



Eighteen grams of glucose are necessary to treat severe hypoglycemia: experience from the emergency medical services department

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INTRODUCTION

People with Type 1 diabetes typically experience between 1.0 to 1.7 severe hypoglycaemic events (SH) per patient per year (1), whereas 7% of patient with Type 2 diabetes, treated with sulphonylurea or on insulin for less than 2 years, can experience one or more episodes of severe hypoglycaemia (2, 3). The last 10-years, there was an intensification of glucose lowering therapies in an increasing number of frail patients, leading to a considerably higher incidence of SH (4, 5). SH is defined as an event requiring assistance of a third person to actively administer glucose, glucagon or provide other resuscitative actions (6). Up till now, few studies have examined the procedures applied for diabetes-related emergencies in outpatients before their hospital arrival. There are considerable deficits in the quality of care of patients with diabetes who present SH, like inadequate initial evaluation, insufficient dose of IV glucose or unnecessary hospitalizations (7). We know that mild hypoglycaemia should be treated with the immediate intake of 15-20 g of oral glucose (8), to our knowledge, there are no data in the current literature for the dose of glucose that is necessary to inject in SH.

OBJECTIVE

We therefore determined retrospectively the treatment of SH in outpatients requiring emergency ambulance assistance and its management by two Mobil Intensive Care Units (Service Mobile d'Urgence et de Reanimation Gonesse). Our primary objective was to know the dose of the given glucose and our secondary objective was to know the factors involved in determining these doses.

PATIENTS AND METHODS

Between April 2012 and December 2013 148 cases with SH were analyzed retrospectively.

RESULTS

A total of 104 cases (77 patients) from of 8 emergency physicians were included in the final analysis, there were 29 women, patients had a mean age of 62 ± 19 years and 62/77 were on insulin therapy. Kidney function, the type of sulphonylurea, insulin dose and the duration of symptoms, on arrival were not available in most cases. Body weight (available in 25 out of 77 patients) was not very high in the majority of patients, mean 72.7 kg for males (range 42 to 100) and 59.1 kg for females (range 50 to 80). Almost half of the patients ($n=53/104$, 49.5%) were taken to the nearby hospital after the intervention (31 in a medical ambulance and 22 used their own transport). The 51 patients who were not escorted to the hospital had a pasta meal at home before the departure of the medical team (as a part of the protocol treatment). Average blood glucose on arrival was 29 and 121 mg/dL at the departure of the emergency team. The average dose of injected glucose (30 % solution in 10 ml ampoule) was 18 g (range 6 to 69 g) according to the following procedure: average of 7g of glucose were administered with the first injection, 6g with the second and 5g with the third. The mean glucose levels were 83 ± 33 after the second and 108 ± 57 mg/dl after the third injection with an average intervention time of 55 minutes. The administered dose was inversely correlated with the duration of the intervention ($\beta = -0.267$, $p = 0.007$) and the Glasgow index ($\beta = -0.357$, $p = 0.001$) even after adjustment for patient's age.

CONCLUSIONS

Our study characterized the clinical profile of SH patients managed by an emergency medical team. They were mostly middle aged men with normal weight. The dose of necessary glucose was guided from the clinical severity of consciousness, i.e 60 ml glucose 30 % (18 grammes of glucose), for most patients.

References 1- Strachan MWJ. Frequency, causes and risk factors for hypoglycaemia in type 1 diabetes. In: Frier BM, Fisher M, eds. Hypoglycaemia in Clinical Diabetes, 2nd edn. Chichester: John Wiley, 2007:49–81. 2-Zammit NN, Frier BM. Hypoglycemia in type 2 diabetes: pathophysiology, frequency and effects of different treatment modalities. Diabetes Care 2005;28: 2948–2961. 3- UK Hypoglycaemia Study Group. Risk of hypoglycaemia in types 1 and 2 diabetes: effects of treatment modalities and their duration. Diabetologia 2007; 50: 1140–1147. 4- Hsu, P. F., Sung, S. H., Cheng, H. M., Yeh, J. S., Liu, W. L., Chan, W. L., ... & Chuang, S. Y. (2013). Association of clinical symptomatic hypoglycemia with cardiovascular events and total mortality in type 2 diabetes a nationwide population-based study. Diabetes care, 36 : 894-900. 5- Zoungas S, Patel A, Chalmers J, de Galan BE, Li Q, Billot L, Woodward M, Ninomiya T, Neal B, MacMahon S, Grobbee DE, Kengne AP, Marre M, Heller S; ADVANCE Collaborative Group.(2010). Severe hypoglycemia and risks of vascular events and death. New England Journal of Medicine, 363, :1410-1418. 6- Workgroup on Hypoglycemia, American Diabetes Association. Defining and reporting hypoglycemia in diabetes: a report from the American Diabetes Association Workgroup on Hypoglycemia. Diabetes Care. 2005 ;28 :1245-9. 7- Holstein A(1), Patzer OM, Machalke K, Holstein JD, Stumvoll M, Kovacs P.Substantial increase in incidence of severe hypoglycemia between 1997-2000 and2007-2010: a German longitudinal population-based study. Diabetes Care. 2012 ;35:972-5. 8- Chevalier N., Böhme P., Durand-Lugger A-S, Bassand A., Vouillarmet J., Marchant N., Maisondieu C., Fontaine S., Nicolescu-Catargi B., Velayoudom-Cephise F-L, Chingan-Martino V., De Lameth I., Hanon P., Desailoud R., L'Ensemble Des Membres Du Groupe Geode (Nice) Fréquence, prise en charge et coût médico-économique des hypoglycémies sévères gérées par le SAMU : résultats de l'étude nationale multicentrique HYPO 15, O72 Congrès de la Société Francophone du Diabète (SFD) , 2015, Bordeaux- 9- American Diabetes Association. (2014). Standards of medical care in diabetes—2014. Diabetes Care, 37 (Supplement 1), S14-S80. 10- http://www.has-sante.fr/portail/upload/docs/application/pdf/2013-02/10lrp04_reco_diabete_type_2.pdf

