**THE CARDIOVASCULAR CAPACITY RESERVE CONTROL IS THE NAME OF THE GAME: A NOVEL HYPOTHESIS COMPREHENSIVELY EXPLAINS SHOCK AND HEART FAILURE**

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Background:Heart failure and shock are major morbidities carrying a diagnostic challenge. Cardiac output may mislead and biomarkers may change too late. Shock types may be matched with the respective heart failure types (e.g. cardiogenic shock and cardiac dysfunction, septic shock and sepsis, etc.) but the relationship is insufficiently understood.

Hypothesis:We suggest that the momentary cardiovascular capacity reserve (in terms of performance) is monitored and controlled by an undiscovered yet central physiological reserve control.Once the reserve level approaches a minimal threshold (regardless of cardiac output), the above mentioned control activates exhaustion manifestations. Heart failure patients have a lower reserve to begin with; hence, they reach exhaustion earlier, even during mild, everyday activities (severity dependent). When the reserve irreversibly deteriorates to an unsustainable level (pre-shock) the central physiological control reacts by sacrificing non-prioritized tissues by shifting blood flow from true (exchange) capillaries to shunting capillaries; this causes shock manifestations - tissue hypo-perfusion and diaphoresis.

Analogy:Comparison between the proposed physiological reserve control and the engineering reserve control of an electrical power plant reveals interesting analogues which better clarifies the control central role in the onset and proceedings of the clinical manifestations.

Discussion and Conclusions:In lack of an alternative comprehensive theory, our hypothesis comprehensively explains the entire “puzzle” through a single mechanism. The hypothesis proposes new research directions, new diagnosis measures and new prospects for early interventions e.g. neutralizing the reserve control effects in the pre-shock patient in order to broaden the window of opportunity.

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