

## Module 10

What are (name) two physiological factors that directly<sup>1</sup> affect left ventricular afterload; explain/discuss the effect(s) (on left ventricular afterload) of each factor. For each of these two direct factors name one (other) factor that affects the direct factor, either directly (on the direct factor) or through intermediates. Please **post your response by 9:00 PM on Day 4 of the Module.**

Left ventricular afterload is<sup>2</sup> "... the pressure in the aorta that must be overcome ... to open the aortic valve and eject the blood." Accordingly, left ventricular afterload includes not only (1) the aortic pressure ("... to open the aortic valve ...") but also (2) the pressure drop across the aortic valve (" ... and eject the blood.").

Aortic pressure is affected by circulating blood volume and by the stiffness of the vasculature. The pressure drop across the aortic valve is affected by aortic stenosis. One could continue on, discussing physiological factors that affect blood volume (e.g., regulation by the cardiorenal system), vascular compliance (e.g., age, diet), and aortic stenosis (e.g., failure of valve leaflets to open completely, aortic plaque) but detailed discussion of such factors is beyond the scope of this course.

So, for our purposes two physiological factors that directly affect left ventricular afterload are (1) aortic pressure and (2) pressure drop across the aortic valve during ejection; an increase in either (or both) of these factors increases cardiac afterload. One (secondary) factor that affects aortic pressure is blood volume; one (secondary) factor that affects the pressure drop across the aortic valve during ejection is atherosclerotic plaque (a tertiary factor being diet).

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<sup>1</sup> "Directly" means that the factor itself affects LV afterload; it does not act through one or more intermediates to affect LV afterload.

<sup>2</sup> See B&L[6+], Figure 16-38 and its associated text on pages 320-321; B&L[7], Figure 16.37 and its associated text on pages 332 - 333.

Rev 0, 4/4/17 - adapted from Fall 2016

Rev 1, 10/20/17 - Question updated to Rev 1 of Module 10 Question; response modified to include refs to B&L[7]

Rev 2, 7/15/18 - Question revised per Rev 2 of DQ 10. Up-dated for 601.

Rev 3, 10/28/19 - change time due from 6:00 to 9:00 PM