Letter to the Editor

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A Different Scintigraphic Perspective on the Systolic Function of the Left Ventricle-I

Sol Ventrikülün Sistolik Fonksiyonuna Sintigrafik Olarak Farklı Bir Bakış Açısı-I

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Dear Editor,

Exponential decay refers to the process of decreasing an amount by a constant percentage rate over time. A leaking container is an example of a non-steady-state fluid system, which behaves exponentially. In this system, the height decreases as the liquid flows out of the cylinder, resulting in a decrease in current. The gravitational potential energy-density gradient is proportional to the height of the fluid inside the container, and this is the driving force of the leaking water from the container (1). The left ventricle can be considered a leaking container, and the contractility of the myocardium is the driving force for ejecting the blood volume from the cavity into the aorta. As seen on the Wiggers diagram, not all volumes and pressures recorded in the left ventricle increase or decrease linearly (2). For this reason, the model described in the manuscript (3), seems to be reasonable to express the systolic ejection dynamics of the left ventricle.

When the pulse rate increases from 60 to 72, the Ec value increases when we recalculate the values for an imaginary patient. "t" value of the imaginary patient [end-diastolic volume (EDV) 100 mL, end-systolic volume (ESV): 40 mL cycle time 6.4/16] for 60 bpm is (6.4/16x1000) 400 ms. Ec value of the imaginary patient for 60 bpm is [40/100= e -k(0.4)] 2.29/s. "t" value of the imaginary patient for 72 bpm is (6.4/16x833) 333 ms. Ec value of the imaginary patient for 72 bpm is [40/100= e -k (0.333)] 2.75/s. When we apply a similar pulse increase to a study patient with real values (EDV: 125 mL, ESV: 35 mL, cycle time 5.5/16), we obtain similar increase in results. For 60 bpm, "t" value is (5.5/16x1000) 343 ms. Ec value for 60 bpm is [35/125= e -k (0.343)] 3.7 / s. For 72 bpm, "t" value is (5.5/16x833) 286 ms. Ec value for 72 bpm is [35/125= e -k (0.286)] 4.4/s. It can be observed that, if all parameters remain constant, the Ec value increases as the pulse increases. This means that the heart can do the same job in less time and perform better. In other words, when the pulse rate increases, a negative development such as "falling into the ischemic category" does not occur.

The "t" value, which shows systole time in the decay formula, takes the patient's heart rate into account for calculating the cycle and systole time.

The cycle time (ms)=60bpm x 1000ms/pulse (bpm) of a patient

The systole time= the cycle time x distance (EDV-ESV)/16.

Ec is a systolic functional parameter of the left ventricle, and while it does not provide information about left ventricular perfusion, it seems to have the potential to detect systolic

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dysfunction caused by any perfusion disorder. Depending on the size, the infarct area affects the systolic function of the left ventricle. Therefore, it is expected to reduce the percentage of the left ventricular emptying per unit time.

This letter to the editor was prepared in response to the author's criticisms (4) about the article referenced with number 3.

Footnotes

Author Contributions

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