

## Full Length Review Article

### REFOCUS AND ATTACK INSULIN RESISTANCE

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#### ABSTRACT

Diabetes is the most wide-spread entity of the industrialized world. There is a great lack of awareness regarding this devastating pan-metabolic syndrome. Its complications being more lethal than diabetes per se. It has already reached epidemic proportions with more than 90% contribution from type- 2 diabetes mellitus. Insulin resistance has been less understood by the treating fraternity as well as the sufferer so we need to refocus our attention in the proper understanding as to its cause and correct remedial measures to be taken by the physicians so that the cardiovascular changes can be reversed timely by inculcating life-style changes through modifying our diets with the concept of low glycemic foods and regular exercise. Finally introducing into our life dietary nutritional supplements and thus living a healthier life by attacking insulin resistance and realizing the early signs of the same i.e Syndrome X.

**KEY WORDS:** Diabetes Type 2, Insulin Resistance, Syndrome - X, Nutritional supplements.

#### INTRODUCTION

The most wide-spread metabolic disorder in existence is undoubtedly diabetes mellitus. There has been a five fold increase in the number of diabetics over the last 35 years in the industrialized world. The amazing fact is that 50% of these individuals are not even aware that they are diabetic (Mokdad *et al.*, 2001). Though diabetes per se is a big enough health problem, its complications are equally ominous. Diabetes contributes to one third of new cases of end stage renal disease. Four out of five deaths are not from diabetes itself but from cardiovascular diseases viz heart attack, stroke or peripheral vascular disease all initiated by diabetes. In the elderly diabetes is one of the leading causes of amputations and blindness (Klein *et al.*, 1994). Since diabetes mellitus has reached epidemic proportions with more than 90% cases known as type- 2 diabetes (adult onset) we must seriously peep into the actual reason of what is going wrong. The big question is why this increase in number of diabetics. What is the way we can personally decrease our risk of developing diabetes.

#### Insulin Resistance

Basically insulin is a storage hormone that carries sugar inside the cell which is stored as fat or utilized. Our body has been programmed to control blood sugars so it compensates by producing more insulin when it becomes less sensitive to its own insulin. This forces the beta cells of the pancreas to produce more insulin in order to control our blood sugars. Now the persons with insulin resistance require more and more insulin as years pass by to keep their blood sugars normal. Elevated insulin levels (hyperinsulinemia) are effective in blood sugar control but result in harmful effects-

labelled Syndrome X. When we combine all the Syndrome X factors, the risk of developing heart disease actually jumps twenty fold (Reavens, 2000).

#### Various factors of labelled Syndrome X

1. Inflamed Arteries
2. Hypertension
3. Increased TG(triglycerides)
4. Decreased HDL(good) cholesterol
5. Increased LDL(bad) cholesterol
6. Increased tendency to clot formation
7. Central Obesity

Several years of Syndrome X(10 to 20 years) makes the beta cells of pancreas to wear out i.e beta cell burn out and insulin levels to drop with simultaneous rise in blood glucose levels (hyperglycemia). Initially there is only mild elevation of blood glucose i.e impaired glucose tolerance termed as pre clinical diabetes. Full blown diabetes mellitus develops in a span of 1 to 2 years if there is no change in life-style. With a steady rise in blood glucose there is acceleration in the aging of arteries at a faster rate.

#### Insulin Resistance- Cause

Simply the result of diet. The body absorbs carbohydrates at different rates which are simply long chains of sugars. The truth is that white bread, white flour, pasta, rice and potatoes release their sugars in the blood stream more rapidly than table sugar. Therefore they are known as high glycemic foods. These foods cause very rapid rise of blood sugar and stimulate release of insulin. In due course of time our bodies become less sensitive to insulin which burdens the pancreas to release higher levels of insulin which in turn cause the destructive metabolic changes associated with insulin.

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## Diagnosis of Syndrome X

Formula is TG/HDL

If this ratio is greater than two, it indicates development of Syndrome X. Physicians need to be aware of this ratio to get hold of the early signs of insulin resistance as at this time the resistance is totally reversible.

## True Prevention

When insulin resistance is treated with simple but effective life-style changes in addition to preventing accelerated damage to the arteries we also avoid diabetes itself. A healthier life-style will make all the difference and not the drugs. There is a dramatic acceleration in the process of Atherosclerosis once insulin resistance begins. So the need for physicians to recognize Syndrome X in their patients at the earliest and encourage life-style changes to correct the problem. Syndrome X appears much before frank diabetes and by this time damage is irreversible. The greatest concern is that by the time of actual diagnosis of diabetes by a physician, majority (more than 60%) of these patients have already developed major cardiovascular disease (Margolis *et al.*, 1973).

## Diabetes- Intervention

First and foremost pay more attention to insulin resistance which is the prime culprit in majority of type-2 diabetes mellitus cases and do not simply focus on treating hyperglycemia. It is insulin resistance (Syndrome X) that leads to central obesity and not vice-versa. In fact obesity is the major outcome of this syndrome. Second encourage aggressive life-style changes to improve insulin sensitivity. Encourage patients to balance their diet by eating low glycemic carbohydrates with good protein and good fat (rich in omega-3). In order to correct the underlying insulin resistance this diet has to be combined with a modest exercise program and cellular nutrition. This will lead to mysterious fall in weight with feeling of goodness and high energy level. The key is to correct insulin resistance instead of weight reduction. Medication should be the last resort in treating diabetes mellitus (type-2). Review article by Dr James for Mayo Clinic said (Keefe, 1999). "Therapeutic efforts in patients with diabetes have focused predominantly on normalizing increased blood sugar levels while often ignoring many of these other modifiable risks, which are caused by the underlying insulin resistance." This accounts, in part, for the fact that cardiovascular diseases account for 80% of diabetic deaths (Brand- Miller *et al.*, 1999). So attacking insulin resistance is far superior approach and better way to control and treat diabetes type-2.

## Diet

The demonstration from various studies reveals that there are some carbohydrates that release their sugars more rapidly than others (Walter Willet *et al.*, 2001). The complex carbohydrates one with lot of fibres release their sugars slowly e.g beans, cauliflower, Brussels sprouts, apples. There is no spike in the blood sugar when low glycemic carbohydrates are balanced with good proteins and good fats (omega-3 fatty acids). To control diabetes this is very critical. After a meal the blood

sugar should not rise significantly- this being a major determinant in diabetic control. The food pyramid recommended by USDA should be modified says Dr Walter, chief of nutrition and preventive medicine at Harvard medical school. At the bottom should be low glycemic carbohydrates while high glycemic foods (white bread, white flour, pasta, rice and potatoes) should go to the top with all the sweets (Low, 1997). We realize that sweets are bad for diabetics but few realize that blood sugar rises faster with high glycemic foods. So one should inculcate the habit of eating low glycemic foods in order to improve diabetic control dramatically combined with good protein and good fat (omega-3) thus making their bodies more sensitive to their own insulin.

## Exercise

Never underestimate the tremendous health benefits of modest exercise especially for the patient with Syndrome X or frank diabetes mellitus. As studies reveal that exercise makes significant contribution in increasing sensitivity of patients to their own insulin as well as having insulin sparing effect. Exercise therefore is a must for all diabetics and insulin resistance subjects. It should involve a balance of aerobics and weight resistance exercise at a rate of three to five times a week. It is equally important to get involved in the exercise program one enjoys. Walking being a rhythm of life can make a tremendous difference when one decides to walk briskly for 30 to 40min atleast three times a week.

## Nutritional Supplements

Several clinical trials suggest that preclinical diabetics and individuals with impaired glucose tolerance have significantly high levels of oxidative stress. Other studies reveal that patients with secondary complications due to diabetes have more significant oxidative stress. So researchers conclude that antioxidant supplements help to reduce these complications (Disilvestro, 2000). Several studies show that all antioxidants may improve insulin resistance especially vitamin E when taken at optimal levels as mixture of several antioxidants e.g vit ACE. Correcting magnesium deficiency improves insulin function significantly (Paolisso, 1992).

## Conclusion

Amazing results are awaiting for all those patients who are willing to change their diet, start exercising on a regular basis and switch to nutritional supplements with key minerals and antioxidants at optimal levels thus improve their own sensitivity to insulin. This being an investment to free yourself from a lifelong dependency to drugs and thus live a healthier life. The goal for a diabetic is to keep tight control in order to keep the glycated haemoglobin (A1C) below 6.5% which is an extremely tough ask to do with medication alone. So by applying these principles, got to refocus our attitude and attack insulin resistance instead of elevated blood glucose. You need to recognize the possible development of Syndrome X by calculating the TG/HDL ratio and the already begun and accelerated cardiovascular damage. Thus simple life-style changes can be miraculous.

## REFERENCES

- Mokdad, A.H., B.A. Bowman, *et al.* 2001. "The continuing epidemics of obesity and diabetes in the United States," *JAMA*, 286, 1195-1200.
- Klein, R. *et al.*, 1984. "Visual impairment and diabetes," *Ophthalmology*, 91, 1-9. And National Institute of Diabetes and Digestive and Kidney Diseases, "U. S. Renal Data System: 1994 Annual Data Report," Bethesda, 1994.
- Reavens, G. 2000. Syndrome X (Simon and Schuster).
- Margolis, J. R. *et al.*, 1973. "Clinical features of unrecognized myocardial infarction. Silent and Symptomatic Eighteen-year follow up. The Framingham Study," *American Journal of Cardiology*, 32, 1-7.
- O' Keefe, J. 1999. "Improving adverse cardiovascular prognosis of type-2 diabetes," *Mayo Clin Proc*, 74, 171-180.
- Brand- Miller, J., T.M. Wolever, *et al.*, 1999. *The Glucose Revolution* (New York Marlowe and Company), 26-27.
- Walter Willet, *Eat, Drink, and Be Healthy* (Simon and Schuster, 2001).
- Low, P.A. 1997. "The roles of oxidative stress and antioxidant treatment in experimental diabetic neuropathy," *Diabetes*, 46, 38-42.
- Disilvestro, R. A. 2000. "Zinc in relation to diabetes and oxidative stress," *Journal of Nutritional Medicine*, 130, 1509-1511.
- Paolisso, G. 1992. "Daily magnesium supplements improve glucose handling in elderly subjects," *American Journal of Clinical Nutrition*, 55, 1161-1167.

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