RESEARCH LETTER

Inborn Errors of Metabolism in a Tertiary Care Hospital of Eastern India

Inborn errors of metabolism are a challenge on a diagnostic and therapeutic level. All newborn babies in our hospital were screened over 4 years. 91 (15%) neonates were screen positive for IEM, G6PD being the most common. Early detection and treatment can improve outcomes.

Keywords: Diagnosis, Newborn screening, Metabolic disorders.

In India, the prevalence of Inborn errors of metabolism (IEM) is one in 2497 newborns [1]; congenital hypothyroidism incidence is 2.1 per 1000 [2] and G6PD deficiency is 2-7.8% [3]. Worldwide, the incidence of IEM is more than 1/1000 [4]. All newborn babies were screened for congenital hypothyroidism (CH), congenital adrenal hyperplasia (CAH), cystic fibrosis (CF), G6PD deficiency (G6PDD), phenyketonuria, galactosemia and biotinidase deficiency by Delfia technology (Perkin Elmer), over a period of 4 years from February 2008 through January 2012. The organic acidemias were picked up by doing a gas chromatography in the urine and Tandem mass spectrometry performed on dried blood spots for detection of aminoacidurias.

91 (15%) newborn babies (50 males) had a screen positive of IEM. Clinical presentation was quite varied. 29 cases were born to consanguineously married couples. History of neonatal deaths, still births or sibling deaths with similar illness was not found in any of the cases. Majority of abnormalities were seen within 30 days of life (***Table* I**). No baby was positive for 17 OHP deficiency. We found more male babies to be suffering from biotinidase deficiency, more females suffering from TSH abnormalities, while the G6PD deficiency was equally distributed. Eight babies were found to have abnormalities in aminoacid metabolism, detected by tandem mass spectrometry (***Table* II**).

The Indian population being 1220 million, and birth rate of 20.6, the estimated number of neonates who would have CH alone would be about 17000 births each year [5]. In our study, out of 600 newborn 90 had a metabolic defect. Biotinidase deficiency [*n*=39], was the commonest finding followed by G6PD deficiency. Aminoacidopathies as a group constituted the next most common disorder. Interestingly, a very high prevalence of inborn errors of metabolism to the extent of 1 in every thousand newborns has been observed [6].

Incidence of G6PD deficiency has been quoted as 22% [7] with incidence in males being 28.3% and in females 1.05% [8]. Rao, *et al*. [9] reviewed a total of 869 cases of which 40.2% were less than 1 year, 19.9% were 1-3 years, 13.5% between 3-5 years, 18.4% more than 5years of age and 8.0% were adults , received within a duration of two years with presenting symptoms of IEMs. Our data shows 2 children with suspected CAH who were lost on follow up.

Our study has certain limitations. The diagnosis of IEM was based on results of tests like blood TMS and urine GC/MS which only suggest the diagnosis and final confirmation needs either enzymatic analysis or genetic studies many of which are found in select centres in India.

TABLE I AGE AND SEX DISTRIBUTION OF NEWBORNS DETECTED WITH IEM [*N*=91]

Disorder	*No. of patients*	*Age*				*Sex*	
		0-30 days	*31-60 days*	*61-90 days*	*91-120 days*	*Male*	*Female*
G6PD	22	19	1	2	0	11	11
Phenylalanine	6	5	0	0	1	1	5
Biotinidase deficiency	39	37	0	2	0	24	15
Galactosemia	11	9	1	1	0	8	3
TSH abnormality	7	5	1	0	1	2	5
Cystic fibrosis	6	4	0	1	0	4	2

TABLE II FINDINGS ON TANDEM MASS SPECTROMETRY (*N*=8)

Tests	No. of patients
Glycine	1
Acetylcarnitine (C2)	1
Hexanoylcarnitine (C6)	1
Myristoylcarnitine (C14)	1
Octadecanoylcarnitine (C18)	3
Glutamic acid	1

The disadvantages of MS/MS are those found with any new technology [10]. The initial cost of a system is high. A level of expertise is needed for preparing samples, operate the system and to interpret the data produced by the MS/MS. Many of the metabolic intermediates detected by this methodology are elevated in multiple different disorders, and so proficiency in interpretation is necessary. Lack of indigenous External Quality Assurance programs is a cause of worry.

Pre-symptomatic diagnosis of these disorders can minimize the irreversible complications and significantly improve the long-term prognosis, by early treatment. This will prevent a lot of anxiety, wastage of time and money for parents and suffering for affected children. Our study highlights many facts of the demographics of IEM in this region. Many such studies are required from other centers to know the actual prevalence, types and burden of IEM.

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