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Severe hypoglycemia in type 2 diabetes mellitus patients managed in the primary care: incidence and risk factors

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Introduction

Type 2 Diabetes Mellitus (T2DM) is one of the most common chronic conditions encountered in the primary care, affecting up to 10% of HK population. Severe hypoglycaemia (SHG), defined as hypoglycaemia episode which required the assistance of another person or admission to hospital, may lead to 3.4-fold higher mortality in T2DM patients.

Objectives

To determine the incidence rate (IRs) of severe hypoglycemia (SHG) in T2DM patients managed in the primary care and to explore possible associating risk factors.

Methodology

Design: Retrospective case series study Setting: General Outpatient Clinic of Hospital Authority, Hong Kong Patients: T2DM patients who had been regularly followed up in GOPCs of KCC from 1 July, 2009 to 30 June, 2015. Severe hypoglycemia is defined as any episode of hypoglycemia requiring emergency admission to the hospital. Satisfactory glycemic control is defined as latest HbA1c being less than 7%. Main outcome measures: Demographic data, biochemical parameters, co-morbidities, drug treatment profile and reasons for SHG were retrieved from the Clinical Management System. Student's t test and analysis of variance were used to evaluate continuous variables and Chi squared test for categorical data. Multivariate logistic regression was used to determine the associating risk factors for severe hypoglycemia.

Result

The satisfactory glycemic control rate of T2DM cases managed at KCC GOPCs has been significantly increased over the past 6 years. Meanwhile, the IRs of SHG has been gradually decreased. The IRs of SHG was 0.97% per year during 2014-15. Patients who had history of SHG were much older than those without (76.2 \square 9.2 versus 66.8 \square 11.7 yrs, $P < 0.001$). Compared with age- and sex- matched DM cases

without SHG, SHG patients had a longer duration of DM, a lower BMI and were more from Old Age Home (OAH) (all $P < 0.001$). Although their Hba1c level was comparable, the serum Creatinine and urine ACR level were much higher in the SHG group, whereas eGFR and total cholesterol (TC) level being much lower than non-HCG group. Hypoglycemia DM patients were also found to have a higher co-morbidity rate of dementia, anemia, stroke and CKD and with a higher proportion being treated with Sulphonylureas (SU) and insulin. Logistic regression analysis revealed that the presence of SHG was associated with an older age [Odds Ratio (OR) 1.9], lower BMI (OR 0.8) and TC level (OR 0.3), co-morbidity with dementia (OR 10.5), anemia (OR 4.4), stroke (OR 2.4), CKD (OR 2.1) and treatment with SU [Daonil (OR 4.4) and Diamicon (OR 2.3)] and insulin (OR 2.4). Most common precipitants for SHG episode included poor appetite/decreased oral intake (36.1%) and infections (31.1%).

Conclusions: Despite that glycemic control rate of T2DM patients managed at KCC GOPCs has been significantly increased over the past 6 years, the IRs of SHG has been gradually decreased. The latest IRs of SHG was 0.97% per year during 201-15. Risk factors for SHG included old age, lower BMI and TC level and co-morbidity with dementia, anaemia, stroke and CKD. Treatment with SU and insulin also contributed to the occurrence of SHG. Family physicians should be alert of these risk factors and take comprehensive strategies to reduce the incidence of SHG in the primary care.