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 is one of the most common clinical conditions encountered in the primary care. Severe hypoglycaemia is a medical emergency that significantly increase the morbidity and mortality among diabetes patients.

Objectives
To determine the incidence rate (IRs) of severe hypoglycemia in type 2 diabetes patients managed in the primary care and to explore possible associating risk factors.

Methodology
Design: Retrospective cohort study Setting: General Outpatient Clinic of Hospital Authority, Hong Kong Patients: Type 2 diabetes patients who had been regularly followed up in GOPCs of KCC from 1 July, 2013 to 30 June, 2014. Severe hypoglycemia is defined as any episode of hypoglycemia requiring emergency admission to the hospital. Main outcome measures: Demographic data, biochemical parameters, co-morbidities and drug treatment profiles 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 IRs of severe hypoglycemia was 11.3 attendances per 1000 patient-year and 10.5 cases per 1000 patient-year during the study period. Patients who had history of severe hypoglycemia were much older than those without (76.2 ± 9.2 versus 66.8 ± 11.7 yrs, P<0.001). Compared with age- and sex- matched DM cases without severe
hypoglycemia, patients with history of severe hypoglycemia 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 hypoglycemia group, whereas eGFR and total cholesterol (TC) level being much lower than non-hypoglycemia 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 hypoglycemia 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 Diamicron (OR 2.3)] and insulin (OR 2.4). Most common precipitants for severe hypoglycemia included poor appetite/decreased oral intake (36.1%), infections (31.1%) and acute cardiovascular disease (7.2%). Conclusions: The incidence of severe hypoglycemia among diabetes patients managed in the primary care was 10.5 cases per 1000 patient-year. Risk factors for severe hypoglycemia 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 hypoglycemia. Family physicians should be alert of these risk factors and take comprehensive strategies to reduce the incidence of severe hypoglycemia in the primary care.