Hajime Kataoka, J Clin Exp Cardiolog 2017, 8:9(Suppl)
DOI: 10.4172/2155-9880-C1-078

Rationale of chloride hypothesis for explanation of the activity of neurohormonal systems in heart failure pathophysiology: Literature review

Hajime Kataoka
Nishida Hospital, Japan

Until recently, most studies focused on the body fluid dynamics in heart failure (HF) pathophysiology through the control of sodium, potassium, and water balance in the body, and through the regulation of solutes and water by the renin-angiotensin-aldosterone system (RAAS) and antidiuretic hormone (ADH) to maintain arterial circulation. Chloride, despite flanking sodium as its anionic counterpart in salt, has remained largely ignored, presenting in the medical literature and in clinical practice as an afterthought to the more popular electrolytes sodium and potassium, or simply as a substitute for bicarbonate to preserve electro-neutrality. I recently demonstrated that changes in vascular volume are independently associated with the serum chloride concentration during worsening HF and its recovery. Based on these observations and the established central role of chloride in the RAAS, I have proposed a unifying hypothesis of the chloride theory for HF pathophysiology, which states that changes in the serum chloride concentration are the primary determinant of changes in plasma volume and neurohormonal activity under worsening HF and its resolution. Though speculative interaction between changes in serum chloride concentration and neurohormonal systems has been given to the proposed hypothesis, it is unknown whether their interactions would correctly work under this hypothesis. Thus, the present study aimed to determine a scientific rationale of chloride hypothesis for explanation of the activity of neurohormonal systems, mainly the RAAS and ADH axis, in HF pathophysiology through the current literature review.

Biography

Hajime Kataoka works as a Cardiologist and as a Physician-Scientist at Nishida Hospital, Oita, Japan. He obtained his MD degree from Kagoshima University in 1977 after which he completed specialty training in Cardiology. He has developed diagnostic methods for body fluid retention by using thoracic ultrasonography searching for pleural effusion and by using body weight/fat analyzer for monitoring of body fluid status. Recently, he is investigating the body fluid status and cardio-renal interaction in heart failure pathophysiology. He served as an Editorial Board Member of World Journal of Cardiology and Case Reports in Cardiology.

hkata@cream.plala.or.jp

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