Management of Diabetes at the End of Life

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ABSTRACT

In terminal illness careful control to avoid long-term complications is not required. Management of diabetes during terminal illness will not only depend on the type of diabetes, but also on prognosis, oral intake and the presence of co-existing disease such as renal and hepatic impairment.

All dietary restrictions relating to diabetes are removed from the early stage of terminal illness. In both T1DM and T2DM, glucose monitoring should be reduced to an acceptable minimum. In the case of a patient treated with insulin, this may be 2–3 times per week and for a patient treated with oral agent's blood glucose could be monitored 1–2 times per week., only in case of special situation frequent monitoring is advisable. This may include: hypoglycaemia, poor food intake, nausea and vomiting, enteral or parenteral feeding or corticosteroid use. The clear aim is to avoid hypoglycaemia and osmotic symptoms, so the recommendations suggest a target blood glucose range between 10 and 15 mmol/l in the early stage of terminal illness with a more liberal range of 5–20 mmol/l in the later stages.

Subsequently there are no agreed, evidence-based strategies to manage diabetes at the end of life or during terminal illness.

Therefore, in this review I will try to uncover some of the challenges and discuss the available guidelines associated with managing diabetes at the end of life and terminal illness from the available scientific evidence.

Keywords: Diabetes, End of life, terminal illness.

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I. INTRODUCTION

Diabetes management during end of life and terminal illness is a complex process involving many factors ranging from psychological, ethical, and clinical perspectives. Terminal illnesses pose many challenges including the method and frequency of SMBG, avoiding hypoglycemic complications and ensuring control of osmotic related symptoms [1]. The terminally ill patient also has to face challenges like presence of pre-existing diabetes, diabetes induced by steroid intake and diabetes associated with cancer/tumor development [1].

Certain physiological factors also exist that may influence glycaemic status during terminal illness. These consist of cachexia, anorexia, malabsorption, hepatic and renal failure. Patients with terminal illness may also experience exacerbations of pain, constipation and fatigue as a result of neuropathy and prolonged hyperglycaemia [2].

Subsequently there are no agreed, evidence-based strategies to manage diabetes at the end of life or during terminal illness.

Therefore, in this review I will try to uncover some of the challenges and discuss the available guidelines associated with managing diabetes at the end of life and terminal illness from the available scientific evidence.

II. SEARCH STRATEGY

Available studies and abstracts were identified through Pub Med and Medline data bases (From 1993-2020) and Cochrane data bases. Key search terms were diabetes and elderly. All available studies and abstracts describing the relationship between diabetes management and end of life were included. The reference list of review articles was also searched.

III. DISCUSSION

A. Targets for Blood Glucose Measurements

A flexible level of BG between 15-20 mmol/l has been recommended by the palliative care physicians where else the diabetic physicians favored a BG level between 10-15 mmol/l [3].

The following points summarize the opinions regarding the frequency of SMBG [3]:

- Diabetes Specialists and Palliative Care Specialists prefer SMBG from twice daily to once every 3 days.
- Frequent testing is advisable for symptomatic patients with hyper or hypoglycaemia.
- Patient wishes and family opinions need to be considered regarding the frequency of SMBG.

- There is a general reluctance to stop SMBG during terminal illness and until the day of death [3].
- For Type 1 DM, there are no guidelines regarding the frequency of BG monitoring; but there is a general opinion to minimize monitoring in order to reduce the pain and discomfort associated with finger-pricking [4].
- During the initial phase of terminal illness, in case of Type 2 DM treated with oral hypoglycaemic agents, there is a general agreement to stop SMBG monitoring [4].
- During the later stages of terminal illness, it is advisable to stop SMBG monitoring [3], [4] but it is not easily implemented.

B. Managing Blood Glucose Controls

Careful control of chronic complications (micro and macro vascular) is not a priority in terminal illness [5]. Hence consideration should be made to stop therapies such as ACE inhibitors and other anti-HTN medications, statins and aspirin.

Diabetes management during end of life will depend on the type of diabetes, prognosis, feeding ability and the presence of co-existing disease such as renal and hepatic impairment [3].

The table below summarizes the managed care guidelines for elderly patients with diabetes (Table 1) [6].

TABLE 1: MANAGED CARE GUIDELINES FOR ELDERLY PERSONS

Guideline	AMDA (2008) For LTC Setting	AGS (2003) For Older Persons	ADA (2010) For Older Adults
Relaxed DM management indicated	Life expectancy < 5 years Hypoglycemia unawareness or recurrent episodes Anorexia, gangrene, malignancy, severe dementia, or dependent feeding	Frail with high burden of: Comorbidities <5 year life expectancy Difficulty adhering to treatment	Limited life expectancy History severe hypoglycemia Advanced complications Many comorbidities
Blood glucose monitoring	No medications or oral agents only: twice daily, 2-3 days/week 1-2 insulin injections/day: twice daily, 3-4 days/week 3 insulin injections/day: 4 times daily	Individualized	Capillary blood glucose may be a useful tool for those with frequent hypoglycemic episodes
A1C	Minimally impaired/life expectancy > 5 years: Target: 7% or lower Every 6 months if well controlled Every 3 months if poor control Life expectancy < 5 years and risks outweigh benefits: Target: 8%	Healthy: Target: 7% or lower Every 12 months if stable and meeting target Every 6 months if target not met Frail: Life expectancy < 5 years: Target: 8%	Healthy: Target < 7% Every 6 months Limited life expectancy: Less stringent
Diet	Regular diet; consistent timing	Not specified	Not specified
Eye exams	Initially and 1-2 times per year	Yearly	Not specified
Foot exams	Yearly or more often if PVD or PND	Yearly	Not specified
Hypertension	Target: 130/80 ACE inhibitors Monitor serum creatinine, potassium, and GFR	If on ACE inhibitors: monitor creatinine, potassium	ACE inhibitors or ARB Monitor renal function
Peripheral neuropathy	Check BP monthly Urine microalbumin/creatinine: Annually if < 30 µg/mg Every 6 months if > 300 µg/mg	Microalbumin initially and yearly	Individualized
Cardiovascular disease	Aspirin, Plavix, or Aggrenox daily (unless contraindicated)	Aspirin daily (unless contraindicated)	Treat with aspirin if life expectancy > 5 years
Dyslipidemia	Target: LDL-C < 100, HDL-C > 40; trig < 150 Treat with statin only after glucose control measures implemented	Target: LDL-C < 100, HDL-C > 40; trig < 150 Treat with statin (if not contraindicated)	Target: LDL-C < 100 Treat with statin if life expectancy > 5 years

C. Type 1 DM and Type 2 DM Treated with Insulin

- Continue previous insulin regimens if otherwise well.
- If reduced appetite or generally unwell, reduce insulin dose or consider short acting insulin in small doses and switch to long acting if condition improves.
- In order to reduce frequent injections and avoid post-

prandial hypoglycaemia, long-acting insulin (Detemir/Glargin) is preferable [7].

- Patients with an anticipated survival of a few months should stop A1C testing and target for FBG up to 180 mg/dl. The Type 1 DM patient on insulin should continue insulin in order to prevent DKA and so should Type 2 DM patients who are prone to symptomatic hyperglycaemia [8].

Type 1 and Type 2 DM patients with an anticipated survival for weeks who are prone to HHS should continue their insulin therapy to prevent DKA. Insulin doses should be adjusted to keep the BG levels >180 mg/dl to avoid hypoglycaemia. Short acting insulin in conservative dose is preferable [8].

- Patients in the final days of life have altered conscious levels and oral intake and so should stop their insulin and SMBG in case of Type 2 DM [9].
- For Type 1 DM patients there is still a chance to develop DKA so it is advisable and reasonable to continue insulin therapy with relaxed BG targets (<360 mg/dl) [9].

TABLE 2: INSULIN TREATMENT IN TYPE 1 AND TYPE 2 DIABETES WITH TERMINAL ILLNESS

D. Type 2 DM on Oral Agents

- For Type 2 DM on oral agents, it is recommended to lower the dose of the SU by 50% if hypoglycemia occurs. Prefer switching to short-acting SU's (nateglinide, repaglinide) as an alternate approach. DPP-IV inhibitors could also be used as an alternate [3].
- Metformin can lead to anorexia and should therefore be discontinued.
- SGLT2 inhibitors can demonstrate important benefits for older people, such as a lower risk of hypoglycemia and reduction of cardiovascular and renal risk thereby allowing its use in disease of any duration. The SGLT2i class is generally well-tolerated, though some caution is also suggested, including adjustment of concomitant therapies, such as insulin and antihypertensives, especially loop diuretics [10].
- If BG levels are persistently above 15 mmol/l then insulin may be required with oral agents. Consider short acting insulin with meals [3].
- Type 2 DM patients on insulin and oral agents with an anticipated survival of a few months can stop their insulin and oral medications should be halved with further dose adjustment [8].

Type 2 DM patients with an anticipated survival for weeks can stop their OHA in the final weeks of life unless they are prone to HHS.

- For patients prone to HHS, short acting SUs can be used to minimize the risk of hypoglycaemia [9].

TABLE 3: ORAL TREATMENT FOR TYPE 2 DIABETES WITH TERMINAL ILLNESS

E. Patient Education

Patient education is of fundamental importance to ensure that the terminally ill patient can adapt to the changing situations [11].

- The Diabetes Specialist Nurse has an evident role for providing education, information/advice (SMBG and Insulin delivery devices) and support to the terminally ill patient.
- Dietary restrictions should be relaxed for the terminally ill patient.
- The Diabetes Specialist team (Diabetes Specialist Nurse, Diabetes Dietician, Educator and Consultant Physician) should work in tandem with the relatives and family members to educate them about the frequency of SMBG, BG targets, dietary management, recognize hypo/hyperglycaemia and to offer dignity and comfort to the terminally ill patient and provide the optimum end of life care (EOLC) [12].

IV. CONCLUSION

Diabetes management at the end of life imposes many challenges to the patient and his/her family and relatives, health care provider and to the general society. Diabetes related chronic complications remain the primary cause for the premature and untimely death of the patients with terminal illness.

Patients with terminal illness in the final stages of life and their families rarely receive any education regarding glycaemic targets, SMBG monitoring, choice of medications, dietary advice, and hypo/hyperglycaemia management hence denying the patient the right to end of life care. It is both an emotional and physically challenging phase for the patient that requires the approach of a multi-disciplinary team in order to ensure a safe and symptom free transition into obtaining dignity and comfort at the end of life.

The presence of multiple co-morbidities, unintentional weight loss of >10% over the last 6 months, general physical decline, serum albumin levels of <25 g/L and relative dependence on regular activities are some of the generic indicators of poor prognosis² which need to be discussed with the patients and their families so that appropriate treatment strategies can be implemented, and careful planning can be initiated.

Finally, it is the distinguished right for every individual with diabetes to gain access to EOLC and a moral obligation of the DST to provide them with the opportunity.

AUTHORS CONTRIBUTIONS

S.R.C. and S.R.A were involved in data collection and drafted the manuscript. R.H.C. conceived the study. S.R.C and S.R.A. wrote the manuscript with input from all authors. S.R.A., R.H.C. and S.B. critically revised the final manuscript. All authors approved of the final manuscript for publication.

REFERENCES

- [1] King, E. J., H. Haboubi, D. Evans, I. Baker, S. C. Bain, and J. W. Stephens. "The management of diabetes in terminal illness related to cancer", QJM, 2012.
- [2] Rowles S, Kilvert A, Sinclair A et al. ABCD position statement on diabetes and end of life care. Pract Diab Int Jan/Feb 2008 Vol.28 No.1.
- [3] McCoubrie R, Jeffrey D, Paton C, Dawes L. Managing diabetes mellitus in patients with advanced cancer: a case note audit and guidelines. Eur J Cancer Care 2005; 14:244-8.
- [4] Poulson J. The management of diabetes in patients with advanced cancer. J Pain Symptom Manage 1997; 13:339-46.
- [5] Kilpatrick ES, Rigby AS, Atkin SL. The Diabetes control and complications trial: the gift that keeps giving. Nat Rev Endocrinol 2009; 5:537-545.
- [6] Garcia TJ, Brown S A et al. The Diabetes Educator 2011; 37:167-187.
- [7] Alderman MH. New onset diabetes during antihypertensive therapy. Am J Hypertens 2008; 21:493-9.
- [8] Angelo M, Ruchalski C, Spronge BJ. An approach to diabetes mellitus in hospital and palliative medicine. J Palliate Med 2011; 14:83-7.
- [9] Boyd K. Diabetes Mellitus in hospice patients: some guidelines. Palliate Med 1993; 7(2): 163-4.
- [10] Custódio, J.S., Roriz-Filho, J., Cavalcanti, C.A.J. et al. Use of SGLT2 Inhibitors in Older Adults: Scientific Evidence and Practical Aspects. Drugs Aging 37, 399–409 (2020).
- [11] Ford-Dunn S, Smith A, Quin J. Management of diabetes during the last days of life: attitudes of consultant diabetologists and consultant palliative care physicians in the UK. Palliat Med 2006; 20: 197-203.
- [12] www.diabetes.org.uk/end-of-life-care.