Initiation of Continuous Subcutaneous Insulin Infusion Using Computerized Program in Qatar: A Pilot Study

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BACKGROUND AND AIM:

CSII therapy is usually started with 20 to 25% reduction in Total Daily Dose (TDD) of MDI insulin, basal/bolus distribution 50/50, single basal rate, carbohydrate-to-insulin-ratio (CIR) formula of 300-450/TDD and correction factor (CF) formula of 90-110/TDD (mmol/l). The aim of this study is to evaluate the effectiveness of unified computerized program for initiation of CSII in T1D patients in Qatar.

CSII program 1/2

	Patient Name		Age	Weigh	Hba1c	Carb/D	Date
			12	44.0	8.4	210	03-02-18
1.0	Previous insulin therapy						Review settings
	Rapid Acting Insulin	Novorapid			8		
	Rapid Acting Insulin	Novorapid			8		
	Rapid Acting Insulin	Novorapid			8		
	Long Acting Insulin	Lantus			20		
	Basal ratio on MDI (%)				45.5		
	TDD on MDI				44.000		
.2.	Insert Reduction (%)				20		
	TDD - pump				35.200		
	Basal rate ratio (35-50%)				40		
	TDD - previous				44.000		
	TDD - pump				35.200		
	Basal Dose				14.075		
	Bolus Dose				21.125		
	Average Units per Hour				0.575		
	Basal Rate 30% less				0.400		
	Basal Rate 30% more				0.775		
	Average U/H by weight				0.367		

METHODS:

We have analyzed **34 T1D patients** (M 17; F 17, age 9.4±3.6 years with diabetes duration 3.8±2.6 years) who started CSII (Medtronic 722, Medtronic Veo and Minimed 640g, (Medtronic, Northridge, USA)) from January 2017 to June 2017. CSII settings were performed using a specific computerized program (in-house built), which calculates basal rates, bolus wizard and sensor settings. Physicians were asked to enter personal data (age, HbA1c, basal/bolus insulin dose, wake up and school time) for each patient and to review the generated settings before initiation of CSII. CSII characteristics and HbA1c were evaluated in the following three months.

RESULTS

Most of the patients (28 from 34) were using Minimed 640G. All patients were using bolus wizard on regular basis with bolus ratio of 58.4±6.7%. **Insulin dose significantly increased from 0.58±0.21 to 0.72±0.22** u/kg/d ($p<0.05$). Most of the patients (31 from 34) have two insulin-to-carbohydrate-ratio of 18.2±8.6gr for breakfast/snack (6am-12pm) and 23.4±9.3gr for the rest of the day; two insulin sensitivity factor of 138±77mg/dl (10pm-6am) and 124±72 mg/dl for the rest of the day. **HbA1c significantly decreased ($p<0.05$) by 1.5 %** (from 9.6 to 8.1%) in the following 3 months.

CSII program 2/2

	Basal No	Time from		H	U/H	U/Day	
	1	0:00		3	0.475	1.425	
	2	3:00		3	0.700	2.100	
	3	6:00		7	0.575	4.025	
	4	13:00		7	0.575	4.025	
	5	20:00		4	0.525	2.100	
	Total			24		13.675	
	Temporary basal type				Percentage		
.4.	Insert Personal Bolus Wizard Settings						
	Insulin sensitivity Daytime (mg/dl)				48	2.7	
	Insulin sensitivity Nighttime (mg/dl)				57	3.2	
	Insert Rule (300…400…450)				450		
	Carb ratio average (U/gr)				13		
	Carb ratio More insulin (U/gr)				10		
	Carb ratio Less insulin (U/gr)				15		
	Carb ratio by (Carbs to insulin)				10		
	Active insulin time (h)				4		
	Glucose Targets (mg/dl)				80	120	
.5.	Low and High Alert Setting						
	High settings				ON		
	High setup (mg/dl)				250		
	Alert before high				OFF		
	Time before high				'/		
	Alert on high				ON		
	Rise alert				OFF		

CONCLUSION:

Our study shows that unified computerized program for CSII initiation may improve glucose control in type 1 diabetes patients. The study should be performed on larger population and longer duration to confirm our results.

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