Review Article ISSN 2639-9326

Diabetes & its Complications

Diabetes Complications: A New Perspective on the Mechanism of their Development

Owusu Akyiaw Bempah, Ph.D.

FV Supplement ltd., 362 Summerwood Road, Isleworth-Middlesex, United Kingdom, TW7 7QP, Tel: +44(0)7914120175.

***Correspondence:**
Owusu Akyiaw Bempah, FV Supplement ltd., 362 Summerwood Road, Isleworth-Middlesex, United Kingdom, TW7 7QP, Tel: +44(0)7914120175.

Received: 19 August 2021; **Accepted:** 15 September 2021

Citation: Bempah O.A. Diabetes Complications: A New Perspective on the Mechanism of their Development. Diabetes Complications. 2021; 5(3); 1-3.

ABSTRACT

***Introduction**: Diabetes complications involves organs with microcirculation (brain, eye, heart, kidney, skin) where glucose-fuelled energy production in the body takes place. The energy production in the cells in the microcirculation is sensitive to changes in quantity and quality of the equilibrated blood. The reaction of the body to these changes is responsible for the development of diabetes complications.*

Long-term chronic diabetes complications occur when the volume of equilibrated blood is reduced as a result of vasoconstriction in the microcirculation. The corrective measures taken to optimize energy production result in organ damage and dysfunction – diabetes complication. These complications affect patients of both diabetes insipidus and diabetes mellitus.

"Hypo" and "Hyper" are complications exclusive to diabetes mellitus patients. They are the body's response to attempt to alter the quality of the equilibrated blood in the microcirculation.

Insulin deficiency destroys the glucose/glycogen equilibrium that keeps blood plasma glucose concentration constant. This results in wild swings from the equilibrium blood glucose concentration. "Hypo" results from low glucose concentration, and "hyper" from high concentration.

***Conclusion:** With the aid of the new polyuria paradigm it has been possible to show that diabetes complications result from the body resisting interference in the glucose-fuelled energy production process in organs with microcirculation.*

Keywords

Diabetes complications, Energy production, Equilibrated blood, Hyper, Hypo, Microcirculation.

Introduction

In a recent review by Tritto and Ambrosio [1] references made on "microcirculation and diabetes complications" were based on AGES and RASH – concepts associated with the Glucose/Protein Interaction Theory to explain the development of diabetes complications. Recent research [2] has shown that Diabetes Insipidus patients also suffer the same type of complications that afflict Diabetes Mellitus patients, disposing of the theory that hyperglycaemia is the cause of diabetes complications.

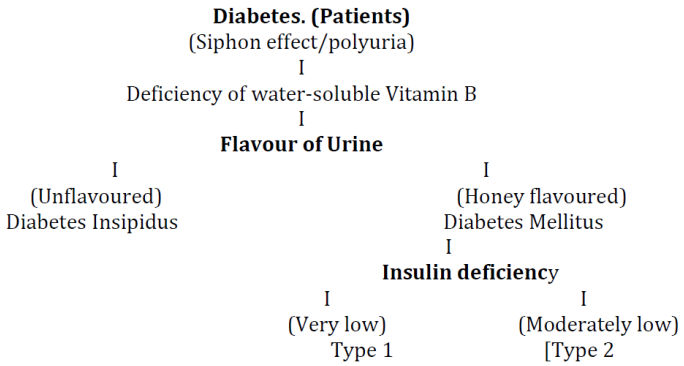
Bempah [3] proposed and demonstrated that long-term, chronic diabetes complications result from tissue damage in organs with microcirculation as a result of the daily polyuria-induced deficiency of water-soluble B-vitamins (niacin and thiamine) in the blood plasma.

Chronic and non-chronic diabetes complications have been elucidated with processes that interfere in glucose-fuelled energy production by altering the quantity or quality of equilibrated blood in the microcirculation.

But first, it is necessary, ab initio, to define "diabetes" and words that are usually associated with it, before taking on diabetes complications.

Diabetes

The Greek word "diabetes" means "siphon." The Romans used it to describe the condition that made patients "urinate copiously with increased frequency" (polyuria). The urine may be unflavoured (diabetes insipidus) or honey- flavoured (diabetes mellitus). Types 1 and 2 diabetes mellitus are mere differentiation in the degree of severity of insulin deficiency. This is shown in the flow-chart 1 [4].



Flow-chart 1. Definitions of Diabetes.

Diabetes complications

Flow-chart 1 indicates two potential factors that can affect energy production in organs with microcirculation in the body, namely: vitamins-B deficiency, and insulin deficiency.

As a result of "increased frequency in copious urination" (polyuria), all diabetes patients suffer from the deficiency of the water-soluble B-vitamins, including the vasodilators, niacin and thiamine, in the blood plasma.

It has been demonstrated [5] that polyuria reduces, daily, the blood plasma vasodilator-vitamins-B in the diabetic patient to about 16%, compared to 64% in the healthy person. Thus, at some point during the 24-hour period, the diabetic patient retains only 25% of the concentration of vasodilators needed by a healthy person to sustain full vasodilatation in the microcirculation.

The daily deficiency occurs mainly in the night, during the fasting period, when there is no replenishment with food-sourced B-vitamins. It is very severe for only a short time and is relieved by breakfast in the morning.

The role of the microcirculation

The organs (brain, eye, heart, kidney, skin) that manifest diabetes complications have microcirculation so, it is pertinent to state the role of the microcirculation. It is at the level of the microcirculation that glucose-fuelled energy production takes place, and so, the microcirculation;

i. optimises nutrient and oxygen supply within the tissue for optimum energy production in the cells; and
ii. avoids large fluctuations in the composition of the equilibrated blood to ensure steady energy production.

The mechanisms of the two forms of diabetes complications will now be explained. First, the long-term, chronic complications.

The Long-term Chronic Diabetes Complications

These complications include; cardiovascular diseases, retinopathy, stroke, nephropathy, erectile dysfunction and ulcers on the skin. All the affected organs – the brain, eye, heart, kidney and skin - have microcirculation and all patients of both diabetes insipidus and diabetes mellitus, experience these complications.

The Mechanism

In spite of the short duration of the blood plasma vitamin-B deficiency, it causes vasoconstriction in the microcirculation, resulting in reduction in the quantity of equilibrated blood in the microcirculation. The reduction in available equilibrated blood means that the number of waves carrying the equilibrated blood is also reduced. Because part-filled cells are not allowed, there is a redistribution of the equilibrated blood in order to preserve energy production. Reduced waves mean some cells are left without supply of nutrients and oxygen. Denied nutrients and oxygen, these cells die. New cells grow, but not enough to compensate for the destruction. In the long term, (5 to 40 years), the cumulative cell-destruction results in tissue damage, and ultimately, to organ dysfunction – diabetes complication.

At the onset of diabetes, organ damage begins at the same time in all organs with microcirculation, although symptoms of organ dysfunction do not manifest at the same time.

"Hypo" and "Hyper"

These forms of diabetes complications affect only diabetes mellitus patients due to deficiency in insulin production. This deficiency ensures that diabetes mellitus patients lose the equilibrium mechanism by which glucose concentration in the blood plasma is kept constant at 83mg/dL.

The Mechanism

The effect is that glucose concentration in the blood plasma can be lower ("hypoglycaemia" or "hypo") or higher ("hyperglycaemia" or "hyper") than the standard equilibrium concentration.

"Hypo" and "hyper" have the effect of qualitatively altering the composition of the equilibrated blood in the microcirculation. In an effort to save the process of energy production, and also to conserve energy, the body reacts by going into the "sleep mode", that is, the outward-oriented sense organs of perception are re-oriented inward so that no impulses and sensations from the outside can access the brain. The patient is said to go into a "hypo" or "hyper". Either condition can be fatal if medical treatment is delayed.

Discussion

It has been possible, with the polyuria paradigm, to work out the mechanism of the development of chronic, long-term diabetes complications and the conditions of hypo and hyper. The response to changes in the equilibrated blood in the microcirculation has been the key factor that has made it possible to develop a therapy to cure chronic diabetes complications.

"Fenomin" drug - derived from the polyuria paradigm - cures all skin ulcers, including gum ulcers; reverses early stage retinopathy; restores erectile function; reverses early stage kidney disorder and first-time stroke patients recover fully. Taken as prophylactic, fenomin also prevents un-manifested complications from manifesting.

Conclusion

With the aid of the new paradigm, it has been possible to show that diabetes complications result from the body resisting interference in the glucose-fuelled energy production process in organs with microcirculation.

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