

CHILDREN WITH DIABETES. THE TREATMENT AND EFFECT OF CONTINUOUS INSULIN INFUSION

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TITLE: Assessment of effect of continuous subcutaneous insulin infusion treatment for children with diabetes

INTRODUCTION:

Diabetes cannot be treated but can be controlled through unmodified regular human insulin (RHI) thus achieving the glycaemic target. But patients often suffer from postprandial hyperglycaemic excursions, together with an increased risk of hypoglycaemia in the post-absorptive period.

Fortunately, the last few years have seen great progress in the study and treatment of diabetes. Recent meta-analyses in the published medical literature have found improved glycaemic control with continuous subcutaneous insulin infusion (CSII) compared with multiple daily injections (MDI) of insulin for patients with diabetes mellitus. Maintaining a good blood sugar level, a diabetic can practically lead the life of a non-diabetic. The well-developed economic countries, which provide state programs for diabetes, view diabetes as a way of life rather than as a disease. In Australia, CSII is predominantly used in type 1 diabetes mellitus patient populations.

OBJECTIVES: To assess the cost of using CSII of insulin to treat children with diabetes type 1 in Sofia, Bulgaria and to compare it with the changes in BMI and HbA(1c). The study was performed from the point of view of the health insurance fund and patients.

METHODS: A combined retrospective and prospective analysis of children patients' records after the introduction of CSII was performed. Cost of CSII, blood glucose

monitoring system and strips was calculated. The primary outcome observed was the variation in HbA(1c) and the secondary was the BMI change.

The data was collected from the Endocrinology and Pediatric clinic, Military Medical Academy (MMA) during the period 01.01.2013 – 31.07.2013. (7 months). 34 children were observed divided into two groups – Group 1 using CSII and Group 2 – control group on analogue insulin treatment with a pen device. The data collected from the patients' dossier include demographics about their age, sex, weight, duration of disease and HbA(1c) and type of treatment (CSII or analogue insulin treatment with a pen device).

RESULTS: Subcutaneous insulin infusion (CSII) systems are of a limited usage because they are not reimbursed by the health insurance fund in the country. The university pediatric clinic is introducing them on the request of the parents and only 30 children apply such. 11 children with diabetes type 1 during the period 1999 – 2011 were observed (mean age 10 years, mean duration of the disease is 7 years, average usage of CSII - 3 years). The CSII price is 3896 Euro and compared to the duration of usage it costs 1292 euro per patient per year. The blood glucose monitoring system costs 20 Euro and for the duration of the disease - 4.96 Euro per patient per year. The test stripes costs 533 Euro/ year (1100 stripes per year) and their average cost according to the duration of the disease is 3779.45 Euro since diagnosis. Thus the total yearly cost weighed with the duration of the disease is 1850 Euro (30% reimbursed). The average improvement of HbA (1c) after the CSII introduction is 1.72 and the average BMI was 37.03.

	Gender	Age (Months)	BMI 1	BMI 2	HbA (1c)1	HbA (1c) 2	Months with diabetes
Pumps	1.41± 0.507	113.82± 49.054	17± 2.739	19.65± 1.272	8.79	6.94± 0.659	66.65± 41.07
Insulin	1.47± 0.514	112.41± 42.705	18± 2.716	19.47± 2.125	9.76± 1.640	8.88± 1.364	41.71± 22.79

	Insulin cost	Pump cost	Pen cost	Consummative
pumps	37.83±12.00	7850.00	-	870.00
insulin	58.41±18.692	-	150.00	225.00

CONCLUSIONS: Improvements in glycemic control associated with CSII led to reduced HbA(1c) that can guarantee good diabetes management, but its control over BMI in growing children is still unclear. Diabetes in a small child places considerable stress on the family in terms of daily injections, dietary management, recognition of hypoglycaemia, and coping with frequent intercurrent illness, which is a normal feature of life in young children. Diabetes in the young child is not rare and seems to show some clinical and epidemiological differences from diabetes in older people.

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