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NEONATAL DIABETES MELLITUS- A CASE REPORT.

Clinical Biochemistry

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ABSTRACT

A child right from its birth had hyperglycemia. His FBS was 900mg/dl which came to normal after insulin injection .He is now two and a half years old and continue to be hyperglycemia. Insulin dose 3 U NOVA 3 and 2 U LANTU given 4 times a day could control his hyperglycemia. He is monitored for glycemic control every 3 day a week .He is having permanent neonatal DM.

KEYWORDS

Hyperglycemia, Neonatal diabetes mellitus

INTRODUCTION

Neonatal diabetes mellitus (NNDM) is a rare disorder reported incidence of 1 in 2 60 000 live births in European population. [1] By definition, neonatal DM presents within 6 months of life with failure to thrive, dehydration and sepsis with or without ketoacidosis. Based on its clinical course, 2 forms have been recognized-transient and permanent. In short, approximately half of these cases have a transient course which resolves in the first few months of life, while others might require lifelong insulin therapy.

Transient neonatal diabetes mellitus (TNDM) results from a developmental defect in β-cell maturation which resolves spontaneously during the postnatal period. It manifests as insulin requiring hyperglycemia within the first week of life. Affected babies are genetically growth retarded as insulin is a major foetal growth factor. Ketoacidosis mostly occurs NNDM. The condition usually resolves within the first year of life. Infants born with NNDM harbour a greater risk of developing type 2 diabetes later in the life. The persistence of the underlying pancreatic defect predisposes to a heightened risk, especially during periods of increased demand like puberty and pregnancy.

The molecular genetic mechanism resulting in TNDM has been elucidated in a majority of cases. Two third of cases of TNDM results from an imprinting defect on chromosome 6q24.[2] Mutations in the KCNJ11 and ABCC8 genes which encode for Kir6.2 and SUR1 subunits of the ATP sensitive potassium channel, usually result in permanent neonatal diabetes mellitus (PNDM), though transient forms have been reported.

Permanent neonatal diabetes (PNDM)

It is characterized by the early onset of persistent hyperglycemia requiring lifelong treatment. All cases of PNDM result from mutations affecting genes regulating pancreatic development, β-cell function, apoptosis or the insulin molecule as such. Approximately half the cases of PNDM in the Caucasian population have been shown to involve defects in the genes transcribing the 2 subunits of K+ ATP channel.

Table I

SN	Bill No	Date	Age	TEST	Result
1.	2947019	06.08.21	2yrs	RBS	902mg/dl

Table II

SN	Date		7am	10am	12:30pm	7pm	10pm
1	4.12.21	*Glucose Level*	190 mg/dl	281mg/dl	236 mg/dl	139 mg/dl	239 mg/dl
		Insulin Dose	NOVA-3U LANT- 2U	-	NOVA-3U	NOVA-2U	LANT-1U
2	5.12.21	*Glucose Level*	152 mg/dl	212mg/dl	153 mg/dl	76 mg/dl	99 mg/dl
		Insulin Dose	NOVA-3U LANT- 2U	-	NOVA-2U	NOVA-2U	LANT-1U
3	6.12.21	*Glucose Level*	115 mg/dl	114mg/dl	130 mg/dl	171 mg/dl	111 mg/dl
		Insulin Dose	NOVA-2U LANT- 2U	-	NOVA-2U	NOVA-2U	LANT-1U
4	7.12.21	*Glucose Level*	187 mg/dl	177mg/dl	97 mg/dl	325 mg/dl	217 mg/dl
		Insulin Dose	NOVA-2U LANT- 3U	-	NOVA-2U	NOVA-3U	LANT-1U
5	8.12.21	*Glucose Level*	192 mg/dl	396mg/dl	396 mg/dl	325 mg/dl	217 mg/dl
		Insulin Dose	NOVA-2U LANT- 3U	NOVA-1U	NOVA-1U	NOVA-3U	LANT-1U

The two and half year old child blood sugar levels at 7am, 12:30pm, 7pm and 10pm and the insulin dose on different days.

Table III

SN	Day		7am	10am	12:30pm	7pm	10pm
1	Monday	*Glucose Level*	120 mg/dl	231 mg/dl	204 mg/dl	247 mg/dl	258mg/dl
		Insulin Dose	NOVA-2U LANT-3U	-	NOVA-2U	NOVA-2U	LANT-1U
2	Wenesday	*Glucose Level*	110 mg/dl	291 mg/dl	300 mg/dl	122mg/dl	264 mg/dl
		Insulin Dose	NOVA-2U LANT-3U	-	NOVA-3U	NOVA-2U	LANT-1U
3	Friday	*Glucose Level*	235 mg/dl	458 mg/dl	129 mg/dl	297 mg/dl	135 mg/dl
		Insulin Dose	NOVA-3U LANT-3U	NOVA-1U	NOVA-2U	NOVA-2U	LANT-1U

A child admitted with hyperglycemia is found to have permanent neonatal DM. His hyperglycemia controlled with 3U NOVA and 2 U LANT 4times daily still having permanent hyperglycemia and now measured giving 1U.It is monitored every three days a week.

Case Report

One child developed hyperglycemia right from birth .There is persistent hyperglycaemia. After food the sugar level become very high which can be controlled by insulin injection .The insulin dose is determined depending on sugar levels. Generally in neonatal transient diabetes mellitus the hyperglycemia disappear after one year of life .But this child has still hyper glycemia even after two and a half years of life. It was detected surprisingly since he came on OP with coma and sugar level was 900mg/dl (Table I) he become normal after insulin injection .Now he is managed by giving NOVA 3 NANT 2 LANTUS four times per day at 7:00AM, 12:30 PM, 7:00PM and 10:00PM is evident from Table II .The fasting tested before starting treatment is presented in table I. It is not type I or type II from the genetic studies. Hence it could be MODY. As the hyperglycemia continue even at the age of 2.5 years it could be persistent transient neonatal diabetes mellitus. After stabilizing of hyperglycemia insulin dose is given (Table II) .After controlling the dose of insulin and stabilizing glucose level it is managed by recording sugar levels 4 times a day with 3U NOVA and 2U insulin glargine injection(LANTU) test is monitored only 3 days Monday ,Wednesday, Friday (3days a week) Table III.

REFERENCES

[1] Slingerland AS, Shields BM, Flanagan SE, Bruining GJ, Noordam K, Gach A, et al. Referral rates for diagnostic testing support an incidence of permanent neonatal diabetes in three European countries of at least 1 in 260,000 live births. Diabetologia. 2009; 52: 1683–5.
[2] Bryan AL, Bryan J. Neonatal diabetes mellitus. Endocr Rev. 2008;29:265–91.