Outcomes of pregnancies complicated by Type 1 diabetes treated with MDI or technological devices

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Introduction

Pregnancies complicated by pre-gestational diabetes are still associated with adverse perinatal outcomes. This has led to a growing use of insulin pumps (CSII) and sensor-augmented pumps (SAP) in pregnant women with T1D, in the attempt to optimize maternal glucose control. This "technological" approach, however, has failed to demonstrate clear-cut benefits on metabolic control and obstetrical/perinatal outcomes.

Aim of the study

To compare neonatal outcomes of pregnancies complicated by pre-gestational diabetes treated with multiple daily injections (MDI) with those of women treated with technological devices (TD: insulin pump and sensor-augmented pump).

Materials e Methods

Pregnancy outcomes of women with T1D cared for at the Diabetes Unit of the Niguarda Hospital, Milan, Italy in the period 2010-2015 were retrospectively evaluated. A comparison between women treated with MDI with those treated with TD was performed. Specifically, information on HbA1c levels, weight gain during pregnancy, blood glucose levels and a large number of neonatal outcomes (birthweight, LGA, SGA, major malformations, neonatal hypo, jaundice, NICU admission) was collected.

Fig.1: HbA1c levels

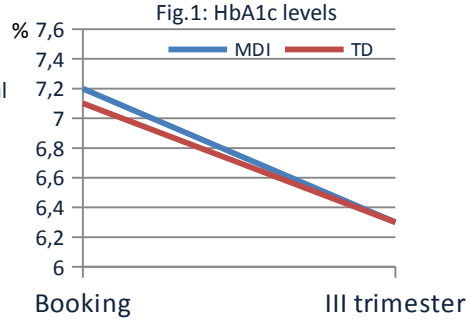


Fig.2: glucose levels

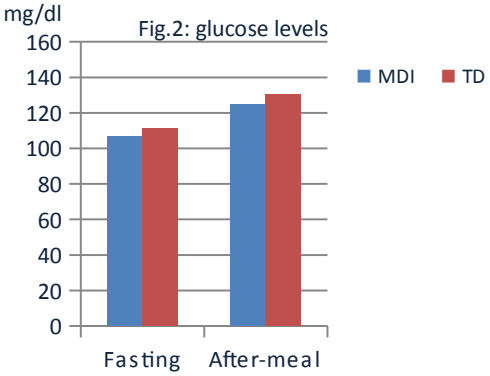


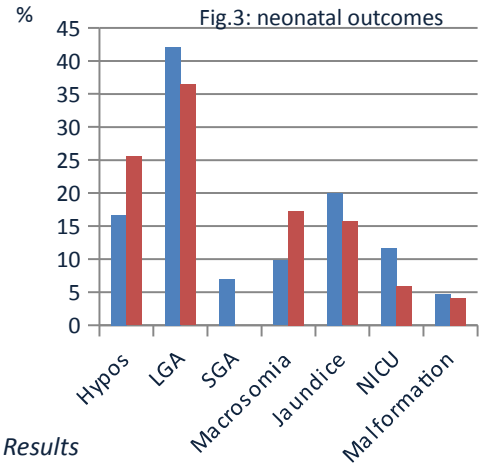
Table 1

	Overall	MDI	TD	p
N	138	71	67	
Maternal age (years)	33.6±5.1	32.8±5.7	34.5±4.2	0.05
Diabetes duration (years)	14.6±8.7	12.3±9.3	17.1±7.3	0.001
Pre-gestational weight (kg)	61.9±11.1	59.7±8.8	64.5±13.1	0.03
Pre-gestational BMI (kg/m²)	22.8±4.1	22.1±3.0	23.6±5.1	0.07
Pregnancy planning (%)	66.4	52.2	82.7	<0.001
Pre-gestational HbA1c (%)	7.1±0.9	7.2±1.0	7.1±0.7	0.59

Table 2

	Overall	MDI	TD	p
N	138	71	67	
Miscarriage (%)	11.2	7.0	14.9	0.17
Delivery (%)				
spontaneous	16.4	20.0	10.4	0.11
induced	27.6	31.0	22.4	0.34
CS	42.5	36.6	46.3	0.30
Male newborn (%)	47.8	43.0	41.0	0.85
Neonatal weight (g)	3403.2±600.8	3333.1±635.8	3485.4±551.7	0.18

Fig.3: neonatal outcomes



Results

Overall, 138 women with T1D were studied (71 in MDI, 67 in TD. Women using technological devices were older, had longer diabetes duration, higher pre-gestational weight and had more often a pregnancy planning compared with women in MDI (table 1).

No between group differences were detected for the way of delivery and neonatal gender and weight (table 2).The two groups were not statistically different for III trimester HbA1c levels (p=0.54) (fig. 1), glucose levels (fig. 2) weight gain (p=0.48), single neonatal outcomes (fig. 3), nor for a composite outcome including all the single adverse outcomes (p=0.80). A logistic regression model adjusted for gestational weight gain, HbA1c change and maternal age showed that the use of technological devices was not associated with the occurrence of adverse neonatal outcomes (OR=0.78, IC 95% 0.27-2.28).

Conclusions

The current use of TD in T1D pregnancies is not associated with better neonatal outcomes compared with MDI. This confirms previous reports on CSII in pregnancy, but seems quite surprising related to SAP. We can hypothesize that the present use of SAP, without structured algorithms, and therapy retrospectively discussed with the medical team, still represents an improper "professional" use of the device. A different, "patient oriented", use could be necessary to optimize pregnancy outcomes.