Diabetes in Elderly

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ABSTRACT

When diabetes for the first time is detected in a patient aged 60 years or more then he is considered as an elderly diabetic. In old age diabetes and glucose intolerance are more frequent. Postreceptor insulin resistance and impairment of insulin secretion are the main causes of glucose intolerance and diabetes in old age. Diabetic symptoms are often non-specific and vague in elderly. Cardiovascular complications are more in elderly and may present with atypical symptoms such as painless MI or lower limb ischaemia without claudication. Acute complications like DKA and HONK coma may occur. However, HONK Coma is more common, while DKA is very rare in elderly diabetics. Weight reduction has very low success rate in elderly diabetic. Short-acting sulphonylureas like glyclazide and tolbutamide are preferred OHA drugs. Insulin must be initiated whenever necessary, once or twice a day schedule is preferred. Metformin is best avoided because of their increased tendency to develop lactic acidosis.

INTRODUCTION

When diabetes for the first time detected in a patient aged 60 years or above, then he is considered as elderly diabetic.[1] The glucose tolerance deteriorates with advancing age. With the currently accepted National Diabetes Data Group criteria, the prevalence of diabetes increases from 2% in the age group 20-44 years to nearly 18% in the age group of 65-74 years.[2]

The number of aged people (those above 60 years age) is increasing throughout the world and also in India due to decline in infectious epidemics and better health care. In India, the number of elderly was 12 million in the beginning of this century.

24 Million in 1961

56 Million in 1991

70 Million in 2001

112 Million is projected in 2016

Among these elderly people 45% have a chronic disease. 50% of the diabetics in our country are aged above 60 years and 50% of the elderly diabetics are undiagnosed.[3] Therefore, the magnitude of elderly diabetes in India is great and requires careful evaluation and proper management.

FREQUENCY AND IMPACT OF DIABETES IN OLD AGE

It has been reported that 2.4% of adult Americans have known diabetes, the prevalence rises to 8.0% for those aged 65 years and over.[4] Prevalence rate of IGT as high as 30% have been reported from Finland.[5] In our country incidence of glucose intolerance has been reported between 8-15% in different series. In those studies the prevalence was higher in those aged 75-79 years than in those aged 80-84. In England, 36% of people aged 85 years and above have abnormal glucose tolerance.[6] Complications of diabetes are more common in elderly. Severe uncontrolled diabetes is more common in those aged over 50 years and in one study carried a mortality of 43% compared with 3.4% in younger patients. This is mostly attributed to cardiovascular complications.[7] Although IDDM can occur at any age, diabetes in old age is most often NIDDM. The peak prevalence of IDDM is 11-13 years whereas that of NIDDM is 65-69 years for men and 70-74 years for women. Only 4.8% patients diagnosed diabetics after the age of 55 years have IDDM.[8]

GLUCOSE INTOLERANCE OF AGING AND ITS MECHANISM

Numerous studies have demonstrated that glucose tolerance (GT) deteriorates with advancing age. This decline begins in the third decades and continues throughout the rest of the life. Normal aging is characterized by impaired glucose-induced insulin release and resistance to insulin-mediated glucose disposal,[9] although these changes are not entirely attributable to aging itself. Factors such as changes in diet, decreased physical activity and obesity had been suggested as causes for decreased glucose tolerance in the elderly. Recent studies, however, suggest that, besides these factors impaired insulin secretion[10] may play an important role in the pathogenesis of carbohydrate intolerance in the elderly.

Plasma insulin levels and kinetics of insulin are not altered in the elderly when compared to a younger age group.[11] Glucagon is

a potent anti-insulin hormone, elevated level of glucagon could result in carbohydrate intolerance. There is a conflicting report regarding role of glucagon in the pathogenesis of diabetes in elderly.

It has been recently reported that elderly obese diabetic patients showed peripheral resistance in combination with defective insulin secretion whereas non-obese diabetic patients showed only secretary defect.[12] Others have reported that NIDDM in non-obese elderly subjects is characterized by a marked impairment in insulin release.[10] Based on these findings, it is now generally recognized that NIDDM is a heterogenous disorder characterized by insulin resistance (IR) and impaired beta cell function. Either defect may be primary and may be sufficient to induce hyperglycaemia. Most evidence indicates that insulin resistance commonly initiates the sequence of events leading to NIDDM. Initially the beta cells can produce sufficient insulin to maintain normal glucose levels. As time progresses the beta cells eventually fail leading to impaired glucose tolerance (IGT) and finally NIDDM.[13] Chronic hyperglycaemia itself may further worsen insulin secretion and insulin action. Both receptor and post-receptor defects have been shown to contribute to insulin resistance in patients with NIDDM.[14]

Increase in glucose levels with advancing age is possibly not physiological as elderly diabetics are associated with greater prevalence of chronic complications and therefore require therapeutic interventions.

CLINICAL PRESENTATION

The presentation of diabetes in elderly is often insidious and its diagnosis is delayed. Symptoms may be vague and non-specific, such as fatigue, unexplained weight loss, urinary incontinence, change in mental state like depression, confusion and apathy. The classical triad of symptoms consisting of polyuria, polydipsia and polyphagia may not be present. Diabetes may be detected by determination of blood glucose for routine screening or preoperative evaluation. Evaluation for recurrent infections, both bacterial and fungal, especially those that involve the skin, intertriginous areas or genitourinary tract may bring the diagnosis to light. Patients may also present with known complications of diabetes like neuropathy (paraesthesia, cranial nerve palsies and autonomic dysfunction like postural hypotension, impotence etc.) or diabetic retinopathy may be detected during eye check-up for errors of refraction. Many cases are detected by finding hyperglycaemia during the investigation of comorbidities, such as delayed recovery from intercurrent illnesses, repeated infections or cardiovascular disease; the latter may present with atypical features, such as painless myocardial infarction, manifested as breathlessness, lassitude or falls. Lower limb ischaemia can occur without claudication and even presents first with gangrene. Acute metabolic disturbances are rare. 25% of cases of hyperosmolar non-ketotic hyperglycaemic (HONK) coma occur in people with previously undiagnosed type 2 diabetes. Rarely, diabetic ketoacidosis (DKA) is the presenting feature of type 1 diabetes in the elderly.[15]

DIAGNOSTIC PROBLEMS

There is hyperglycaemia without glycosuria. Urine sugar is often negative and misleading. This is because renal threshold for glucose rises with age. Diagnosis and control of therapy based on urine analysis alone is inadequate and often misleading. Blood sugar estimation – with advance of age, there is a gradual tendency for the level of blood sugar to rise. Whether this is aging process or increased frequency of diabetic is still controversial. It is said that to the extent of 50% or more over the age of 70 years would be suspected of being diabetic if criteria developed for younger people are used. It is customary to add 10 mg % for each decade over the age 50 years for one hour postprandial sugar values. Postprandial hyperglycaemia is quite common among elderly people and a good number of false-positive diabetes would be diagnosed. Hence the fasting blood sugar would be a better guide in an elderly. A fasting plasma glucose of 140 mg/100 ml or more would be the diagnostic criteria of diabetes in the elderly (WHO).[3]

MANAGEMENT

Aim of management

- To alleviate symptoms
- To reduce the risk of hyperglycaemic crisis.
- To prevent, delay and manage vascular and other chronic complications.
- To achieve a normal life-expectancy whenever possible.

It takes several years for the complications to develop. Older subjects with diabetes are living longer and one should therefore, not assume that chronic complications of diabetes will not occur in the elderly. As a matter of fact, cross-sectional studies have indicated that in diabetic subjects in the age group 55-74 years, the risk of vascular complications is significantly increased.[16] The main problem in the diabetic management is the question whether good diabetic control will achieve this goal. The recently published results of DCCT have clearly demonstrated that strict control of hyperglycaemia will prevent and slow the progression of microangiopathic complications in young patients with IDDM.[17] Although patients with NIDDM were not studied, the American Diabetic Association believes that the results should be applicable to patients with NIDDM since the underlying mechanism of the development of these complications is similar in the two types of diabetes-IDDM and NIDDM. There is no reason to believe that the results of better control would not apply to people with NIDDM. It may be mentioned here that tight control was associated with an increased risk of significant hypoglycaemia. Older patients with significant atherosclerosis may be vulnerable to permanent injury from hypoglycaemia.[18] From the above factors it may be emphasized that main goal of treatment of elderly diabetes is symptomatic relief with a reasonable degree of blood glucose control without causing hypoglycaemia. If complications are present, their treatment and efforts to prevent their deterioration should also be attempted. Basically treatment of young adult and elderly diabetic does not vary much, but treatment of elderly diabetic is individualized and modified according to the existing co-morbid conditions.

Treatment Modalities

Three pillars of management are – Diet, Exercise and Drugs.

Diet

Majority of diabetics are controlled with diet alone. Elderly subjects have difficulty in following diet formulation, so a very

simple dietary regime is prescribed for compliance. Caloric restriction should be sufficient to correct any excess weight. Avoidance of refined sugar, nutritionally adequate food and often small inbetween meal and bedtime feeding are recommended. However diets rarely produce weight loss in the elderly and may be unjustifiably burdensome in the frail.

Exercise

It is very difficult to prescribe a good exercise programme in elderly due to associated osteoarthritis, cardiovascular, respiratory and neurological disorders. Simple exercise like fast walking, swimming and cycling may be preferred. Running and tennis playing are to be avoided. Moreover, exercise may also cause hypoglycaemia in patients on drugs or insulin, may occur suddenly, hours after exercise has been finished. Yogic exercises are of doubtful value in the control of hyperglycaemia.

Drugs

Oral Hypoglycaemic Agents (OHA)

Sulphonylureas - short acting sulphonylureas such as glyclazide and tolbutamide, are preferred because of the likelihood in the elderly of impaired renal function, poor nutrition, impaired counter-regulatory responses and cognition, and other factors that increase the risk of hypoglycaemia.

Metformin is best avoided in elderly subjects because of its increased tendency to cause lactic acidosis with renal impairment and hepatic or cardiac failure. General hazards of drug treatment in the elderly include the possibility of multiple drug interactions, non-compliance and inappropriate drug prescribing.[15]

Insulin

Many elderly people with diabetes are able to manage twice daily injection regimens, particularly with the convenience offered by pen-injection devices. Problems can arise with increasing faulty, deteriorating mental ability or poor vision, all of which make accurate insulin administration more difficult.[19] The use of once or twice daily injections of the new long-acting insulin analogue glargine may be advantageous and needs to be explored in elderly diabetic subject.[15]

Treatment of Diabetic Complications in the Elderly

Acute complications

DKA, HONK coma may occur, HONK being more common and DKA is rare. The principles of treatment of DKA and HONK cases are similar as in young individuals but much more care is to be paid to fluid replacement due to frequently compromised cardiovascular status of elderly patient.

Chronic complications

Renal failure

In elderly in addition to diabetic glomerulosclerosis other cause like hypertensive nephrosclerosis, chronic pyelonephritis, obstructive uropathy to stone, benign prostatic hypertrophy and neuropathic bladder are to be considered.

Diabetic Foot

Elderly diabetic is prone to get foot lesion because of circulatory insufficiency, neuropathy, infection and uncontrolled diabetes. All factors aggravate and can lead to life-threatening gangrene. All needs proper assessment and control of infection and diabetes.

Hypertension in Elderly Diabetes

Incidence of hypertension increases with age of the patient and duration of diabetes. In elderly, hypertension is often essential and may present with isolated systolic hypertension, which is related to accelerated atherosclerosis. They require proper treatment with diuretics, calcium channel blockers etc.

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