

Hospitalisations due to severe hypoglycaemia in patients with type 2 diabetes: a US national perspective

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Background and aims: Hypoglycemia is a major limiting factor in intensive glycemic control for both type 1 and type 2 diabetes. Severe hypoglycemia is associated with increased risk of adverse clinical outcomes, including cardiovascular complications and possibly increased mortality. We examined the prevalence of serious hypoglycemia hospitalizations in patients with Type 2 diabetes in the US community population.

Materials and methods: The Nationwide Inpatient Sample (NIS) is a stratified random sample of all US community hospitals. It is the largest inpatient care database in the US and the only database that has information on all inpatient care regardless of insurance status. NIS's large sample size and data sampling techniques allow calculation of national estimates for particular diagnoses and analysis of secular trends. We studied all inpatient hospitalizations in NIS in 2009 with a primary or secondary diagnosis of Type 2 diabetes and hypoglycemia in patients aged 18 years or older and analyzed them as a proportion of total US resident adult population. US population estimates and projections for the resident US population were obtained from the US Census Bureau.

Results: In 2009, there were 33.1 million all-cause hospitalizations in the US among patients 18 years or older in 232.5 million person-years of observation. Of these, 7.2 million (21.7%) hospitalizations were for a primary or secondary diagnosis of Type 2 diabetes, providing a rate of 3,096.8 per 100,000 person-years in the US population. In 2009, there were 248,422 hypoglycemia hospitalizations in type 2 diabetes patients (average age 67.3 years 95% CIs, 50.7% men), accounting for 3.45% of all hospitalizations in these patients (national prevalence rate 106.9 per 100,000 person-years). Hypoglycemia hospitalizations among type 2 diabetes patients resulted in 1.9 million hospitalization-days in 2009 (average per hospitalization 7.58 days, 95% confidence intervals 7.38 - 7.78), at a total cost of \$12.07 billion (average \$48,569 per hospitalization, 95% confidence limits \$45,781 - \$51,537 per day). Medicare and Medicaid programs were responsible for 76.1 % of these hospitalizations and costs. A large percentage of these hospitalizations (87.5%) were considered non-elective. The case-fatality rate was 3.7%, resulting in 9,274 deaths in patients with hypoglycemia and type 2 diabetes in 2009.

Conclusion: National US population-level data suggest that hypoglycemia in Type 2 diabetes was associated with 248,422 hospitalizations and 9,274 deaths in 2009, and a total cost of over \$12 billion. These numbers do not include the long-term indirect clinical consequences of hypoglycemia. While aggressive euglycemic control remains important, the clinical and financial implications of severe hypoglycemia are considerable. Careful selection of anti-diabetic drugs, and close monitoring should be considered to reduce the risk of severe hypoglycemia.

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