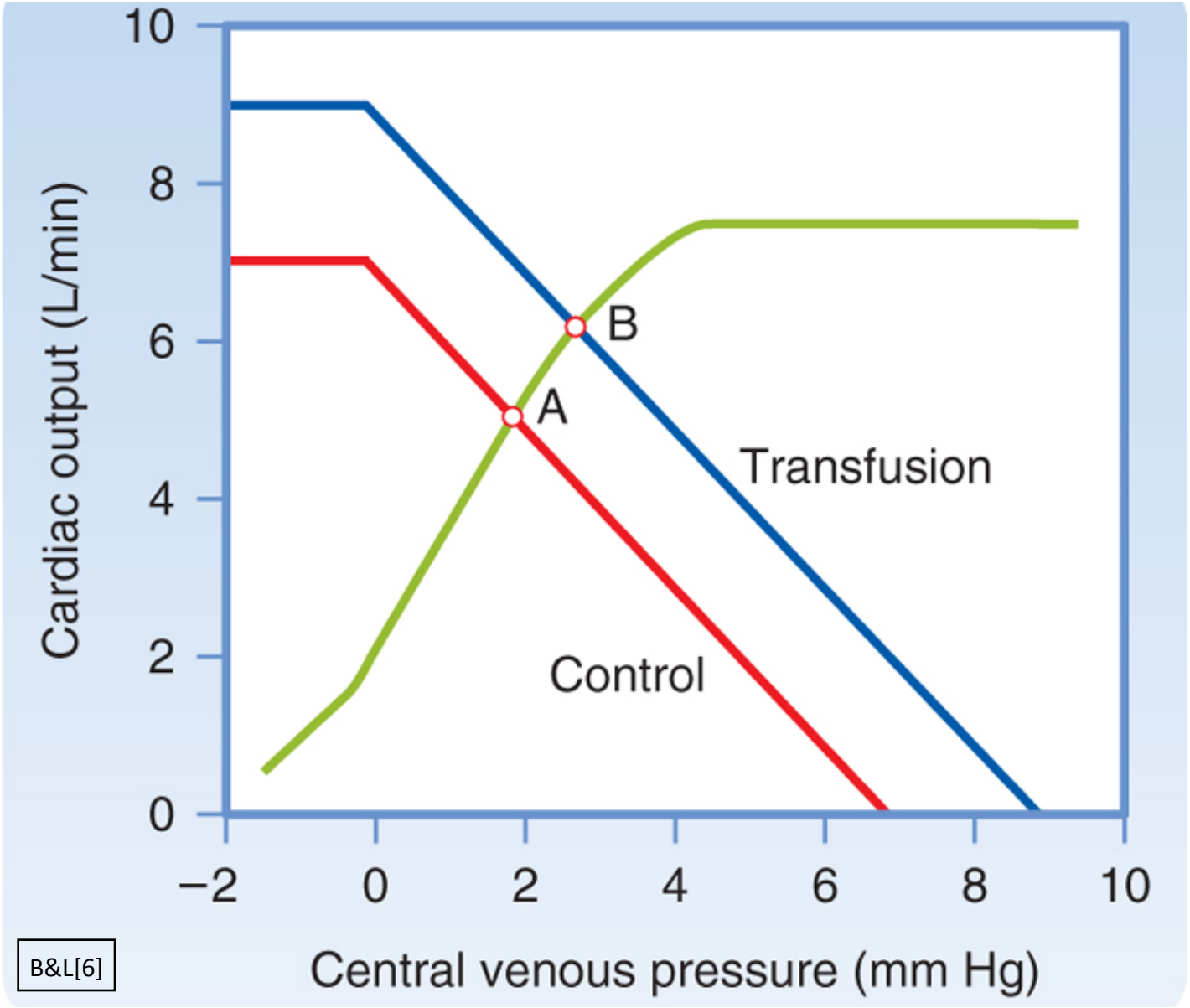

Figure 19-9 After a blood transfusion, the vascular function curve is shifted to the right. Therefore, cardiac output and venous pressure are both increased, as denoted by translocation of the equilibrium point from A to B.

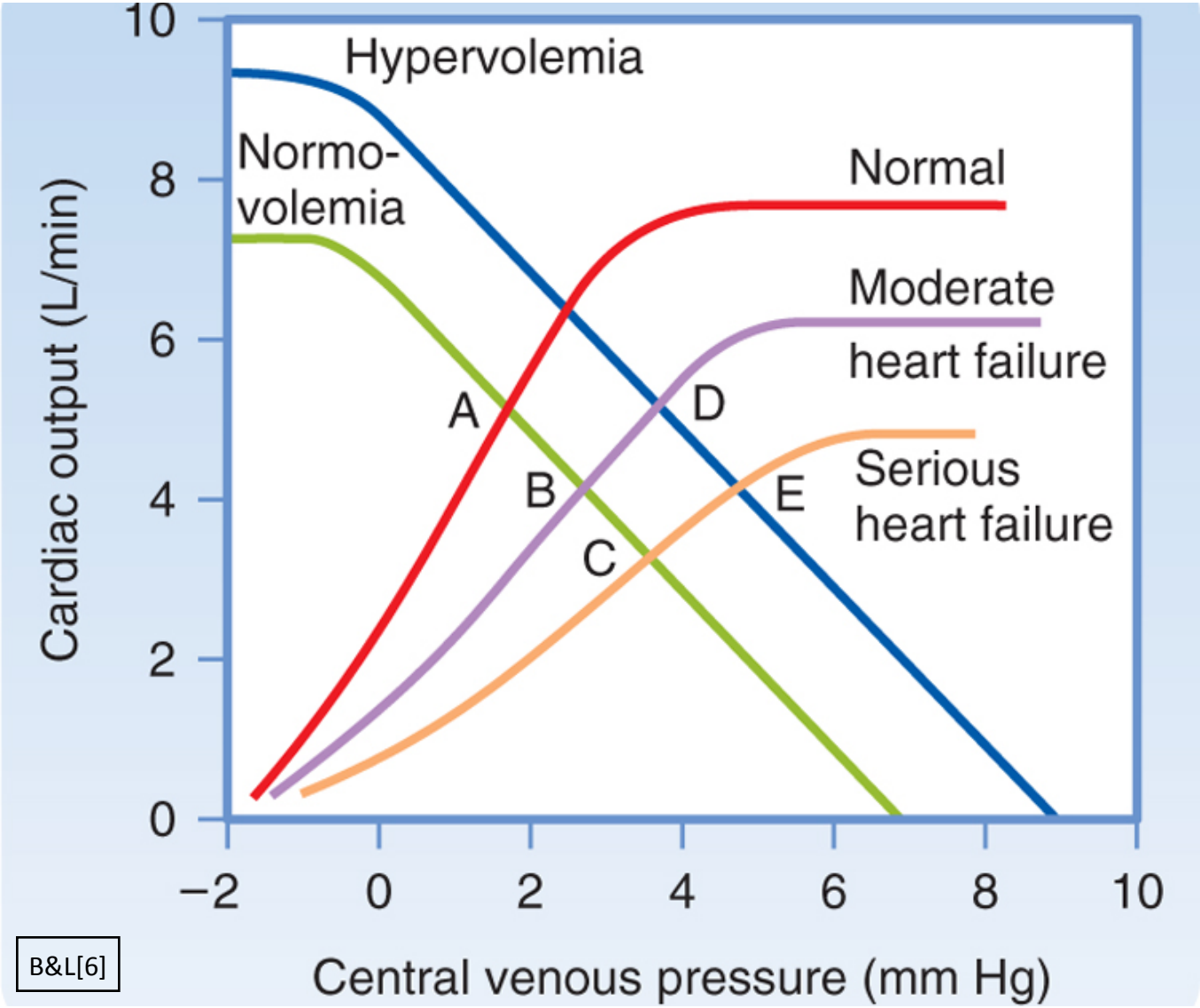

Figure 19-10 Moderate or severe heart failure shifts the cardiac function curves downward and to the right. Before changes in blood volume, cardiac output decreases and central venous pressure rises (from control equilibrium point A to point B or point C). After the increase in blood volume that usually occurs in heart failure, the vascular function curve is shifted to the right. Hence, central venous pressure may be elevated with no reduction in cardiac output (point D) or (in severe heart failure) with some reduction in cardiac output (point E).

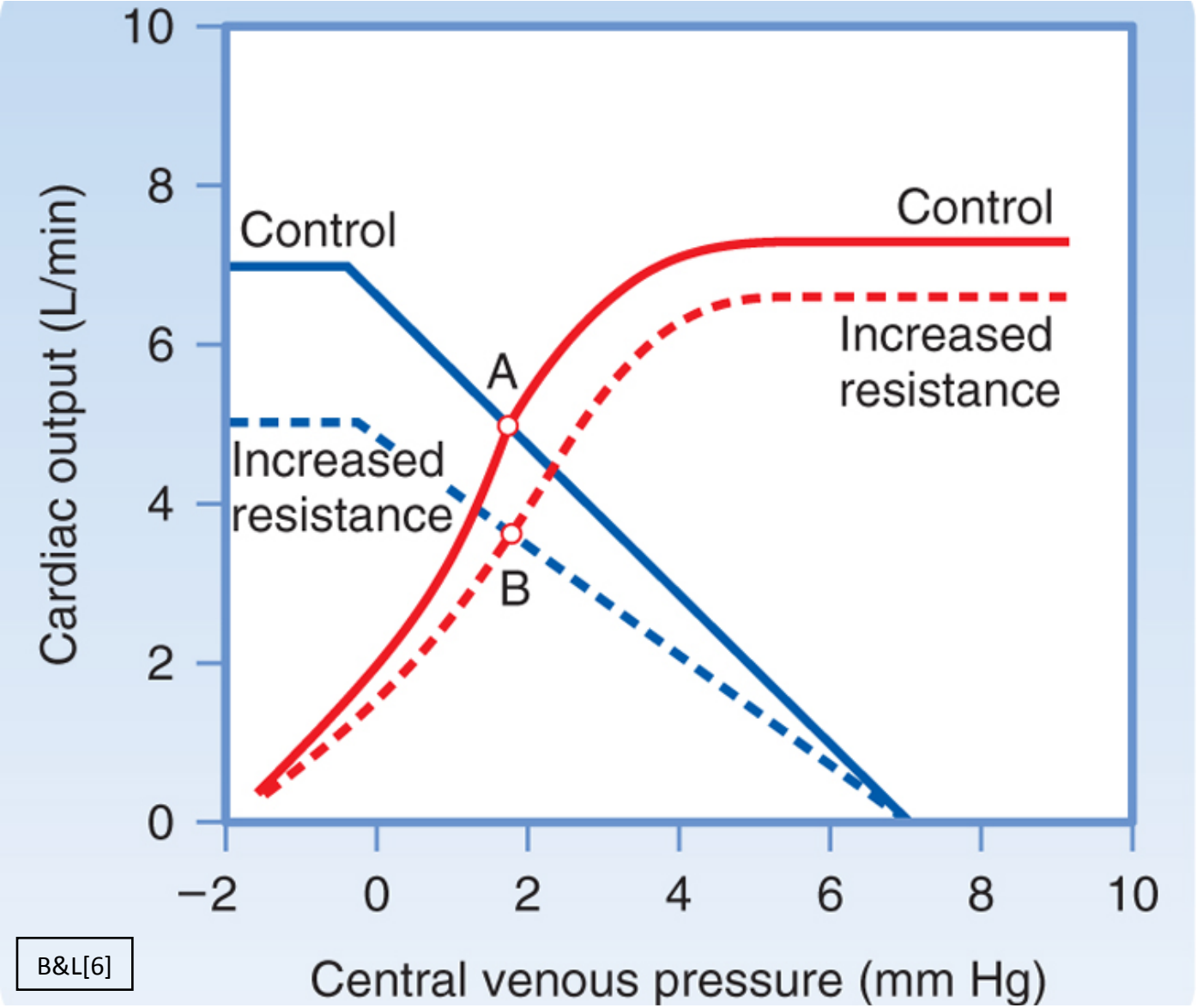

Figure 19-11 An increase in peripheral resistance shifts the cardiac and vascular function curves downward. At equilibrium, cardiac output is less (B) when peripheral resistance is high than when it is normal (A).

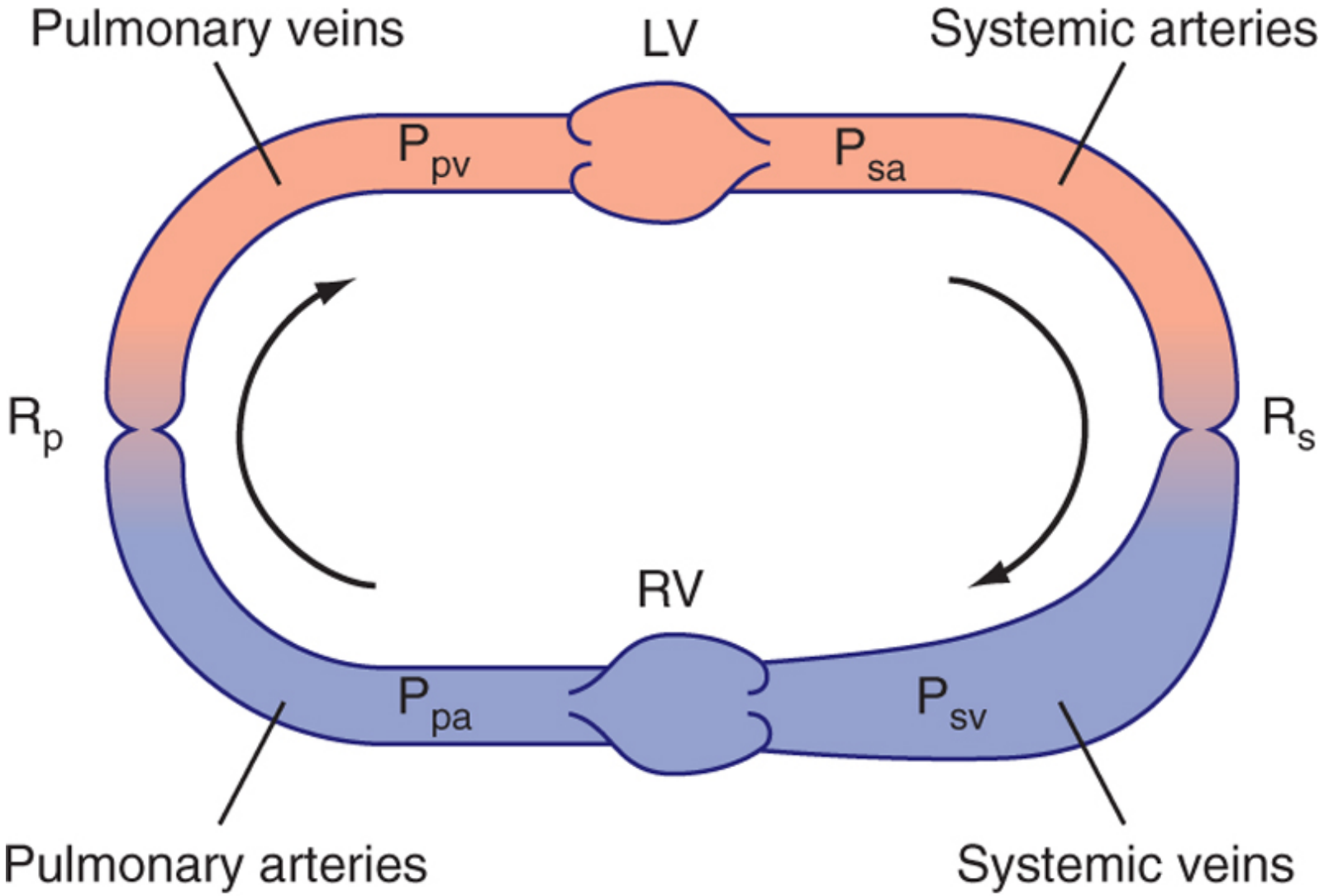

Figure 19-12 Simplified cardiovascular system model that consists of the left (LV) and right (RV) ventricles, systemic (Rs) and pulmonary (Rp) vascular resistance, systemic arterial and venous compliance, and pulmonary arterial and venous compliance. Psa and Psv are the pressures in the systemic arteries and veins, respectively; Ppa and Ppv are the pressures in the pulmonary arteries and veins, respectively.

END

Video 2, Module 10