Review article

MANAGING DIABETES IN THE NEW MILLENNIUM; CHALLENGES IN A DEVELOPING COUNTRY

Annex-2.5

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With the control of communicable disease, increasing urbanization and simultaneous increase of life expectancy, developing countries like Sri Lanka are currently experiencing an era of transition in the morbidity and mortality pattern in their adult population. In this regard, non-communicable diseases such as diabetes mellitus have emerged in to epidemic proportions.

According to World Health Organization (WHO), the number of the adult population affected by diabetes mellitus in developing countries is projected to grow by 170% from 84 million in 1995 to 228 million people in 2025(1). Moreover, by 2025, developing countries will be home to 76% of all persons with diabetes and our neighbor India ranking the 1st position with 57 million diabetic people. Of special interest to health economists and planners are WHO projections of the age structure of the diabetic population. If the present trends persists, by 2025 most diabetic people in developed countries will be aged 65 years and over while the majority of diabetic patients in the developing countries will be in the 45-64 year age group, the most productive years of life. One important factor that would have a significant influence on these future predictions of prevalence of diabetes is the new criteria laid down by the American Diabetes Association (ADA) for the diagnosis of diabetes (2).

On the global perspective, there have been many new developments in the management of diabetes mellitus over the last few years. These include evidence-based knowledge on the benefits of strict glyceamic and blood pressure control and new pharmacological agents for the management of multitude of diabetes related conditions. Impact of these new strategies on the morbidity and mortality of diabetic individuals in the developing world is well established. However, implementation of above mentioned management strategies for diabetic people in the developing world is hampered by many economic and other constraints.

Impact of new diagnostic criteria

The American diabetic association (ADA) has each recently proposed a new system for the diagnosis and classification of diabetes. The new classification, which is rendered obsolete by advances in research on etiology of diabetes, describes four major types of diabetes.

New etiologic classification of Diabetes Mellitus

- Type 1 diabetes (beta cell destruction usually leading to absolute insulin deficiency)

  a. Immune mediated
  b. Idiopathic

- Type 2 Diabetes (may range from predominantly insulin resistance with relative insulin deficiency to a predominantly secretory defect with insulin resistance)

- Other specific types

  a. Genetic defects of beta cell function
  b. Genetic defects in Insulin action
  c. Diseases of exocrine pancreas
  d. Endocrinopathies
  e. Drug or chemical induced
  f. Infections
  g. Uncommon forms of immune mediated diabetes
  h. Other genetic syndromes

- Gestational diabetes mellitus

New ADA criteria for diagnosis of diabetes Mellitus

1. Symptoms of diabetes plus casual plasma glucose concentration > 200mg/dl (11.1 mmol/l). casual is defined as any time of day without regard to time since last meal. The classic

symptoms of diabetes include polyurea, polydypsia and unexplained weight loss)

Or

2. Fasting plasma glucose > 126 mg/dl (7.00mm0ol/l), fasting is defined as no caloric intake for at least 8 hours

Or

3. 2-hr plasma glucose > 200mg/dl (11.1mmol/l) during an OGTT. The test should be performed as described by WHO using glucose load containing the equivalent of 75 grams of anhydrous glucose dissolved in water

In the absence of unequivocal hyperglycemia with acute metabolic decompensation, these criteria should be confirmed by repeat testing on a different day. The third measure (Oral Glucose Tolerance Test) is not recommended for routine clinical use.

Note:

Fasting Plasma Glucose < 6.1 mmol/l – normal.

Fasting plasma Glucose > 6.1 and < 7.mmol/l - Impaired Fasting Plasma Glucose (IFG).

Fasting plasma glucose > 7.00mmol/l - provisional diagnosis of diabetes; the diagnosis must be confirmed.

There is some concern in applying new diagnostic criteria for many Asian populations. In the new criteria, lowering of cut off value of fasting plasma glucose level from 7.8 mmol/l to 7 mmol /l to diagnose diabetes will detect more individuals at an early stage, who would otherwise have presented with many late complications of the disease. There is a new category of Impaired fasting glucose (FPG 6.1- 7.0 mmol/l) included in the new diagnostic criteria and the Oral Glucose Tolerance Test (OGTT) is no longer recommended for routine use. But experiences in many Asian populations have shown that abolition of OGTT will underestimate the prevalence of diabetes in these communities (3). It has been observed that individuals who are diagnosed to have diabetes based on 2 hour plasma glucose value over 11.1 mmol/l in OGTT will fall in to the category of Impaired Fasting Glucose with resultant confusion. It is possible that the differences in the etiology of diabetes (especially in the more prevalent type 2) between the western and Asian populations are responsible for these discrepancies. Therefore, abolition of OGTT and recognition of the new category of Impaired fasting glucose in the new ADA criteria cannot be recommended for developing countries.

Achieving a tight Glycaemic control

Both Diabetes Complication and Complication Trial (DCCT)(4) and United Kingdom Prospective Diabetes Study (UKPDS)(5) demonstrated clear benefits that tight control of plasma glucose is associated with lower incidence of major micro vascular complications in type 1 and type 2 Diabetes respectively. The circumstances under which these tight control of day-to-day blood glucose control achieved included Self Blood Glucose Monitoring (SBGM) of 4 to 6 times a day with medical and para medical staff supervising and assisting fine adjustments in their medications at frequent intervals. These could be practical in the developing world where the care of diabetic patients is delivered through a team of trained personnel including a Physician or a Diabetologist dietitian, diabetes educator nurse, and a podiatrist. In contrast, a vast majority of diabetic people in the developing world cannot be expected to practice SBGM due to economic and other limitations. Delivery of health care to diabetic patients in most developing countries is only through general medical staffs who are burdened with unacceptably high doctor patient ratios. Diabetes nurse educators, Dietitians and other auxiliary staff who play an important role in the Diabetes care team are not available in many developing countries. At present glycaemic control of majority of diabetic patients attending to general medical clinics is assessed by a monthly fasting plasma glucose report and very few patients check their urine for sugar at home. Both of the above mentioned methods yield very crude information of a patient's day-to-day plasma glucose control, which is a major determinant of most of the late complications of diabetes. Although the assessment of Glycosylated Hemoglobin (HBA1C) is a more reliable index of plasma glucose control over a period of 8 weeks, it is not currently carried out in laboratories in any state hospital. As a result one

cannot expect to achieve a tight glycaemic control in our diabetic patients attending to hospital clinics who are sub optimally investigated and managed. This has lead to a high prevalence of morbidity due to late micro and macro vascular complications among diabetic patients seeking hospital admission, adding more burdens to escalating health care costs in the state hospitals.

This exposes both the delay and lethargy in the implementation of best available knowledge for the benefit of vast majority of Sri Lankan diabetic patients and undue costs resulting from such strategies.

Screening for early complications vs. management of late complications

Early detection of some of the major complications of diabetes is possible by timely and regular screening of individuals with diabetes. Many therapeutic interventions have shown to be effective in retarding the progression of both micro and macro vascular complications if undertaken at correct time. Annual Screening for microalbuminuria, lipid profile, regular ophthalmologic examination and examination of feet for early changes of neuropathic changes are an essential part in a proper follow-up plan for a diabetic patient (6).

But the current practice of providing care for diabetic patients through general medical clinics leave little or no room for the delivery of such specialized care for needy patients. Even the major hospitals in Sri Lanka have very limited facilities for screening of major diabetic complications. This is true for both laboratory and manpower recourses. As a result, increasing number of diabetic patients in this part of the world suffer from most of the late complications of diabetes. The management of these late complications consume much more financial and manpower resources.

Future of diabetes care

Rising incidence of diabetes mellitus in countries like Sri Lanka and its added burden on the healthcare system call for new strategies. A comprehensive approach is necessary in both planning and implementing preventive and control programs. This necessitates an integrated program for primary diabetes care with a new public health strategy, generation of a reliable database (diabetes register), training of health personal (dietitians, nurse educators, podiatrists) for the delivery of modern diabetes care and appropriate laboratory technology. With the prevailing economic hardships and progressive reduction of government expenditure on health sector, these new strategies may be difficult to achieve- but the consequences of failure will be devastating.

References

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