Postnatal Growth of Infants with Neonatal Diabetes: Insulin pump (CSII) versus Multiple Daily Injection (MDI) therapy

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Introduction and Objective

Permanent neonatal diabetes mellitus (PNDM) is a persistent hyperglycaemia diagnosed within the first 6 months of life. A correct genetic diagnosis can affect treatment and clinical outcome.

Clinical manifestations at the time of diagnosis include intrauterine growth retardation, hyperglycaemia, glycosuria, osmotic polyuria, severe dehydration and failure to thrive. Insulin production is inadequate, requiring exogenous insulin therapy.

The treatment corrects the hyperglycaemia and results in improvement of growth. However, there are no studies reporting the longitudinal growth of these infants (head circumference, length and weight gain) after starting insulin therapy.

Patients and Methods

Growth parameters: weight (Wt), Length (L) and head circumference (HC) were assessed in 9 infants with PNDM during the first 2 years of their postnatal life.

Five infants were on insulin pump therapy (CSII) and 4 infants were on multiple daily injections (MDI) therapy

Results

At ± 4 months of postnatal growth, two out of 9 infants had a LSDS < -2, 4 had WtSDS < -2 and 1 the HCSDS was <-2

After 20 ± 4 months of insulin therapy a growth catch-up occurred in the majority of them.

At the end of the 20 ± 4 months of age on insulin therapy:

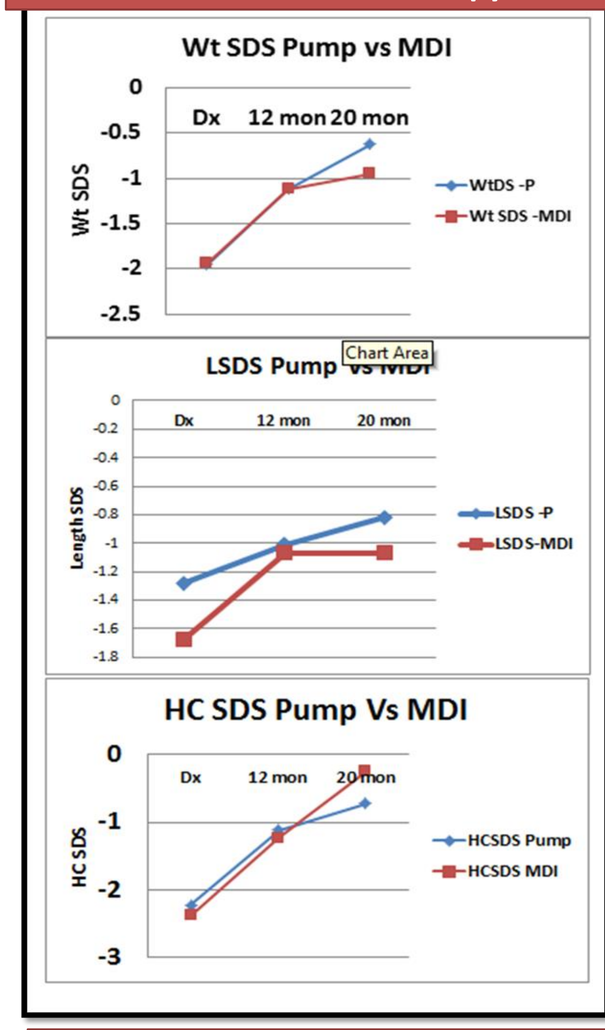
1. Length standard deviation score (SDS) increased from -1.45 to -0.65,
2. HCSDS increased from -2.3 to -0.51 and
3. WtSDS increased from -1.94 to -0.7.

Growth parameters in infants on CSII therapy were better than those on MDI therapy. The mean level of HbA1C was non-significantly lower in the CSII group versus the MDI group (9.6 ± 1 % vs 10.3 ± 2 %; p: ns).

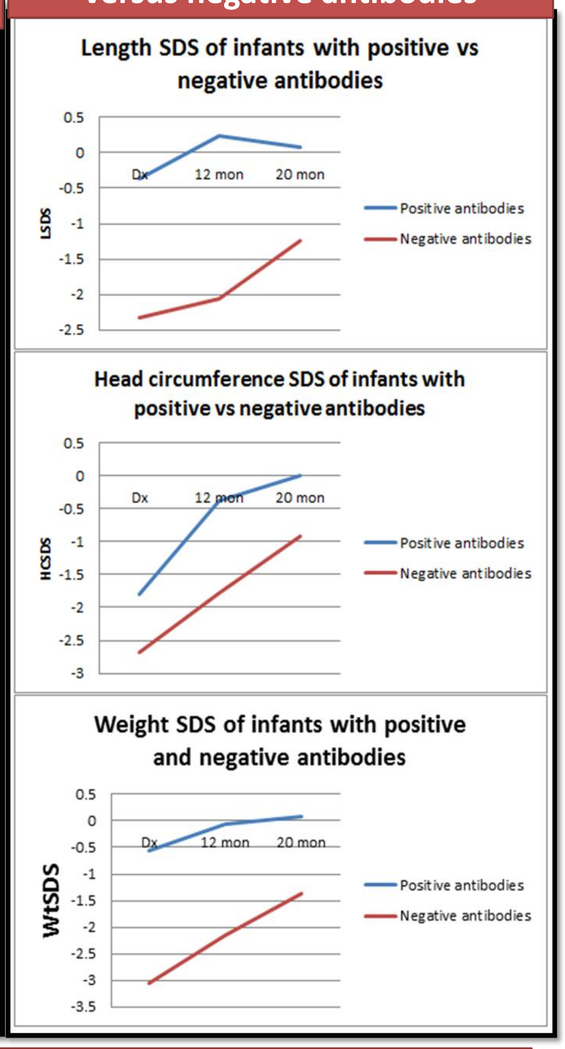
Results

Postnatal Growth of infants with PNDM

Growth of infants with PNDM on insulin versus MDI therapy



Growth of PNDM with positive versus negative antibodies



Growth of infants with PNDM on insulin versus MDI therapy

Postnatal Growth	At Dx	12 months	20 months
WtSDS	-1.9456	-1.2211	-0.7222
LSDS	-1.4556	-1.0367	-0.6567
HCSDS	-2.2889	-1.1611	-0.5111
Growth MDI vs Pump			
LSDS -Pump	-1.28	-1.01	-0.80
LSDS-MDI	-1.68	-1.07	-1.07
WtDS -Pump	-1.95	-1.12	-0.62
Wt SDS -MDI	-1.94	-1.12	-0.95
HCSDS Pump	-2.22	-1.11	-0.72
HCSDS MDI	-2.38	-1.22	-0.25

Continuous subcutaneous insulin infusion (CSII) in our 5 cases of PNDM) proved effective with lower HbA1c concentration compared to MDI therapy.

CSII can control blood glucose with few hypoglycemic events, which are particularly frequent and dangerous at this age.

Conclusions

Most infants with PNDM exhibit significant good catch up growth within the first two years of life irrespective of the etiology of their neonatal diabetes. Further studies are needed to confirm our preliminary observations and to explain the persistent slow growth parameters in some of them in spite of insulin treatment.

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