



SHORT COMMUNICATION

A Self-Sufficiency Philosophy for Non-Communicable Disease Control

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Abstract

A non-communicable disease comprising various vascular diseases namely renal microvascular disease, cerebrovascular disease, and coronary vascular disease, has been a threatening public health problem today. The failure of preventive strategy is due to the lack of understanding the nature of the origin of vascular disease. In this regard, it is likely to take place at very early stage following the natural imbalance between the mechanism of vascular injury and repair resulting in an excessive production of vascular toxins, and an insufficiency of vascular repairing process, commonly occurring in an unhealthy person with inappropriately consuming of imbalanced diets, an inadequate physical activity in accordance with the national activity guidelines, and with mental and physical stress—a characteristic of self-insufficiency status. Such process of vascular disease develops spontaneously and continuously throughout life inducing a progressive ischemic state till target organ damage is well established. Recognition and treatment of the disease is usually late due to the lack of sensitive diagnostic marker available for early detection of the disease process, and fails to correct the ischemia as well as unable to restore the renal function.

In contrast, a prevention of the development of vascular disease can be accomplished at the early stage of the occurrence of the disease under self-sufficiency condition.

Keywords

Non-communicable disease, Vascular disease, Diagnostic markers, Circulating toxins, Vascular repair

Introduction

A great concern to the general public health problem today is the progressive increment in the severity of non-communicable disease namely a variety of mac-

ro- and microvascular diseases that has continued to be a significant threatening burden inducing multiple organ damages such as chronic non-diabetic, as well as diabetic kidney diseases, cerebrovascular disease, and coronary vascular disease, etc. [1]. This is due to the under-recognition of the early stages of the disease, because of the insensitive diagnostic markers available under common practice such as the determination of microalbuminuria, the level of serum creatinine above 1.2 mg/d/L, or the diagnosis of diabetic kidney disease is accepted for initiation of treatment, only when the creatinine clearance drops below 60 ml/min/1.73 m² [2,3]. This would lead to the treatment not only initiates at the late stage (diabetic kidney disease stage 2,3), but also ignore the most important part of early stage of diabetic kidney disease (stage 1, 2), wherein the defense mechanism of repairing process of vascular disease is adequately function, and restoration of renal function is possible [4,5]. Several studies have demonstrated that there is a spatial relationship between renal microvascular disease and chronic kidney disease, and that the renal microvascular disease associated with renal ischemia induces chronic kidney disease [6]. Treatment with vasodilators in most of these diabetic patients fails to correct the renal ischemia, and also is unable to restore renal function under present common practice [3,7]. Such present preventive and therapeutic strategy failure is due to the lack of understanding the nature of origin of the vascular disease.

The Development of Vascular Disease in Non-Communicable Disease

Naturally, a healthy condition is under the influence



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of natural balance between the mechanisms of injury and repair, in order to maintain the normal homeostasis of the body system. During life, a vascular injury and the corresponding process of vascular repair occurs simultaneously at the beginning of the onset of body metabolism of food, and on exposure to noxious or contaminated environments. Following the process of body metabolism, a variety of toxins such as oxygen radicals, superoxide, hydrogen peroxide, etc. are generated and released into the circulation. Also taken together with other toxins derived from food, environment such as stress, high sugar and lipids; they become circulating toxins that would injure the blood vessel, in particular the endothelial cell lining resulting in the loss of endothelial cell by detaching itself from the vascular wall, and thereby the initiation of vascular disease. However, under normal healthy state, this would trigger the repairing process of the blood vessel by neutralizing the circulating toxins, and replacing with new endothelial cell proliferation, and vascular regeneration toward normal [7]. A transient depletion of antioxidants and angiogenic factors is spontaneously replenished by the normal diet, exercise, an adequate body and mind rest and an avoidance of stress. These successive cycles of increased toxic oxidant-a depleted antioxidant- a replenished antioxidants have spontaneously and continuously taken place in normal healthy subject associated with normal habit of eating and physical activity-a self-sufficiency condition.

In contrast to the above healthy practice, the unhealthy person associated with self-insufficiency condition such as a continuous consumption of unhealthy diet, an inadequate physical activity, an inadequate rest for mental and physical stress; a continuous consumption of antioxidants and angiogenic factors would create a permanent state of deficiency in repairing mechanism, and these would induce a progressive vascular injury to both macro-and microvascular vessel.

Due to the lack of diagnostic marker for early renal microvascular disease available under common practice, the diagnosis of renal microvascular disease would rely indirectly on the detection of chronic kidney disease, or diabetic kidney disease instead. Such diagnostic markers are the serum creatinine determination, the presence of microalbuminuria, or the accepted definition of chronic kidney disease, or diabetic kidney disease, only when the creatinine clearance drops below 50 percent level of normal (below 60 ml/min/1.73 m²). Such practice would under recognize the early stage of chronic kidney disease, as well as of renal microvascular disease.

In addition, this would ignore the most crucial period of the early stage of disease that would be vulnerable for vascular repair and regeneration due to the adequate mechanism of vascular repair available only at this stage. Treatment at this early stage with vasodi-

lators would improve the stage of renal ischemia, and restore the renal function [5,8]. Unfortunately, under present common practice, the diagnosis and treatment of chronic kidney disease and diabetic kidney disease usually initiate at a rather late stage and beyond the state of vascular regeneration and restoration of renal function [7,9,10].

An Innovative Strategy to Prevent the Development of Non-Communicable Disease

To solve the present therapeutic failure in preventing the development of common non-communicable disease, it requires 2 crucial issues that need to be addressed. First, biomarker to early recognize the renal microvascular diseases, as well as the diabetic kidney disease. Second, a self-sufficiency philosophy for controlling of the development of vascular disease.

With respect to the former, new diagnostic markers have been available to be sensitive enough for screening of (1) An early diabetic kidney disease (stages 1, 2) such as creatinine clearance, cystatin C, Fractional Excretion of Magnesium (FE Mg) and (2) Of early renal microvascular disease such as renal plasma flow, peritubular capillary flow, angiogenic factors (Vascular Endothelial Growth Factor (VEGF)), VEGF receptor I, angiotensin 1; as well as antiangiogenic factors endostatin, VEGF receptor 2, angiotensin 2 [4]. The above sensitive diagnostic markers make it possible to screen for early stage of renal microvascular disease, as well as diabetic kidney disease.

With respect to the latter, a self-sufficiency healthy person is a person who has been a rather well prepared for the prevention of the development of vascular disease, and is likely associated with a rather well balanced vascular repair mechanism. Therefore, treatment of the disease at the early stage, would be able to the correct the renal ischemia and improve the renal function, and thereby, prevent the development and progression of the non-communicable disease [4,8]. In this regard, the Ministry of Public Health of Thailand has already launched the above conceptual view of early screening and implementing early preventive strategy to cover 797 governmental hospitals throughout the country in 2016 [4].

Disclosure Statement

We declare there is no conflict of interest in the content of the article.

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