
Geriatric Diabetology: An Overview

S Kalra, A Ganie, N Agrawal

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Abstract

Over the past decade, diabetology has evolved as a strong independent specialty in response to the global epidemic of this disabling disease. However, the needs of special populations with diabetes are often ignored. Older people are one such population (1). Though geriatric diabetes is developing as a sub-specialty in certain countries, most endocrinologists have ignored this important subset of patients. Is it because geriatric diabetes is difficult to manage? It is because there are no clinical guidelines or cook-book formulae to follow? (2) Or because older patients are cantankerous and difficult to satisfy? Perhaps because the high incidence of comorbidities makes medical management too complex? Or because the high-risk nature of old age and diabetes put together makes geriatric diabetology a risky venture? Or simply because geriatric persons have less money and are unable to afford our fees, making geriatric diabetology a non profitable business? Whatever the reason, we should all remember that we too will be geriatric one day. This should be reason enough for us to read the rest of this paper.

THE RATIONALE FOR A SPECIAL APPROACH

Older persons with diabetes face certain unique problems which set them apart from other people with diabetes. Social problems include dependence on family/ society for access to health care, financial limitations, lack of access to services and difficulty in travel.

Medical issues to be considered include the increased comorbidity, age related functional impairment, age related physical limitations, and risk of mortality in old persons. Endocrine considerations such as increased vulnerability to hypoglycemia, duration dependent complications, age specific complications of diabetes, and increased mortality from acute complications also set the geriatric population apart.

Nutritional factors like changing food tastes, inability to chew low glycemic index food, inability to digest high fibre foods, and difficulty in access to healthy food make diabetes care a challenge in elder citizens.

Health care related points to be considered in caring for elder diabetes patients include poor medical follow up, less empathy with younger health care providers (HCPs), and less patience on part of HCPs.

These problems compound the difficult existence with

diabetes, and increase the disability caused by the disease and its complications. All these factors need to be addressed if we are to achieve optimal health for older persons with diabetes.

AGING AND GLUCOSE TOLERANCE

Glucose intolerance increases with age (3), and this worsening continues into the geriatric age group. The extent of rise is 5.9—13.0 mg% per decade in 1 hour and 2 hour post-glucose load samples, the rise being more pronounced in women by 9.9 mg%. This intolerance is due to alterations in glucose induced insulin release and resistance to insulin-mediated glucose disposal. The main defect is a post receptor defect in the skeletal muscles (4). Lean elderly persons have a significant impairment in insulin secretory capacity of the pancreas. Obese subjects on the other hand exhibit marked resistance to insulin mediated glucose disposal. In both subsets, glucose effectiveness (the ability of glucose to stimulate its own uptake in the absence of insulin) is impaired. This has important therapeutic implications, because it accounts for upto 76% of glucose uptake in the fasting and 50% in the post prandial state (5,6). The age related glucose intolerance increases the severity and impact of diabetes in the geriatric age group. Other factors which contribute to geriatric diabetes include (7) obesity, sedentary life style, difficulty in exercising, reduced dietary carbohydrate, and use of diabetogenic drugs (Thiazides, Steroids).

EPIDEMIOLOGY

Diabetes prevalence rates peak in the 6th decade and are maintained in older age groups in white populations. In communities such as the Pima Indians, peak prevalence occurs earlier, at age of 40 in men and 50 in women (8). An analysis of OPD records at a north Indian endocrinology centres shows that 13.6 % of all diabetic men and 10.8% of all women attending the OPD are aged above 60. The percentages for men and women above 70 are 5.8% and 4.2% respectively. Indoor patients reveal a similar trend (personal observations).

CLINICAL FEATURES

Geriatric diabetes often presents with an insidious onset, and many cases are diagnosed fortuitously, during a pre-operative checkup or while investigating other co-morbidities (9).

Weight loss, osmotic symptoms and pruritis vulvae are common symptoms for which patients seek medical advice. At times slow recovery from illnesses such as stroke, infections and wounds, leads one to suspect diabetes. Other causes in rural north India are frequent rat bite, which makes family members suspect 'sweet blood' and self inflicted burns with hot water due to impaired peripheral sensations. In some patients, vague symptoms such as depressed mood, apathy, insomnia, hyper somnolence and mental confusion herald the onset of diabetes (10). If left unrecognized and untreated, they lead to classic diabetic ketosis (DKA), hyper osmolar non ketotic coma (HHNKC) or a 'mixed' metabolic decompensation which fits neither in DKA or HHNKC. Known as well as newly diagnosed diabetes are more prone to developing 'geriatric' syndromes of poor mobility, falls due to myopathy, poor vision and cognitive impairment; urinary incontinence; unexplained weight loss; and memory disorder or cognitive impairment.

Awareness of these atypical and varied presentations of diabetes in older people leads to earlier diagnosis and management, thus preventing avoidable morbidity and mortality.

ACUTE COMPLICATIONS

Many lean elderly diabetes behave as type 1 diabetes, presenting with DKA or ketonuria, and requiring small doses of insulin for maintenance of health. Others are typical type 2 diabetics, on low doses of sulfonylureas and sensitizers. In

times of stress, however, they may need insulin for short periods.

HHNKC, and a 'mixed' metabolic disturbance (hyperglycemia, mild acidosis, mild dehydration and absent ketones) are other acute hyperglycemic manifestations (11). The tendency to hyperosmolarity in HHNKC is worsened in the elderly who may not appreciate thirst well, may have difficulty drinking enough water, and may be on diuretic therapy.

Hypoglycemia, however, is the most common acute complication in geriatric diabetes. It can occur due to both insulin and oral hypoglycemics, and is precipitated by missed meals, less caloric intake, gastro intestinal upset, renal failure or hepatic failure. Endocrine causes that predispose to hypoglycemic include hypopituitarism (pituitary infarction is a common etiology in the elderly), hypothyroidism and hypoadrenalism.

Poor manual dexterity and weak visual acuity, coupled with dependence on others for injections, may lead to injecting a wrong dosage of insulin in the wrong site, with improper technique and prolonged injection-meal gap. All these factors can cause hypoglycemia.

Older people as well as their relative and physicians have little knowledge of hypoglycemia, and it may be misdiagnosed as stroke, transient ischemic attack, dementia or epilepsy.

Even if able to diagnose 'hypo' geriatric citizens are often incapable of treating themselves, and their diminished counter regulatory hormone secreting capacity means a delayed recovery.

INFECTIONS

Diabetic foot is a common cause of morbidity and mortality in geriatric diabetics (12) Peripheral vascular disease, neuropathy, limited joint mobility, high foot pressures, increased susceptibility to infection and difficulty in self-inspection and self care all lead to an increased risk of foot ulceration, as well as, amputation.

Other infections are also common in elderly diabetics, and the diagnosis may be missed or delayed because of an insufficient or masked inflammatory response. UTI, skin infection, tuberculosis and cholecystitis may unmask a latent diabetic state.

CHRONIC COMPLICATIONS

Both macro and micro vascular complication occur with higher frequency in geriatric diabetics. In a cross sectional

study of type 2 patients aged 53-80 years, retinopathy, peripheral neuropathy, hypertension and impotence were found to have higher prevalence with increasing age (13). Another study revealed a positive relationship of age with only persistent proteinuria, and not with retinopathy. Another analysis of both type 1 and type 2 patients found independent associations of age with renal impairment, sensor neuropathy and microvascular complications only (14,15)

Erectile dysfunction is a common age related complications which is often neglected and may be an obvious reason for diminished quality of life or depressive illness (16). Female sexual dysfunction is equally common but even more neglected complication of geriatric diabetes.

COGNITIVE IMPAIRMENT

Cognitive dysfunction is associated with both diabetes and impaired glucose tolerance, and may recover with good glycemic control (17).

The implications of this dysfunction in geriatric diabetology include increased hospitalization, less self care ability, less reaching out for endocrine care, erratic control because of irregular diet and medication, and self induced hypoglycemia if the patient forgets that he/she has taken and OHA/insulin and repeats the dose.

Depression is a frequent co morbidity in elderly diabetics and predicts poor control, decreased compliance and increased chances of death in hospitalized patients.

TREAT TO TARGET

The concept of 'treat to target' is gaining ground in diabetology, and targets are being revised lower and lower, for lipids, glucose and blood pressure.

Are the targets achievable or appropriate for geriatric diabetology? Most researchers seem to think so. Therefore, one should try to control blood glucose to optimum levels while avoiding hypoglycemia, blood pressure and serum lipids should be lowered, and aspirin use encouraged as much as possible. These strategies decrease mortality, present complications and improve quality of life.

The major aims of management should be prioritized and a treatment plan drawn up with the patient and his/her family in descending priority, as follows:

1. Relief of symptoms.
2. Good quality of life.
3. Avoidance of acute hyperglycemic complications.
4. Avoidance of hypoglycemia/ adverse drug reactions.

5. Maintenance of optimal weight.
6. Avoidance of chronic complications.
7. Early detection & management of cognitive dysfunction.
8. Near maximal life expectancy.

For frail/dependent patients, it is enough to try and achieve the higher mentioned aims.

LIFESTYLE MANAGEMENT

It is difficult to change lifestyle (diet, exercise, stress response) in elderly persons, who are often perceived as being rigid and non-compliant by health educators. However, a few minutes of empathic explanation in local dialect, using culture specific analogies often does the trick. While soft skills are necessary for diabetes counseling to be effective in every setting, they are more essential for geriatric diabetology.

All dieticians and counsellors (who are usually young, from modern background) should be sensitized to the special needs of the elderly, who usually follow a traditional lifestyle, and expect health care providers to behave in a sober and slow manner.

Diet and exercise are the mainstay of geriatric diabetes management, but the advice given should be both appropriate and accurate.

ORAL HYPOGLYCEMIC DRUGS

Gliclazide and glimepiride are safer sulfonylureas, while glibenclamide and glipizide are associated with fatalities due to hypoglycemia (18,19,20).

Even safer are the newer secretagogues, repaglinide and nateglinide. Repaglinide is safe in mild to moderate renal improvement and offers the 'democracy' of 'no meal, no dose'.

Metformin is safe, inexpensive, weight-neutral and non-hypoglycemic (21). However, its contraindications limit its use in nearly half of all geriatric patients, and it may cause gastro intestinal symptoms and vitamin B12 malabsorption. Acarbose is safe, but not very effective in older diabetics. Thiazolidinedione are safe in elderly persons, provided they do not have cardiac impairment. They are associated, however, with an increased risk of osteoporosis.

Sitagliptin and vildagliptin are safe as well as effective in elderly patients, and can be prescribed as either monotherapy or combination therapy,

If monotherapy fails, drugs may be given in combination. The safest drugs are repaglinide, nateglinide and thiazolidinediones.

Whatever the drug used, one should begin with low doses, and titrate upwards cautiously (22).

INSULIN

Insulin use in geriatric diabetics has increased in recent years, with the introduction of safer short acting and long acting insulin analogues as well as user friendly devices. Benefits of this therapy include improvement in well being and cognitive function (23,24). Various regimes are detailed in Table 1.

Figure 1

Regime	Examples	Indications	Advantages	Disadvantages
Once daily Insulin	NPH	Frail patients > 80 years, Symptomatic control.	Single injection Can be given by HCP	poor control
Once daily analogues	Determir/ Glargine	Frail patients > 80 years, Symptomatic control, 'mild' diabetes	single injection can be given by HCP/self, no hypoglycemia; timing not linked with meal; suitable in cognitively challenged patients; hepatic/ renal/ GI impairment.	cost
Twice daily insulin Twice daily analogues	Premixed 50 Premixed 30 Aspart Lispro Lispro premixed	Good control in most patients Good control, erratic meal times/ risk of hypoglycemia	Two injections Good control less hypoglycemia flexibility in meal timing flexibility in injection timing (before/after meals) Suitable in renal/ hepatic/GI/memory impairment	Injection meal gap must be maintained. fixed meal times. cost
Basal/ Bolus insulin	regular tds +NPH hs	Tight control in	tight control,	Frequent monitoring
Basal/bolus analogues	aspart tds + glargine od Lispro tds + glargine od	hospital Motivated individuals in OPD	can reduce microvascular complications	Cost

If none of these regimes work, an oral sensitizer can be added to any regime.

CONCLUSIONS

Newer OHA and insulin analogues/ devices have helped strengthen the armamentarium available to geriatric diabetologists.

What is required, however, is a motivation on part of the endocrinologist, general physician as well as community/family to improve geriatric diabetes services, to improve the health of our elderly patients and to ensure optimal physical, mental, social and emotional functioning of our respected elder diabetics.

No one can shirk responsibility for these members of our society. We owe our very physical existence to them. A 'shared healthcare approach' involving counsellors, community workers, local doctors and specialist geriatric diabetologists/endocrinologists will be best suited to ensuring good health for these patients.

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Author Information

Sanjay Kalra

Bharti Hospital, Karnal, India

Ashraf Ganie

SKIMS, Srinagar, India

Navneet Agrawal

Medical College, Gwalior, India