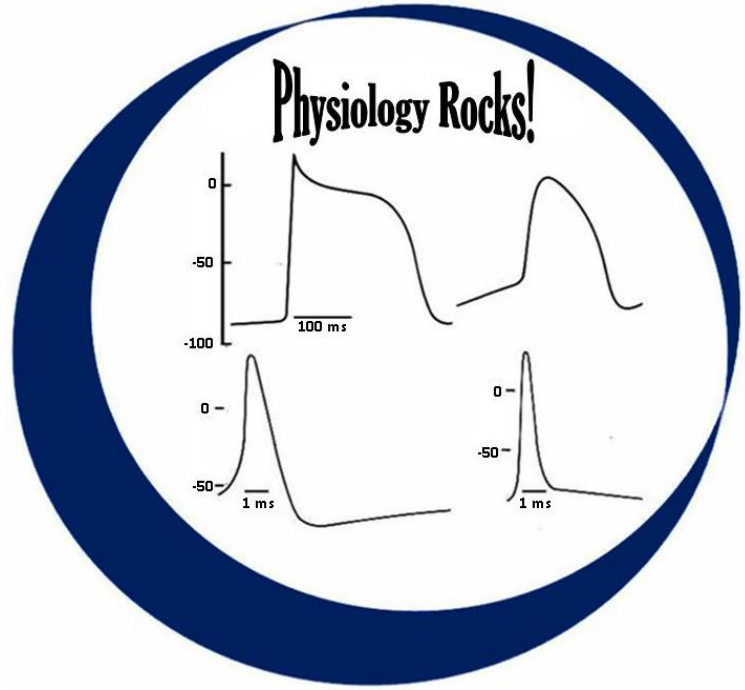
Lecture 28
Cardiac-Vascular Interactions



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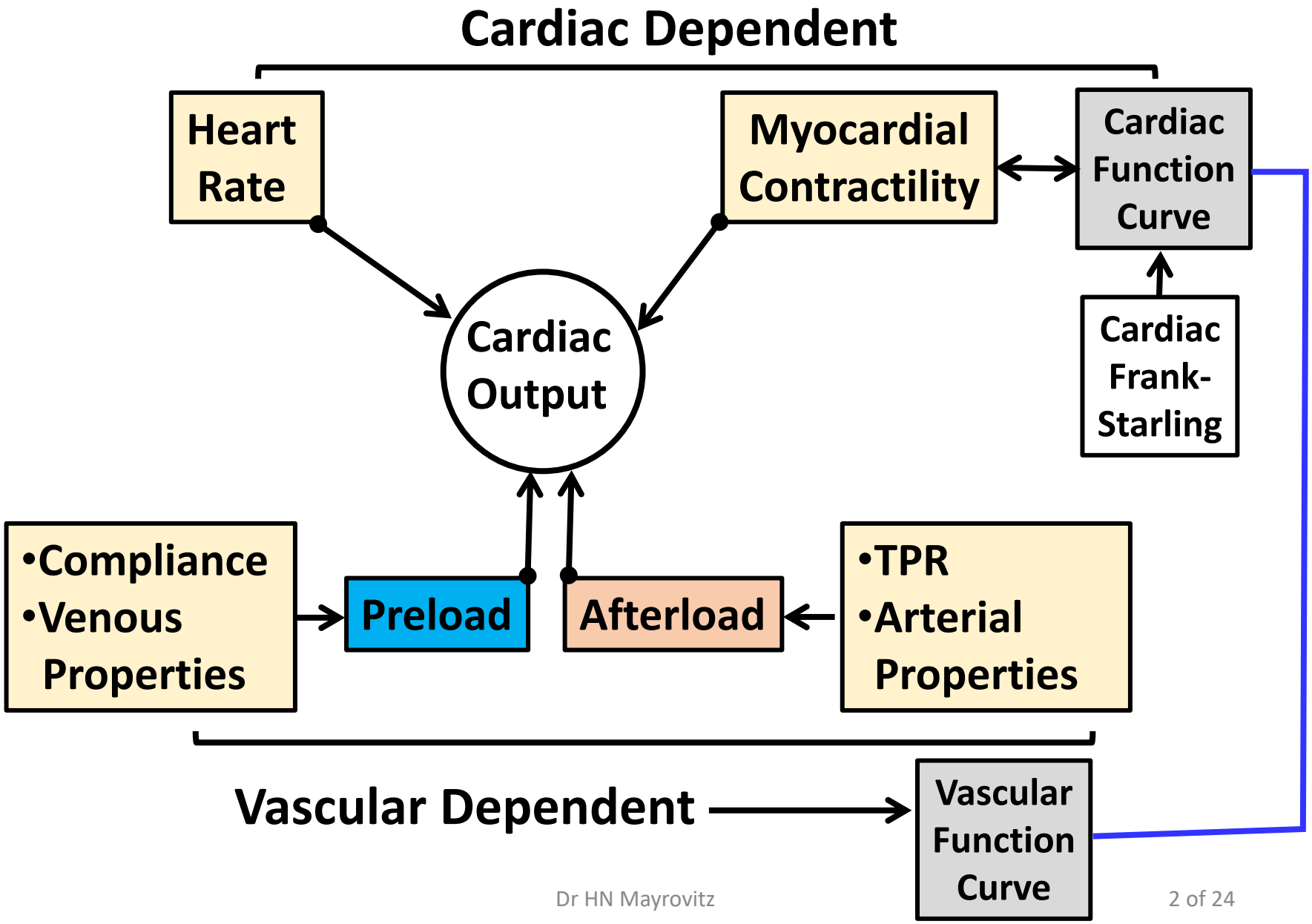
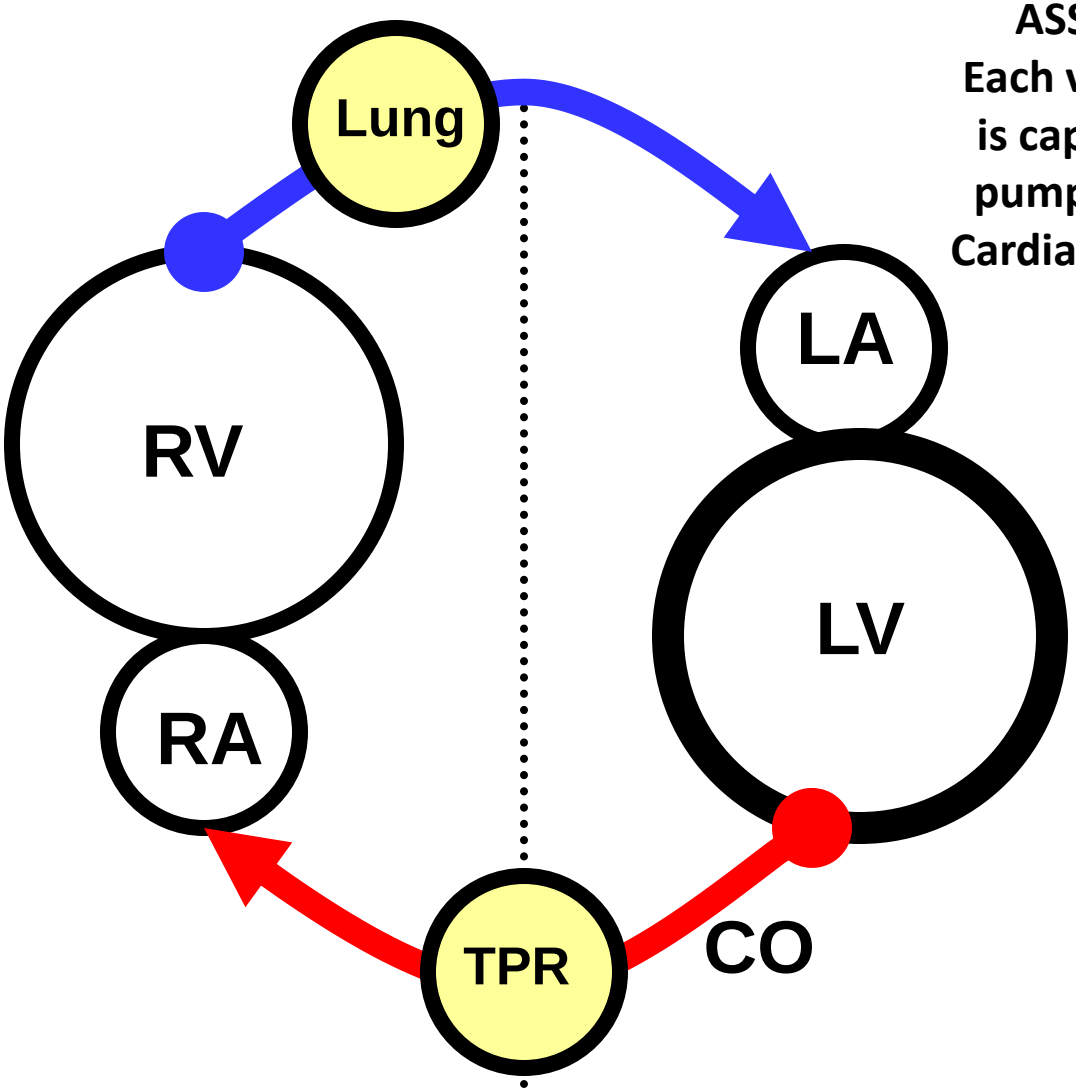
Cardiac Output Major Determinants



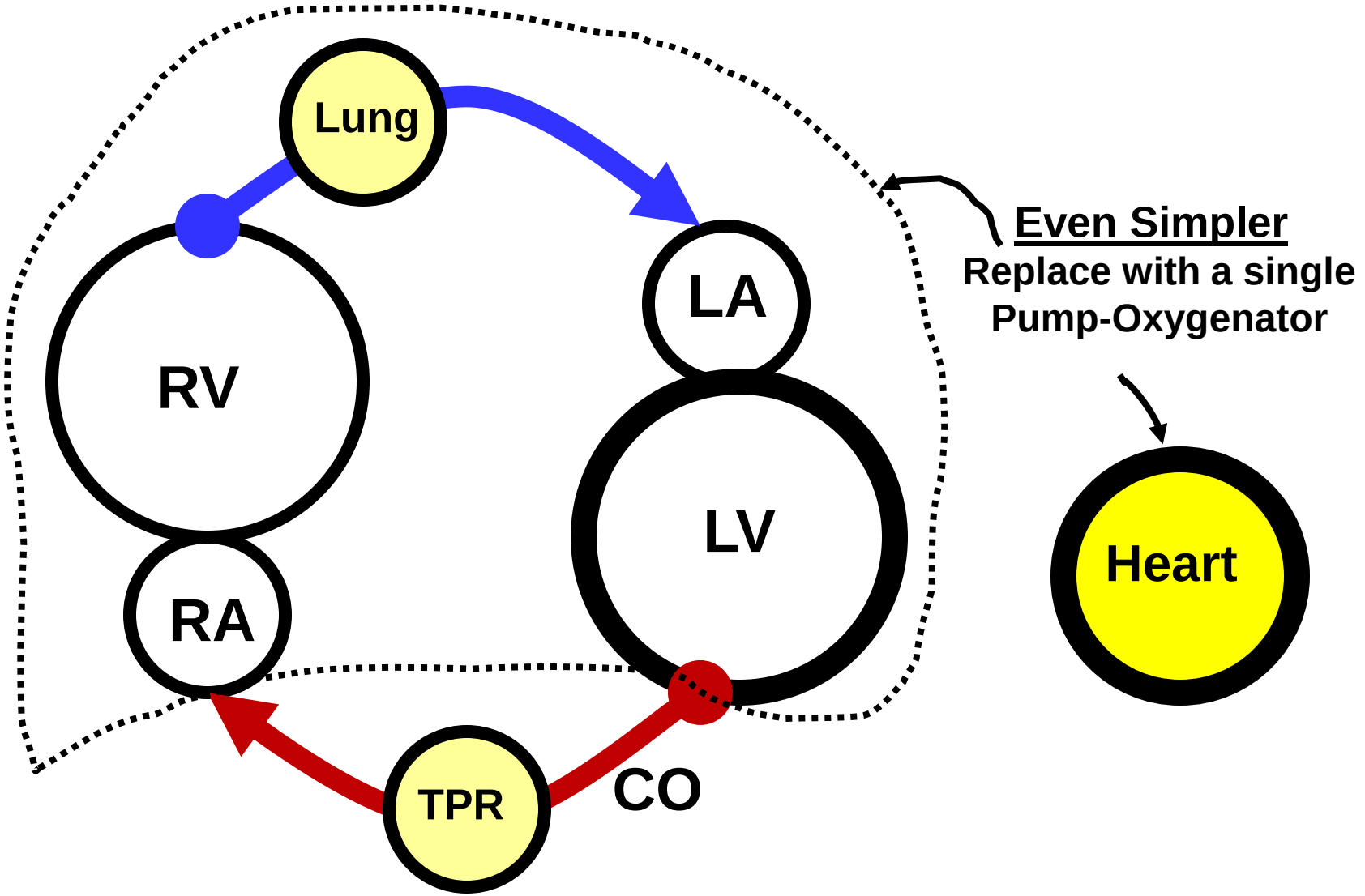
The Cardiovascular Representation

1st Level of Cardiac-Vascular Coupling

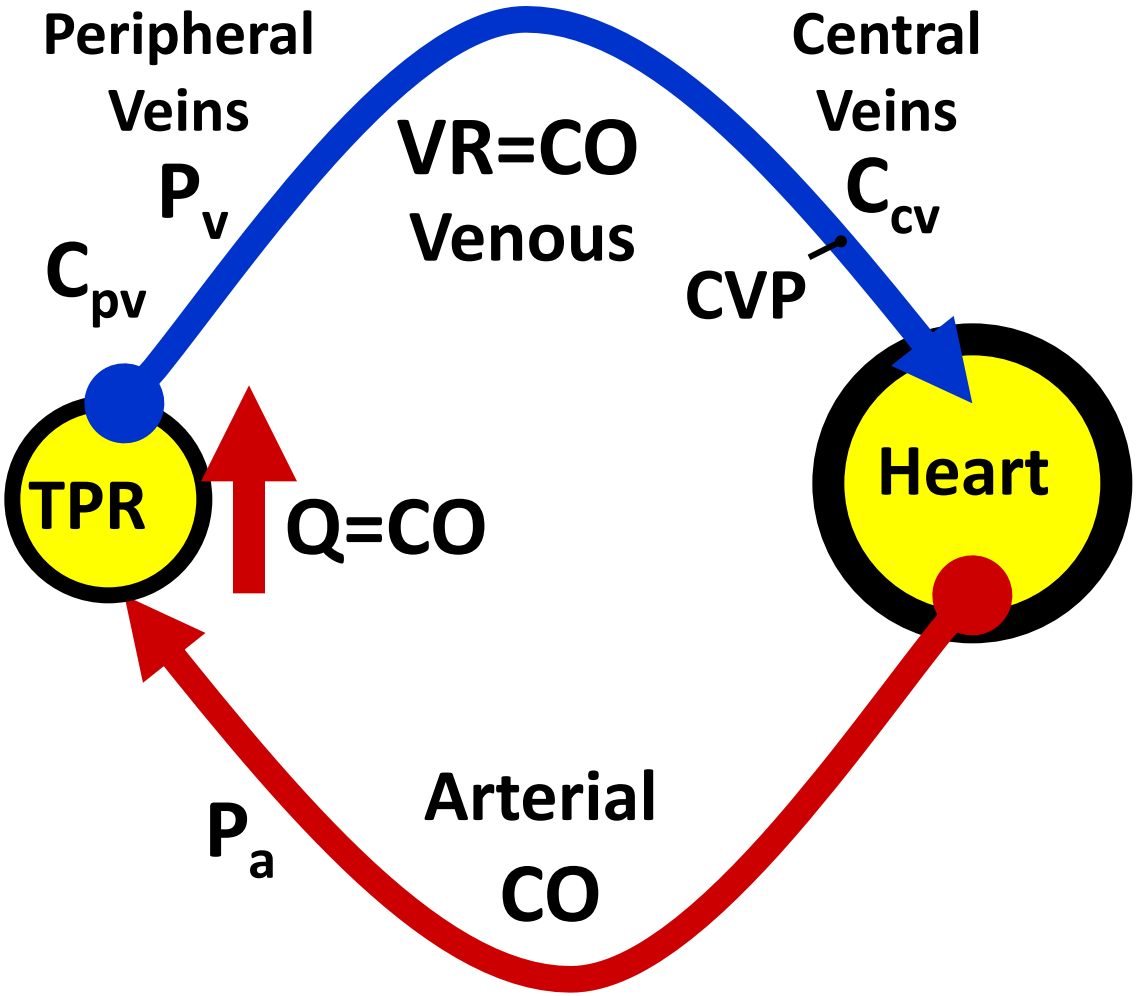


ASSUME
Each ventricle is capable of pumping the Cardiac Output

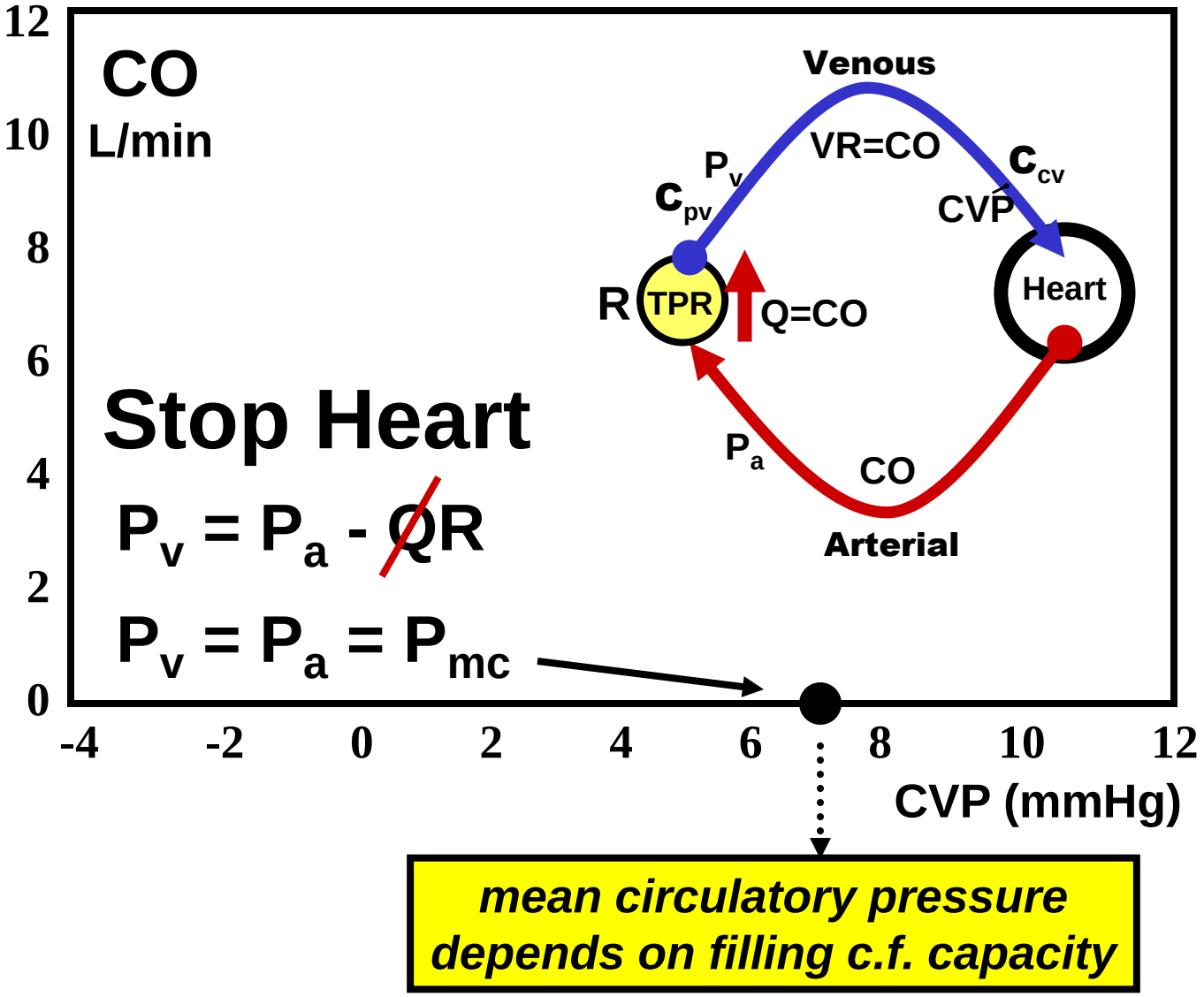
2nd Level of Cardiovascular Coupling



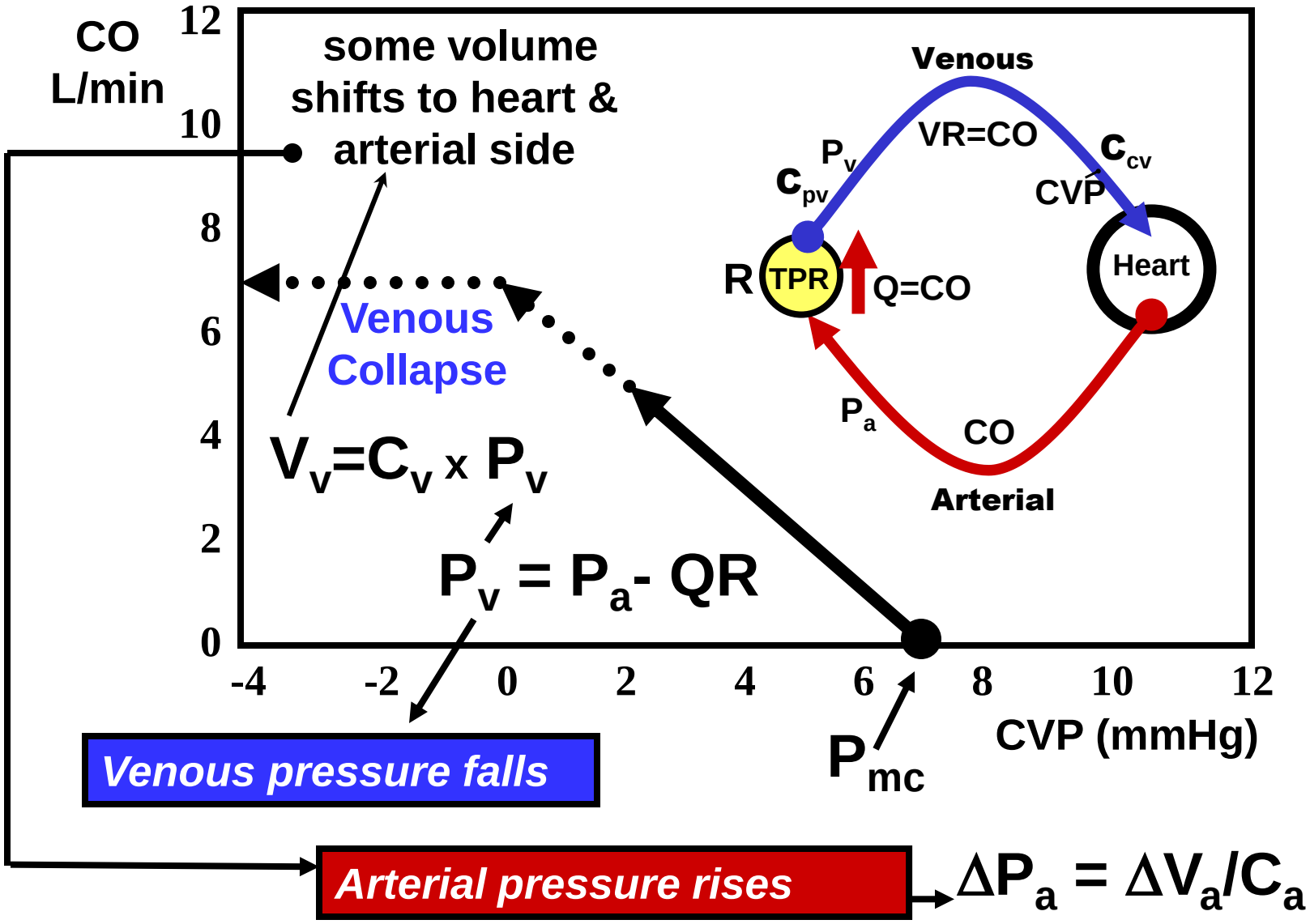
Basic Representation



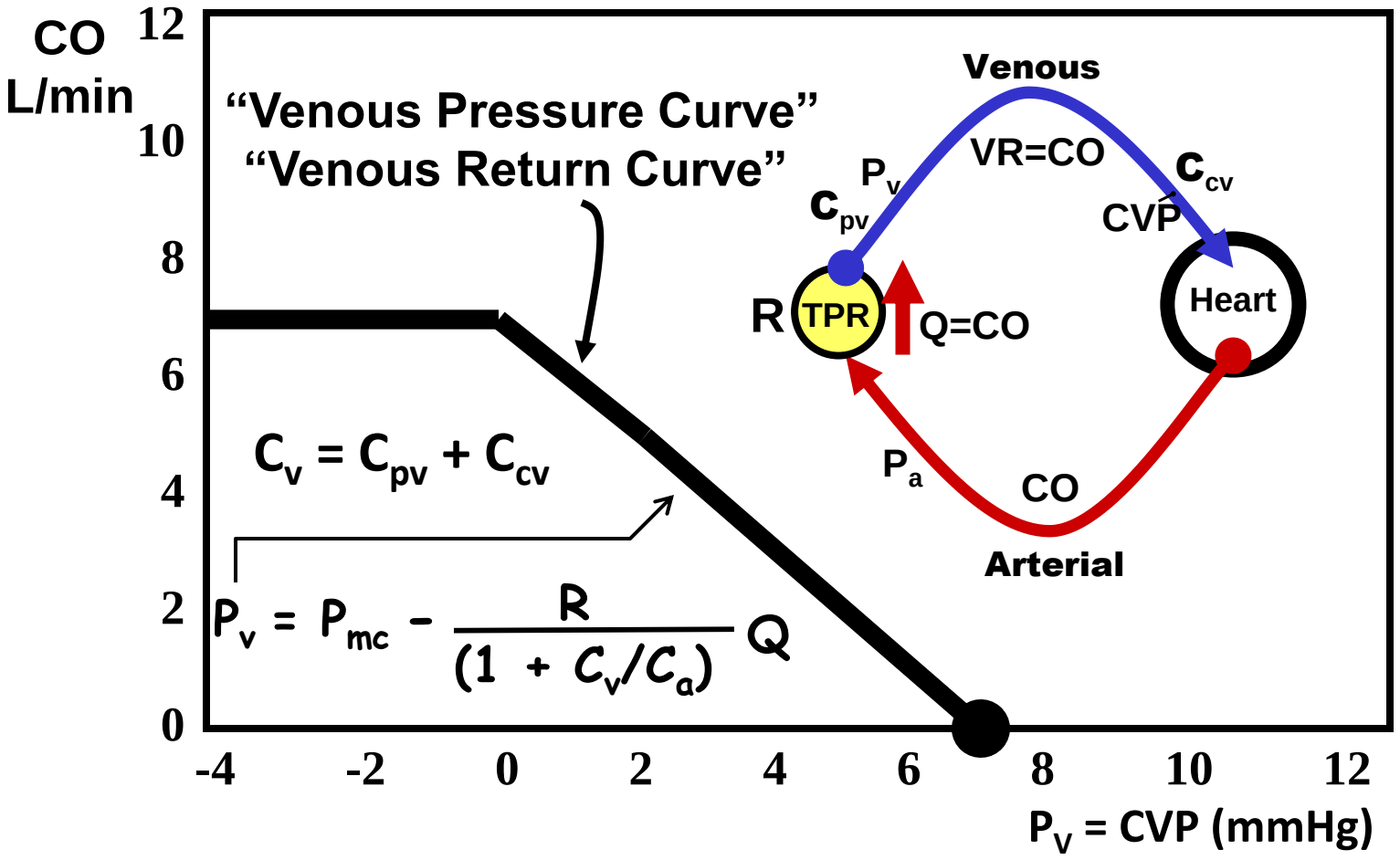
Vascular Function Curve – Heart Stopped



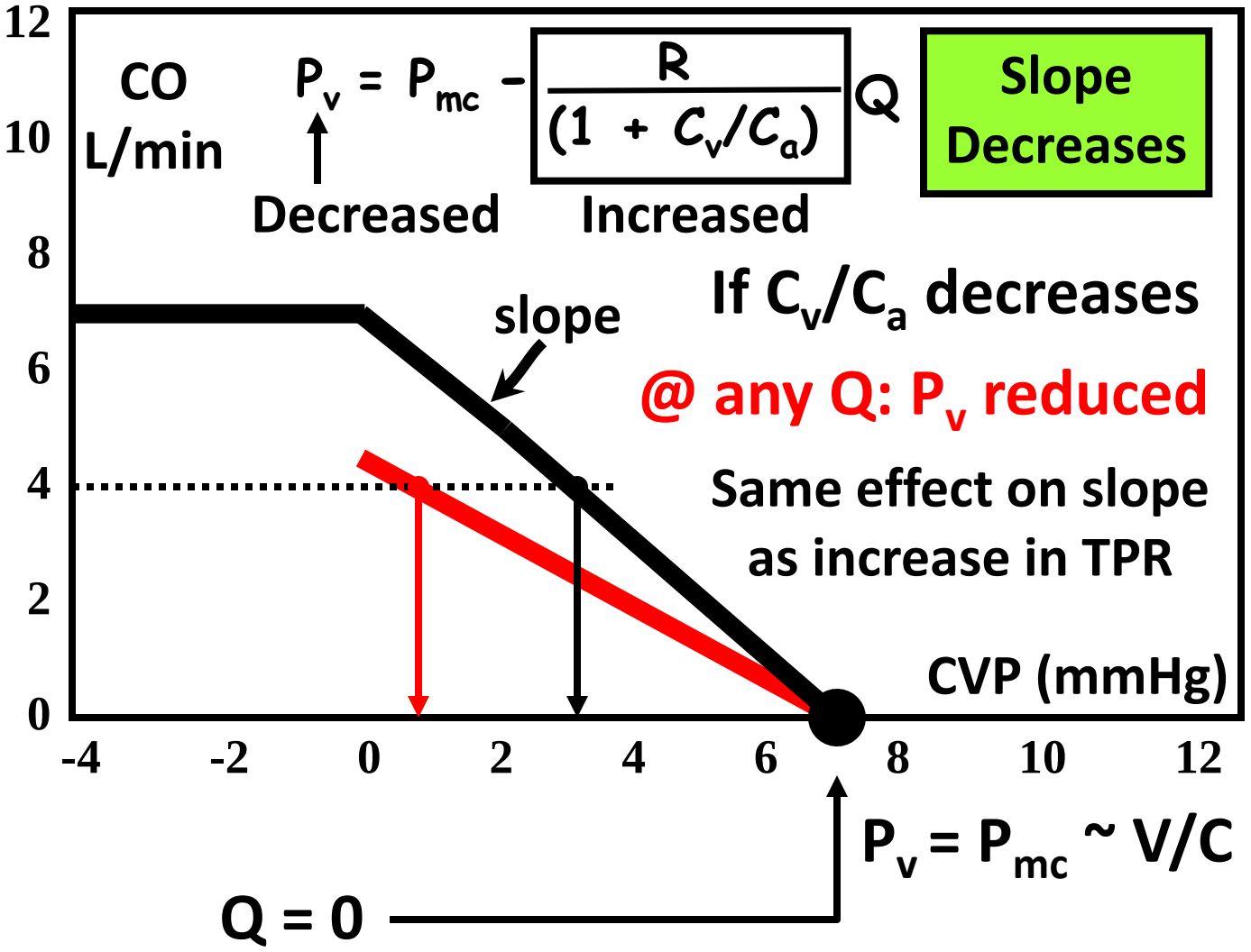
Restart Heart – Start Pumping



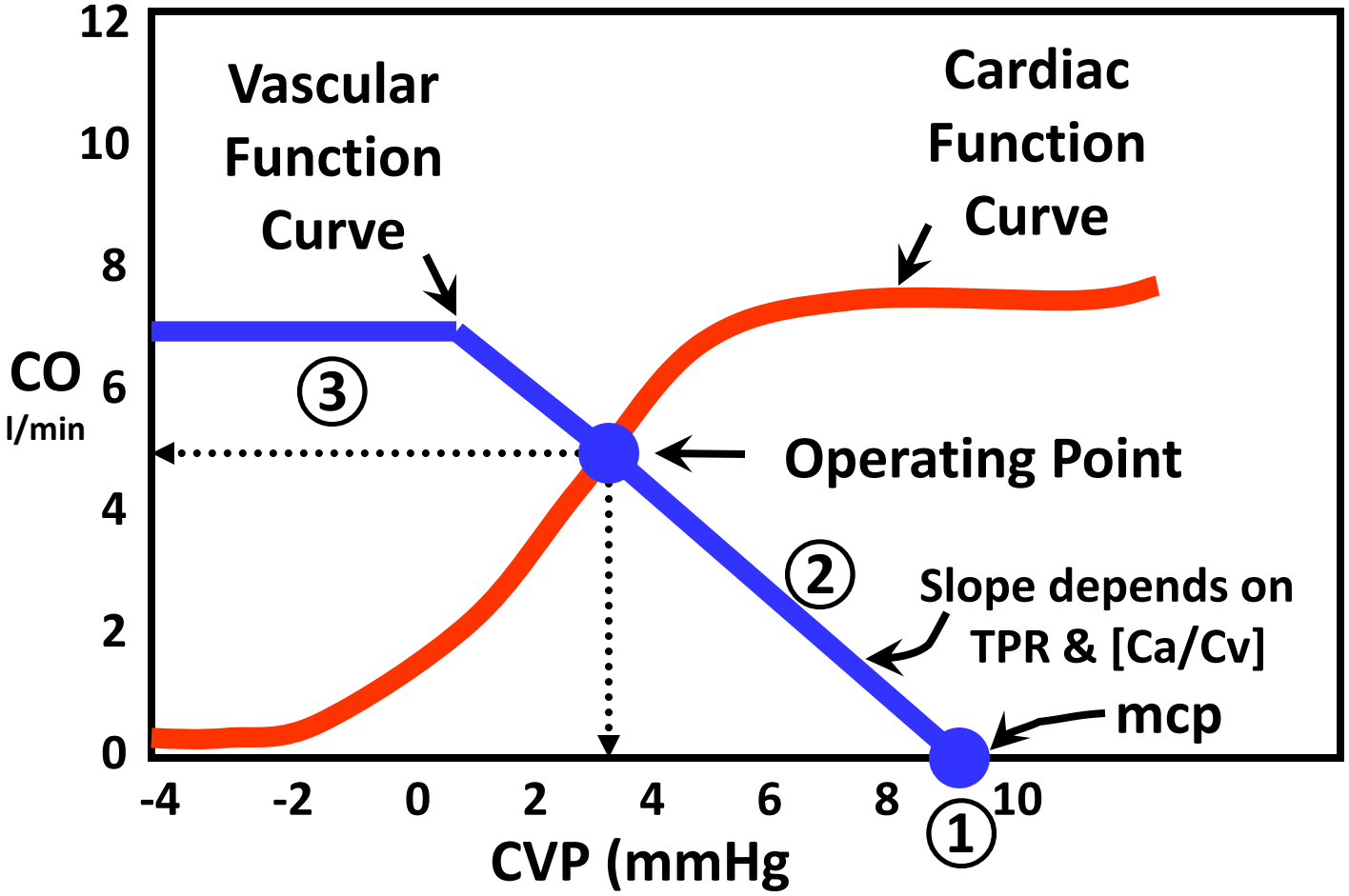
Vascular Function Curve – Heart Pumping



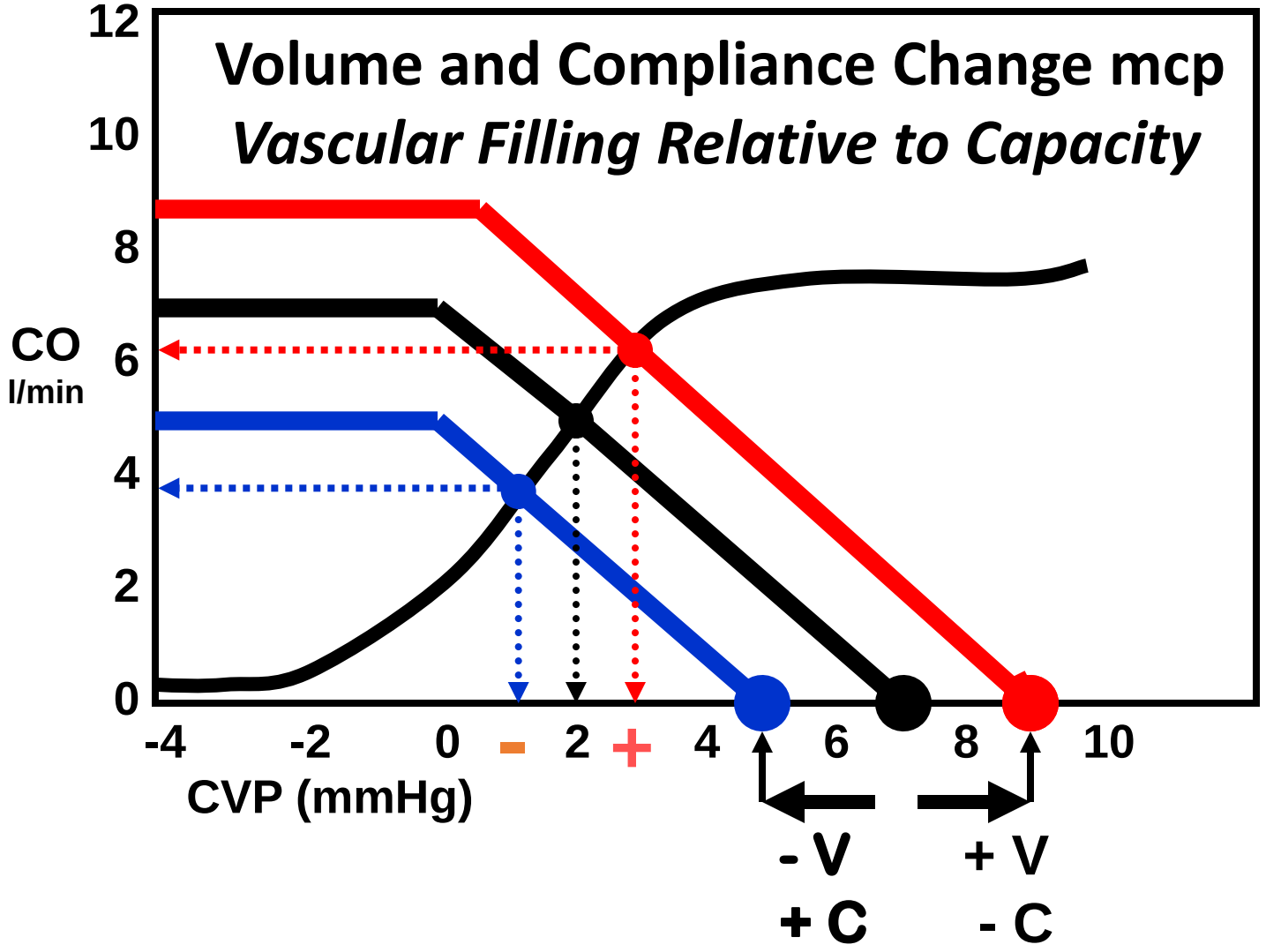
Vascular Function Curve: Slope Change



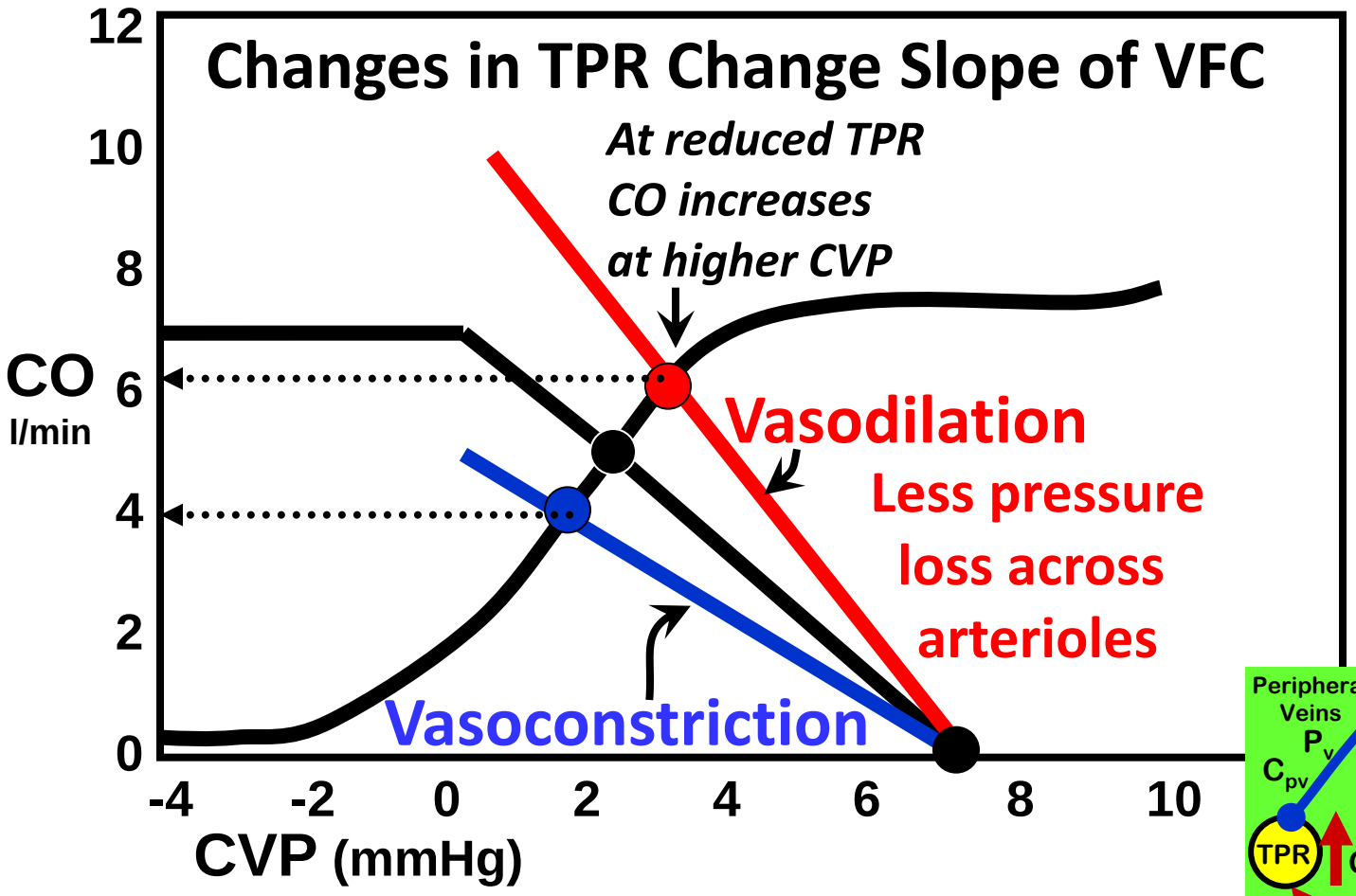
Vascular and Cardiac Function Curves Intersect

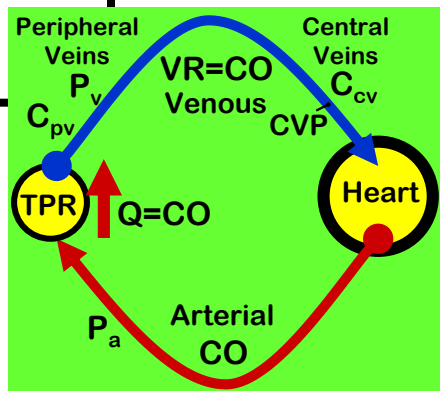


Mean Circulatory Pressure Changes

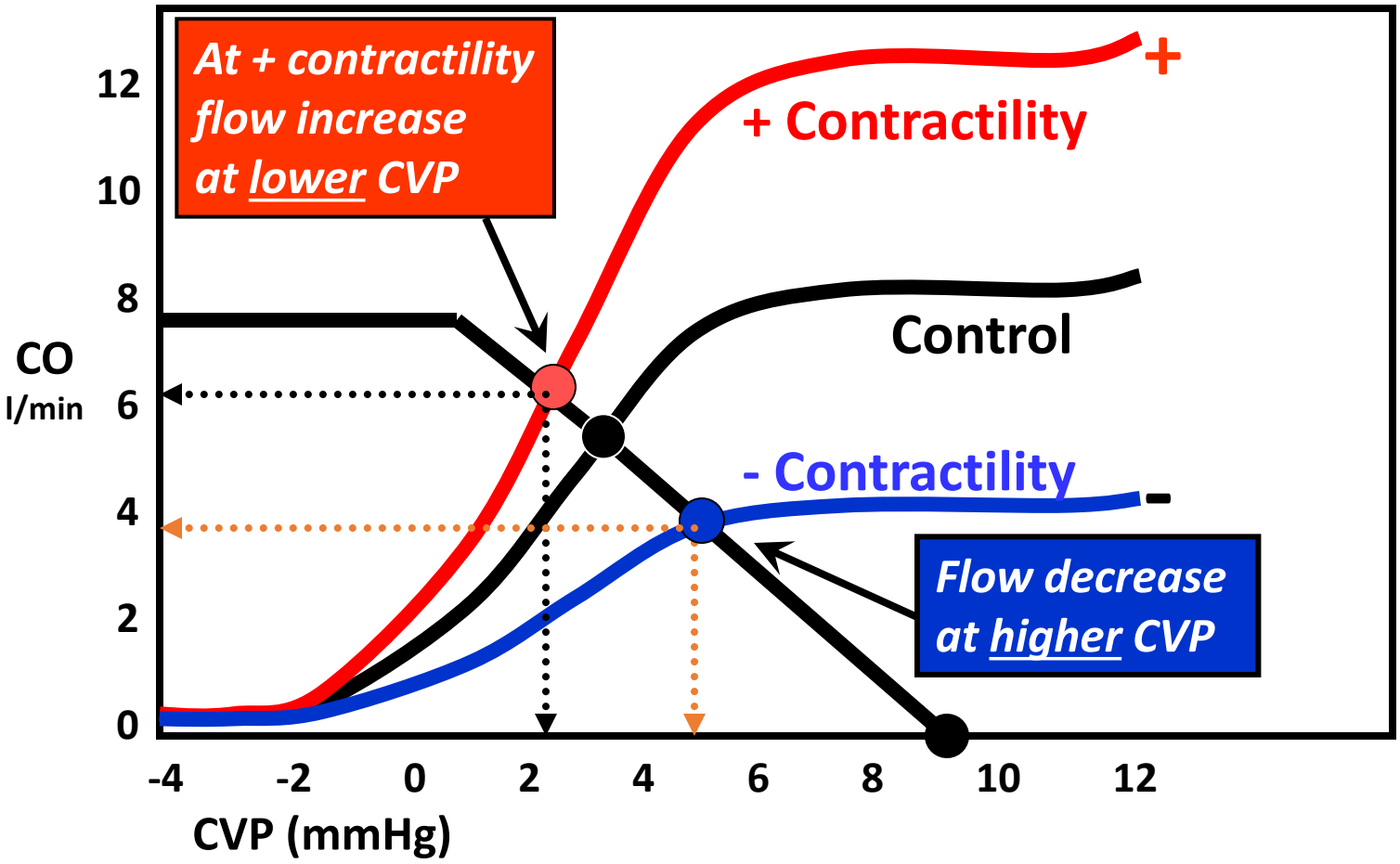


Vascular Function: Slope Changes

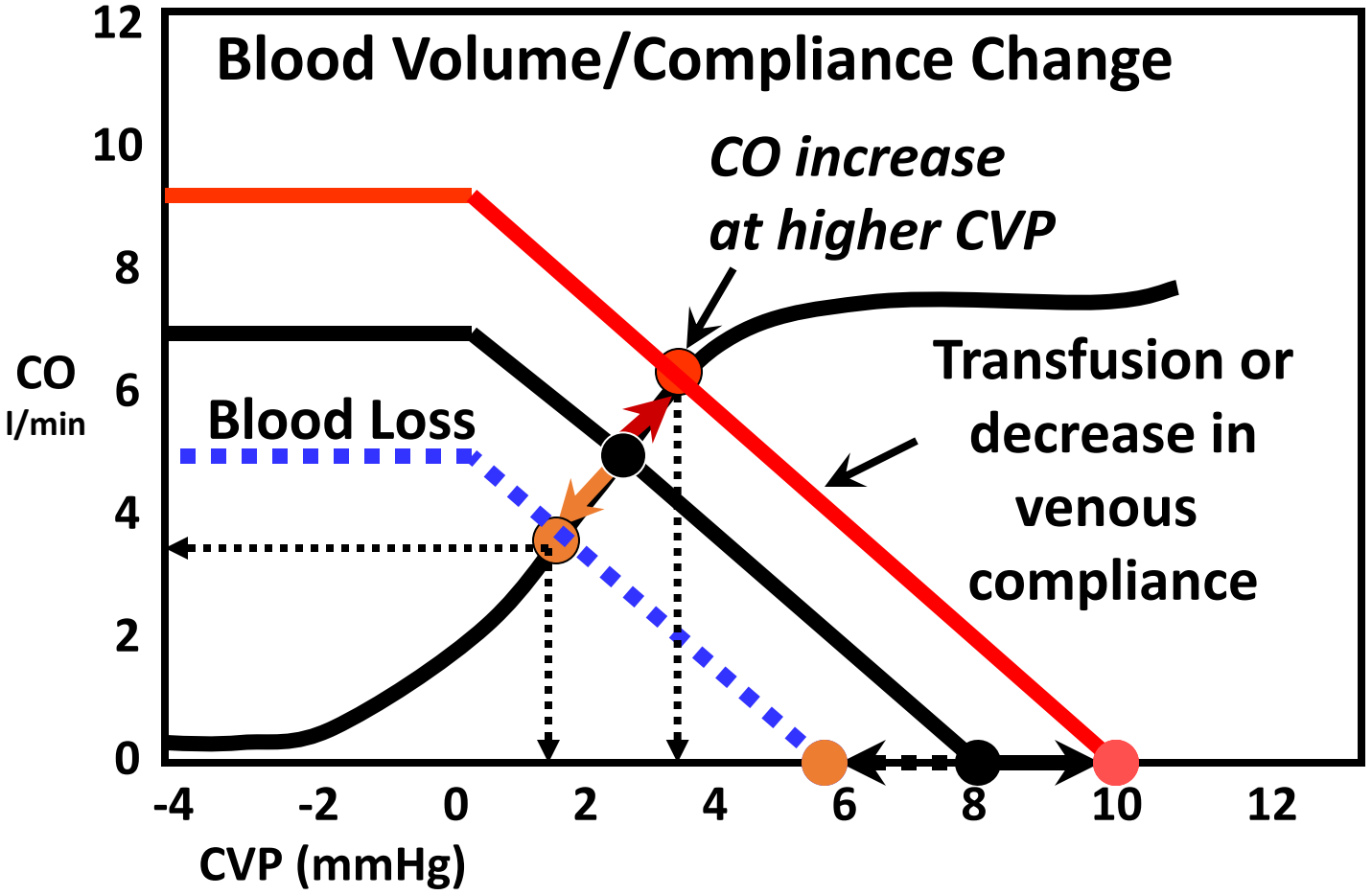




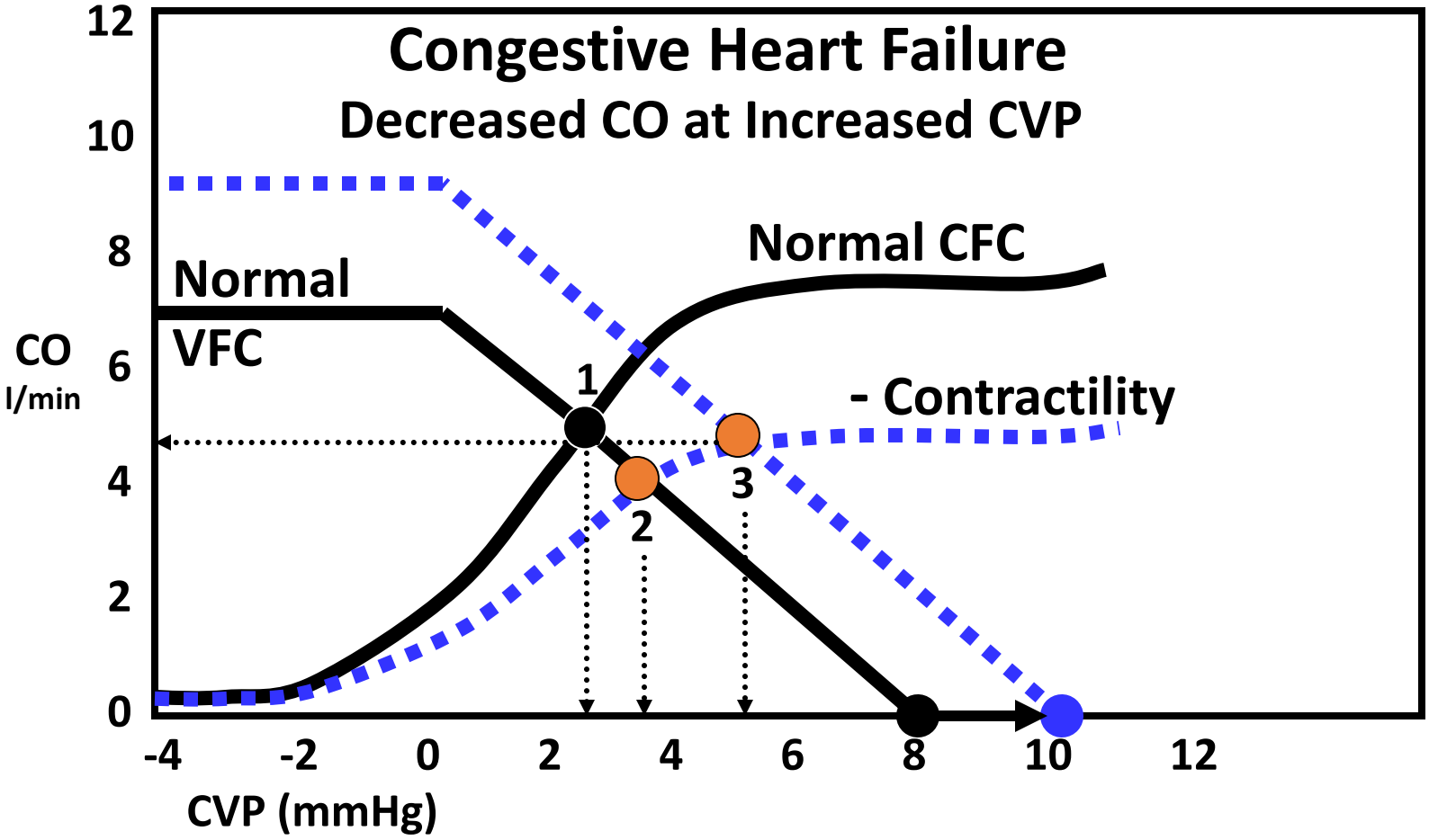
Contractility Effects



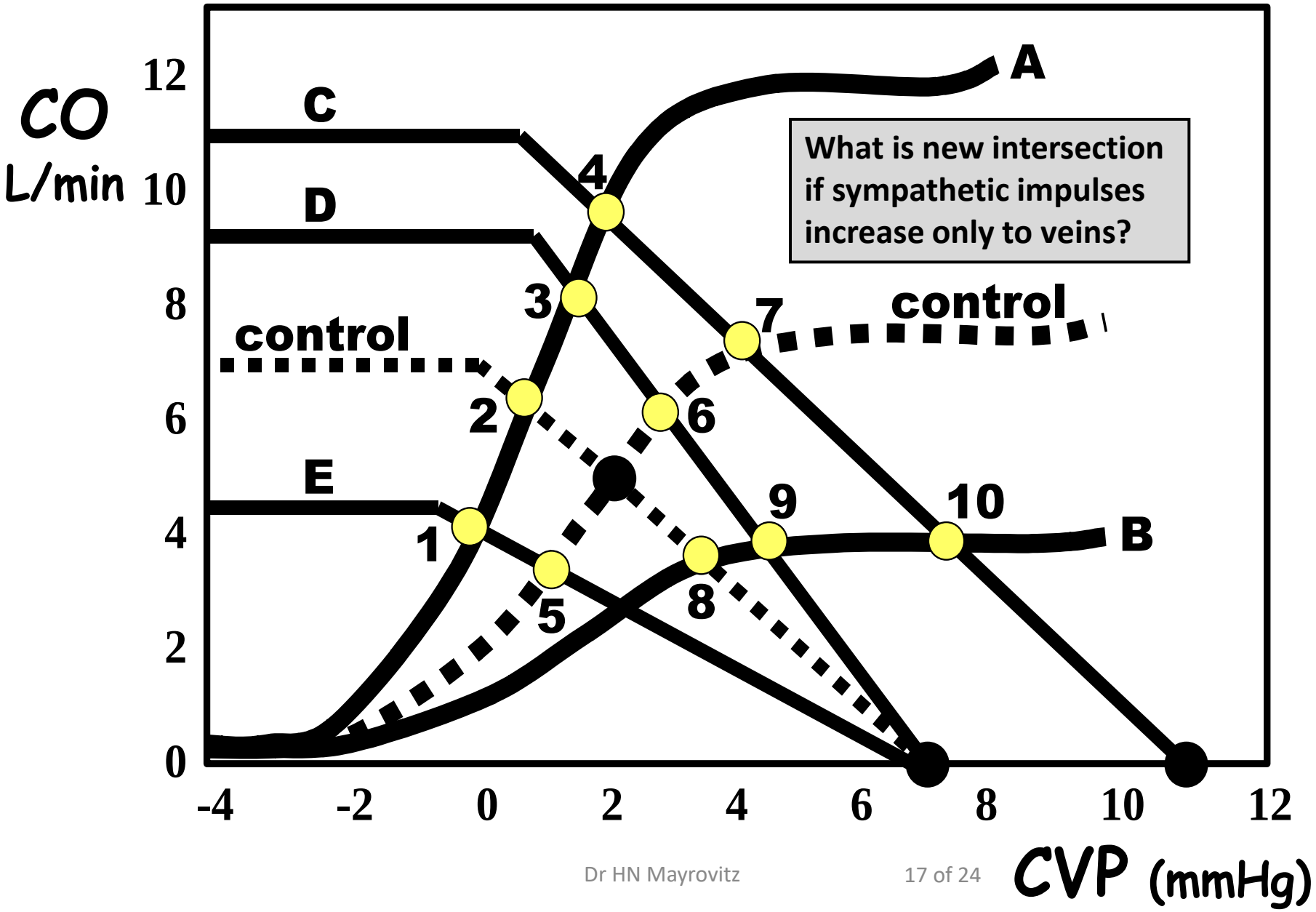
Shifts in VFC



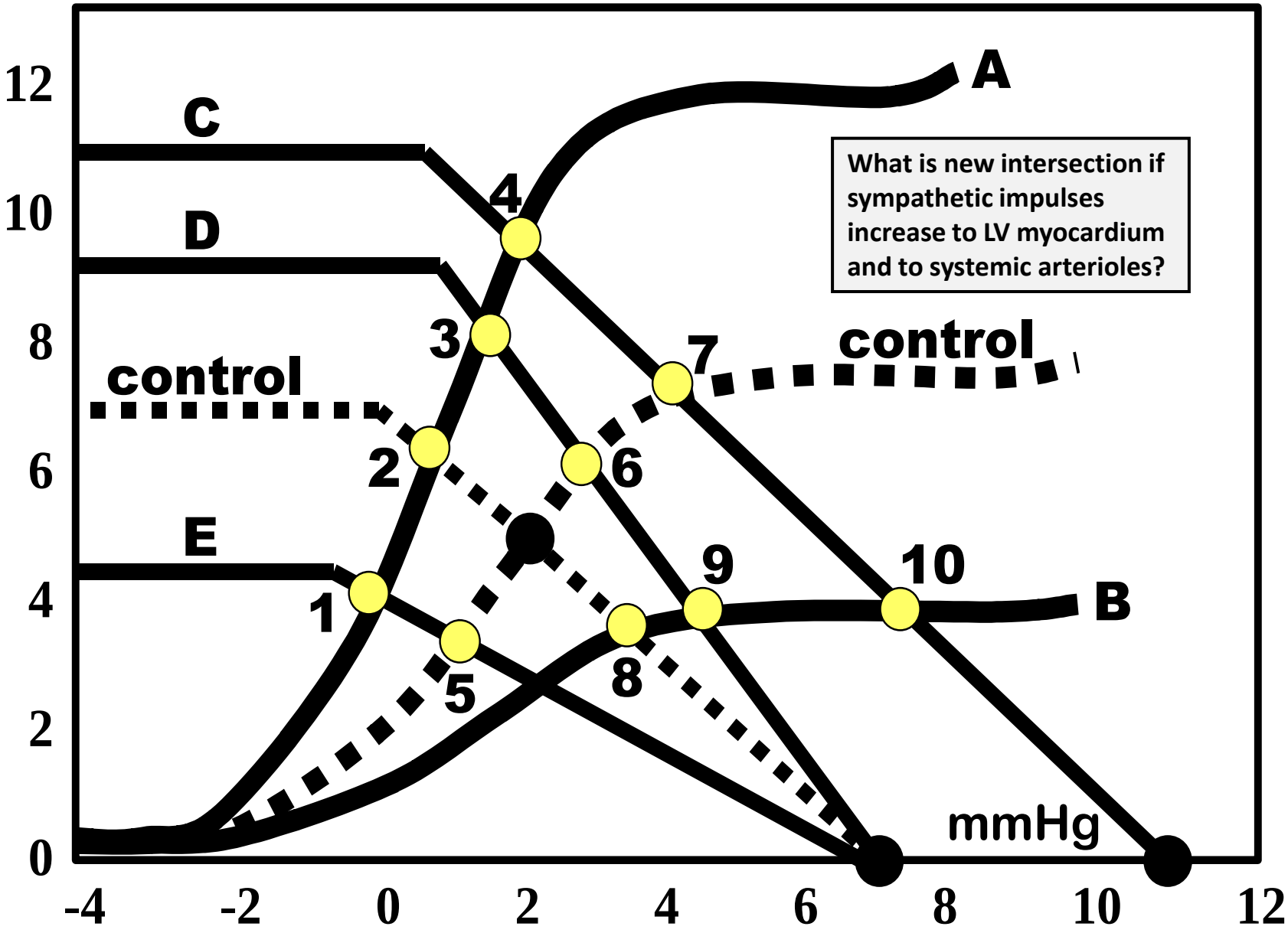
Decreased Contractility



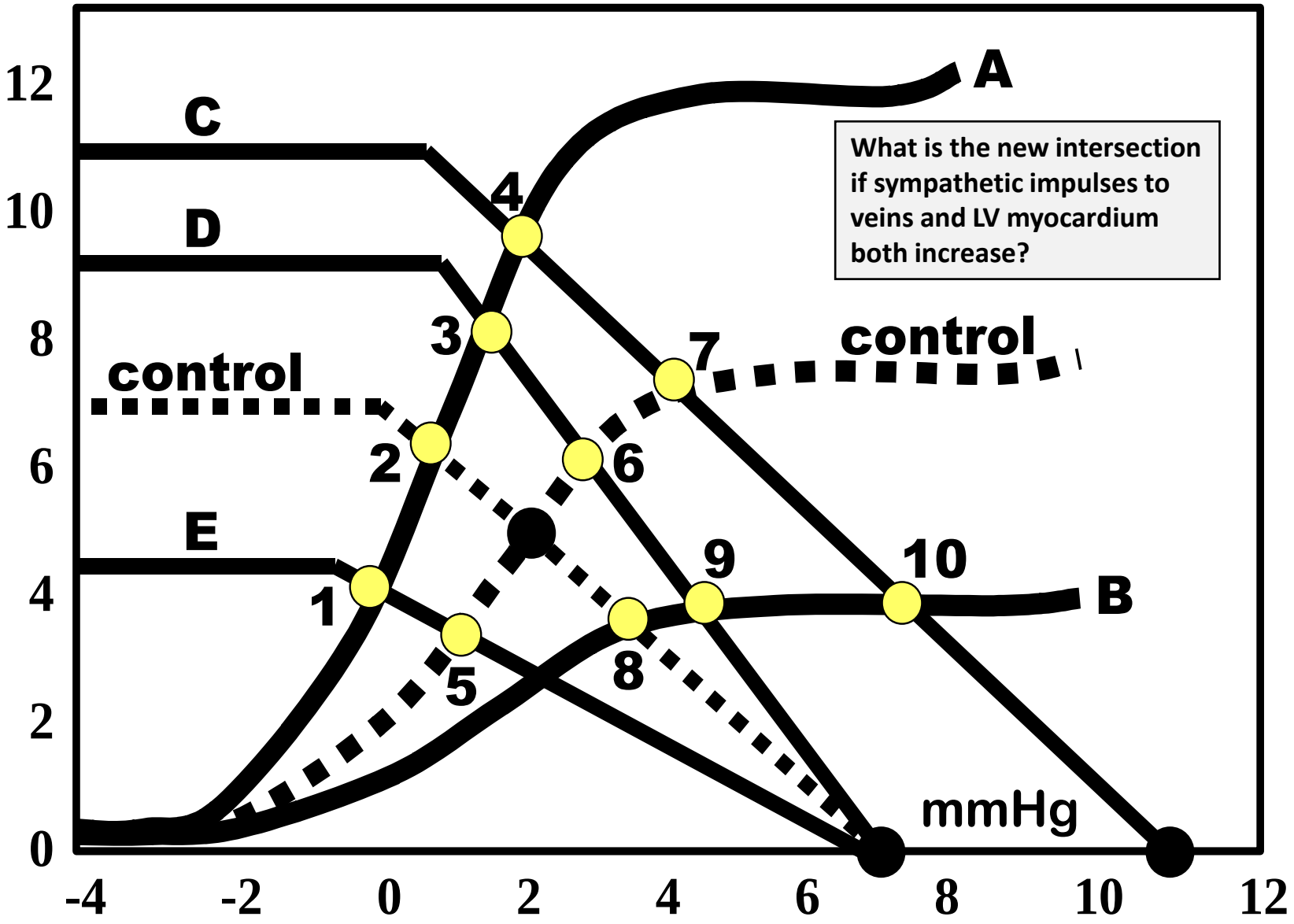
Interactive Question



Interactive Question

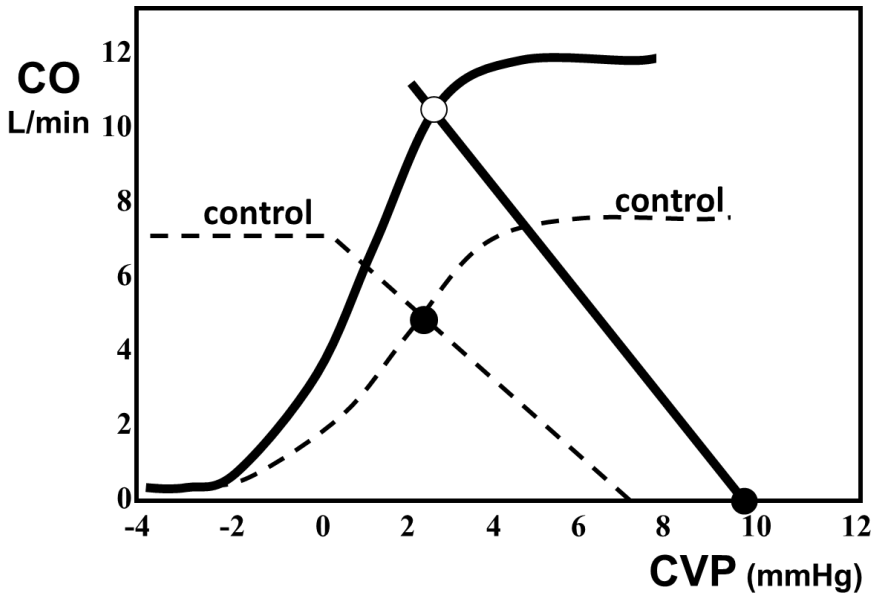


Interactive Question



Interactive Question

The figure shows a hypothetical patient's cardiac and vascular function curves before a change (control dashed line) and the change that occurred due to some event (solid lines). CO and CVP are cardiac output and central venous pressure respectively. What best describes the change that occurred?



A. Contractility and TPR increased

B. Contractility and TPR decreased

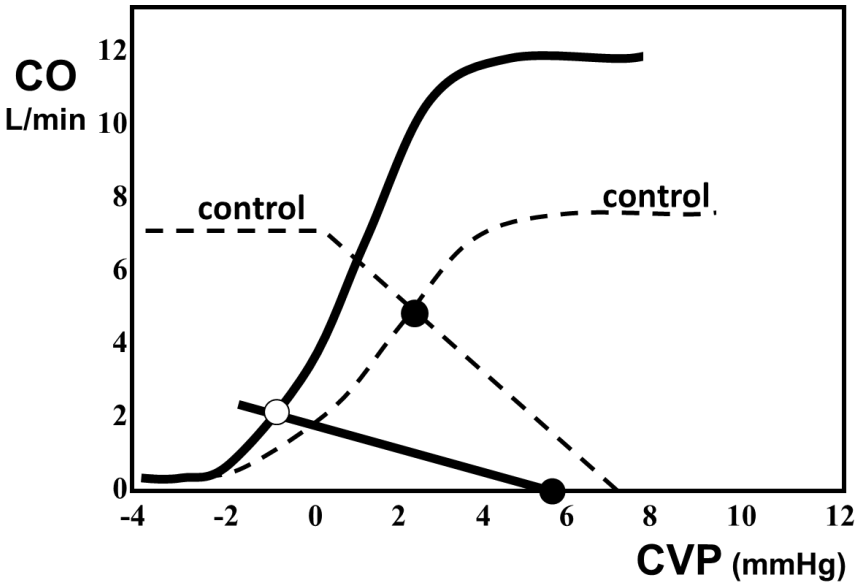
C. Contractility and blood volume increased

D. TPR and blood volume increased

E. TPR increased and contractility decreased

Interactive Question

The figure shows a hypothetical patient's cardiac and vascular function curves before a change (control dashed line) and the change that occurred due to some event (solid lines). CO and CVP are cardiac output and central venous pressure respectively. What best describes the change that occurred?



A. Contractility and TPR increased

B. Contractility and TPR decreased

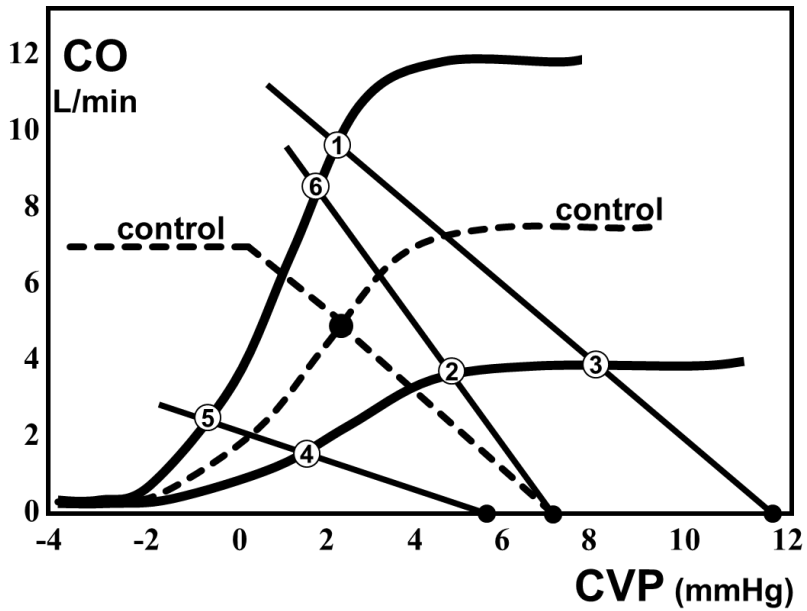
C. Contractility and blood volume increased

D. TPR and blood volume increased

E. TPR increased and contractility decreased

Interactive Question

The figure shows a hypothetical patient's cardiac and vascular function curves before a change (control dashed line) and the change that occurred due to some event (solid lines). CO and CVP are cardiac output and central venous pressure respectively. What best describes the change that occurred?



If the intervening event is **increased sympathetic activation of heart and arterioles**, what is the new operating point?

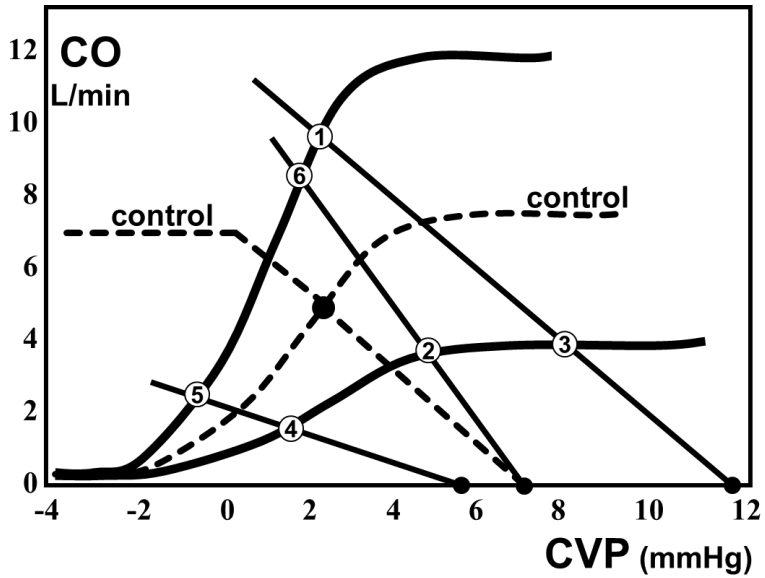
A. 2
B. 3
C. 4
D. 5
E. 6

Interactive Question

The figure shows a hypothetical patient's cardiac and vascular function curves before a change (control dashed line) and the change that occurred due to some event (solid lines). CO and CVP are cardiac output and central venous pressure respectively. What best describes the change that occurred?

If the intervening event is **increased sympathetic activation of heart and veins**, what is the new operating point?

A. 1
B. 3
C. 4
D. 5
E. 6

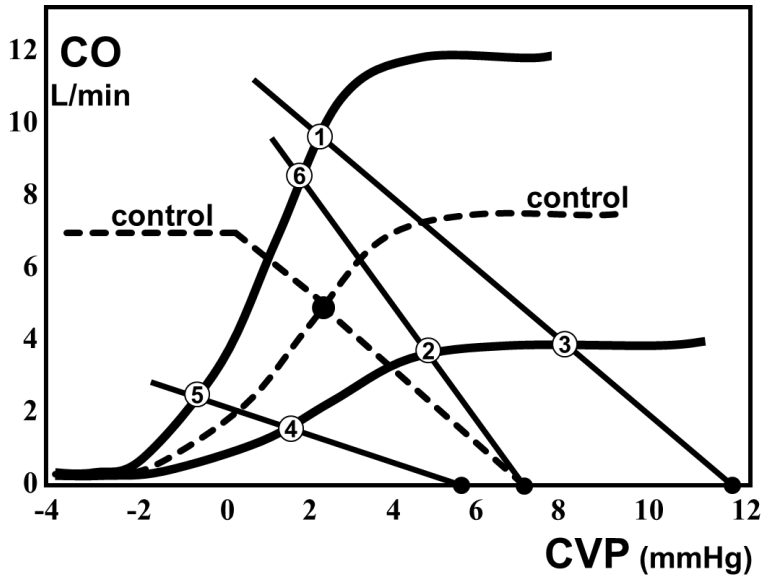


Interactive Question

The figure shows a hypothetical patient's cardiac and vascular function curves before a change (control dashed line) and the change that occurred due to some event (solid lines). CO and CVP are cardiac output and central venous pressure respectively. What best describes the change that occurred?

If the intervening event is **administration of a vascular dilator and a positive inotropic drug**, what is the new operating point?

A. 1
B. 3
C. 4
D. 5
E. 6



End of Lecture 28