Research Article

To study the response to enteral and parental mode of glucose therapy in management of hypoglycemia

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Abstract

Introduction: Hypoglycemia is a fairly common problem encountered in Hypoglycemia. It is important to anticipate this problem and evaluate babies with either risk factors for hypoglycemia or symptoms, because hypoglycemia is usually easily treatable and can occur in infants who appear well. **Material and Methods:** This prospective study was conducted in a public municipal hospital attached with medical college spanning over 10 months from March'99 to January'2000. In all 1854 newborns were screened for hypoglycemia with the working definition of blood sugar level less than 30 mg/dl irrespective of gestational age using folin -wu method. **Observations:** In our study we screened 1854 neonates out of which 78 neonates were found to be hypoglycemic. The incidence is 4.21 %. 20 Babies out of 37 (54%) responded completely to glucose Therapy. **Discussion**: The incidence of neonatal hypoglycemia in various studies conducted in the past ranged from 0.5 to 15% Sizonenko P C *et al* has found the incidence of neonatal hypoglycemia to be 2-3 per 1000 live births. While according to Singt; M *et al* and Gutberlet R. L. *et al*, The incidence ranges from 0.2 to 11.4 %.
Keywords: Hypoglycemia, Oral feeds, I.V. glucagon.

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INTRODUCTION

Hypoglycemia is a fairly common problem encountered in neonatal period. It is important to anticipate this problem and evaluate babies with either risk factors for hypoglycemia or symptoms, because hypoglycemia is usually easily treatable and can occur in infants who appear well. Brain dysfunction and neurodevelopment retardation is known to be associated with prolonged hypoglycemia and to prevent it, early diagnosis and effective management is essential. Although extensive literature exists, there is still disagreement over normal range of blood glucose in neonates. Limited data is available correlating length of hypoglycemia with outcome and the relative risk of symptomatic versus asymptomatic hypoglycemia. Because of these concerns and uncertainties it seems prudent to aggressively screen infants at risk for hypoglycemia.

MATERIAL AND METHODS

This prospective study was conducted in a public municipal hospital attached with medical college spanning over 10 months from March'99 to January'2000. In all 1854 newborns were screened for hypoglycemia with the working definition of blood sugar level less than 30 mg/dl irrespective of gestational age using folin -wu method[1]. A detail of each newborn baby screened was recorded in a preformed Performa which included antenatal, intranatal and postnatal details The babies having low cord blood sugar both symptomatic and asymptomatic babies. Therapeutic measures were instituted and babies were monitored at 2, 6, 12, 24 and 48 hours of age using dextrostix. Values in hypoglycemic range were reconfirmed by laboratory analysis for which the samples were send in fluoride bulb to inhibits the glycolysis of red blood cells[2]

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OBSERVATIONS AND RESULTS

Table 1: Incidence of neonatal hypoglycemia (n = 1854)

Total no. of neonates	1854
Hypoglycemic neonates	78
Incidence (%)	4.21%

In our study we screened 1854 neonates out of which 78 neonates were found to be hypoglycemic. The incidence is 4.21%

Table 2: Response to stepwise glucose therapy in asymptomatic hypoglycemic neonates (n = 44)

Steps	Mode of therapy	Total no.	No. of babies recovered	% of babies recovered
I	Oral feeds	44	16	36.36%
II	I.V. 10% dextrose bolus (200 mg/kg.) followed by 4 mg/kg. / min.IV infusion	28	18	64.28%
III	10% dextrose increased to 6 mg/kg/min	10	7	70.00%

Above table shows that 16 babies out of 44 asymptomatic hypoglycemic neonates responded to oral feeds, 18 out of remaining 28 babies responded to I.V. 10 % dextrose bolus (200mg /kg) followed by 4 mg / kg /min (64.28%) while? for remaining 10 asymptomatic hypoglycemic neonates 10% dextrose was increased to 6 mg /kg /min out of which 7 babies (70%) responded and remaining 3 babies becomes symptomatic.

Table 3: Response of symptomatic babies to treatment (n = 34+3)

Response to treatment	Number	Percentage
Complete	20	54%
Partial	17	46%

Table 4: Complete response to stepwise glucose therapy in symptomatic babies (n=20)

Steps	Mode of Therapy	Total Number	Number of babies recovered	%of babies recovered
1	I.V. 10% dextrose bolus(200mg/kg) followed by 6 mg /kg/min IV infusion	20	10	50%
II	10% dextrose increased to 8 mg /kg/min IV infusion	10	6	60%
III	10% dextrose increased to 10 mg/kg/min I V infusion	4	4	100%

20 Babies out of 37 (54%) responded completely to glucose Therapy,

Table 5: Response to stepwise Therapy in babies with persistent symptoms N=17

Steps	Mode of Therapy	Total No.	No. of babies recovered	Percentage recovered
I	I.V. 10% dextrose bolus (200mg/kg) followed by 10mg/kg/min I.V. infusion.	17	7	41.17%
II	1 0 % dextrose increased to 12mg/kg/min I.V.infusion	10	5	50.00%
III	I.V. Hydrocortisone 10mg /kg /day in 2 divided doses	5	4	80.00%
IV	I.M.glucagon 0.1 mg/kg	1	1	100.00%

Above table shows that out of 17 babies with persistent hypoglycemic neonates 12 responded to increased dose of 10% dextrose infusion up to 12mg.^g/min while out of remaining 5., 4 babies responded to hydrocortisone and 1 baby responded to glucagon.

DISCUSSION

The incidence of neonatal hypoglycemia in various studies conducted in the past ranged from 0.5 to 15%[2] Sizonenko P C *et al*[3] has found the incidence of neonatal hypoglycemia to be 2-3 per 1000 live births. While according to Singt; M *et al*[4] and Gutberlet R. L. *et al*[5], The incidence ranges from 0.2 to 11.4 %.

Table 6: Incidence of Symptomatic neonatal hypoglycemia

Investigators	No. of babies studied	Numbers of babies hypoglycemic	Rate/1000
SinghalPK et a![6](1992)	2248	43	19.
Sharmaet a![7]1983)	9014	56	6.2
Karan et a![8](1975)	566	12	2.1
Kumari et a![9](1971)	9366	16	1.7
Corblathetal[10](1964)	2775	8	2.9
Gruenwald eta![11](1964)	3000	5	1.7
Neligan eta![12](1963)	6000	12	2.0
Our study	1854	34	18.3

In our study we observed that 16 out of 44 asymptomatic hypoglycemic neonates (36.36%) responded to oral feeds only (Table 2). King KG[2] has also advised early feeding in asymptomatic infants. The remaining 28 babies still having persistent low blood glucose level and needed parenteral administration of glucose. 25 out of 28 responded to intravenous administration of glucose bolus (200 mg /kg over 1 minute) followed by continuous infusion drip. While 3 neonates became symptomatic after few hours and treated with increased dose of I. V glucose. Among symptomatic group (34+3), 20 babies (54%) responded to I.V. glucose therapy completely (table 4). 10 out of 20 symptomatic hypoglycemic neonates (50%) responded to glucose infusion rateof6mg/kg/min while out of remaining 10 symptomatic hypoglycemic neonates 6 responded (60%) to increased dose of I. V. glucose to 8 mg /kg /min. (60 %) and 4 responded to increased dose of glucose to 10mg/kg/min. Out of 37 symptomatic hypoglycemic neonates 17 babies showed only partial response to the treatment and still symptomatic. 12 babies (70%) responded completely within 48 hours, after increased dose of dextrose to 12 mg /kg/min (table 5). Still remaining 5 babies persistently showing symptoms and were started on I .V. hydrocortisone 10 mg / kg / day in two divided doses. 4 out of 5 babies (80%) responded completely. One baby who was persistently symptomatic was started on Inj. Glucagon o.1 mg /kg intramuscularly, The baby responded well. Carter P *et al*[43] recommended I.V. glucagon in SGA and premature infants but proper blood glucose level should be done within 3 hours of starting therapy. It is important to start early feeding in neonates particularly if associated with high risk factors. There is high incidence of perinatal problems in hypoglycemic neonates intensifying the role of careful monitoring of blood glucose level and careful observation.

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