Benefits of CSII over MDI to pregnant women with type 1 diabetes

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Figure 1: HbA1c through pregnancy according to mode insulin delivery

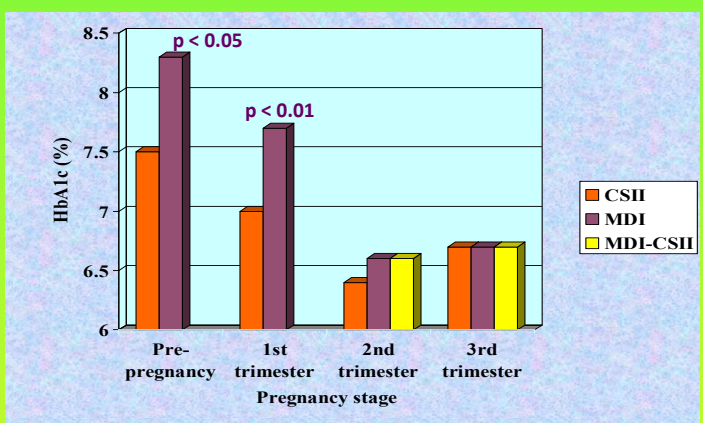
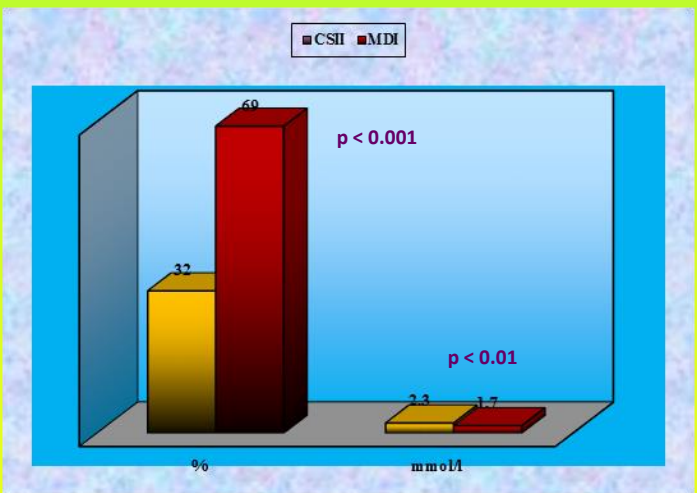


Figure 2: Neonatal hypoglycaemia: frequency < 2.0 mmol/l; absolute level



ABSTRACT

We have routinely offered insulin pump therapy (CSII) as an alternative to multiple daily injections (MDI) for intensive insulin therapy in pregnant women with type 1 diabetes for 20 years. We report our data on maternal and fetal outcomes, including maternal glucose control. These show maternal benefits with respect to glycaemic control in early pregnancy, both HbA1c and hypoglycaemia severity, and weight gain; and neonatal benefits in terms of reduced frequency of neonatal hypoglycaemia. There is a non-significant trend towards a lower frequency of babies born large for gestational age.

METHODS

130 pregnancies in women with T1DM

- 70 pump, 64 live births; 60 MDI, 53 live births
- 16 women switched MDI to CSII in early pregnancy

Retrospective audit medical records to collect data on:

- Glycaemic control: HbA1c, reported hypoglycaemia
- Birth weight
- Neonatal hypoglycaemia; SCBU admissions
- Maternal weight gain
- Insulin dose requirements

RESULTS

- HbA1c significantly better with CSII than MDI pre-conceptually and in first trimester (figure 1)
- Severe hypoglycaemia rates reported as lower with CSII vs MDI: 8% vs 18% ($p<0.001$)
- Vaginal delivery: 28% CSII vs 18% MDI
- Neonatal hypoglycaemia frequency significantly reduced when mother used CSII (figure 2)
- Maternal weight gain lower with CSII:
  - 12.3 ± 5.3 vs 15.0 ± 4.58 kg ($p<0.05$)
- Less increase in insulin requirements with CSII
  - 1.5 ± 0.5 vs 2.5 ± 1.7 (ratio dose start:end)
- Greater proportion of babies with birth centile $\leq 95^{th}$ when mother used CII: 57 vs 46% (NS)
- Better maternal post-partum glycaemic control: HbA1c: 7.6 ± 1.2 CSII vs 8.4 ± 1.7% MDI ($p<0.001$)
- No difference in other neonatal outcomes or need for SCBU admission

CONCLUSIONS

There is little published evidence to suggest that insulin pump therapy offers significant advantages over MDI for pregnant women with type 1 diabetes, either in terms of glycaemic control or maternal and fetal outcomes. Meta-analyses of observational trials comparing CSII with MDI in pregnancy have not shown any benefit in terms of maternal glycaemic control, or maternal or fetal outcomes (1,2). A multicentre observational study from British Columbia showed a better mean HbA1c throughout pregnancy in women using pumps rather than MDI, but with no evidence of benefit in maternal or fetal outcomes. Indeed there were more large for gestational age (LGA) babies born to mothers using CSII (3). Our study has the benefit of being a single-centre experience with all women receiving the same level of health-care professional support and education. Furthermore CSII was not reserved for women who were failing to achieve adequate glycaemic control using MDI but was offered to all women on the basis of personal choice. We have shown that women using CSII achieve better glycaemic control, at least through the first half of pregnancy, associated with reduced rates of severe hypoglycaemia. There are associated improvements in maternal outcomes, notably weight gain, and fetal outcomes, notably neonatal hypoglycaemia, with a non-significant trend towards a lower frequency of LGA babies when mother had used CSII.

REFERENCES

1. Farrar D et al. Cochrane Database of Systematic Reviews 2016, Issue 6; 2. Ranasinghe PD et al. J Women's Health 2015;24:237; 3. Kallas-Koeman MM et al. Diabetologia 2014;57:681