PERINATAL ASPHYXIA – CLINICO – EPIDEMIOLOGICAL FACTORS – AN ANALYSIS

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SUMMARY

Perinatal asphyxia is a potentially lethal but preventable cause of perinatal morbidity and mortality. This study aims to recognize such factors. Study design is of case control type. 111 cases of perinatal asphyxia and 222 pre selected controls were taken and after defining the high risk factors, univariate analysis and Fishers exact test was used on the observations made.

The following were found to be significantly associated with perinatal asphyxia cases; prematurity (32.5%), age (8.1%) and weight (22.5%) of the mother, parity of ≥5 (5.4%), inadequate ante-natal care (64.9%), eclampsia (3.6%), fetal growth retardation (25.2%), antepartal haemorrhage (10.8%), transverse arrest of head (12.6%), breech delivery (3.6%), application of forceps (29.7%) and caesarean delivery (36.9%).

Study highlights the fact that even though many individual factors like height of the mother, illiteracy, low socio-economic status, pre-eclampsia, hydramnios, compound presentation, cord prolapse may not be significantly related to causation of asphyxia, combination of these factors make the new born in a high risk group for occurance of asphyxia.

INTRODUCTION

Perinatal asphyxia continues to be a focus of research for more than a century (Little, 1861; Courville, 1971). It is one of the potentially lethal but a preventable cause of perinatal morbidity and mortality. Many cases of asphyxia can be prevented by adequate preparedness, for the resuscitative difficulties antici-

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pated at birth. Though these difficulties can be anticipated in majority by recognition of certain high risk factors (Singh, 1977; Singh and Kalra, 1978), few may suffer without any predisposing factor (Adamson and Myess, 1975).

This study was undertaken to determine the role of various clinico-epidemiological factors towards the causation of birth asphyxia, so that early recognition of these factors would lead to early referral and intervention leading to decrease in incidence of perinatal asphyxia.

MATERIAL AND METHOD

This case control study was conducted in the 2316 new born delivered consequetively in a hospital, from February 1989 to October 1989.

Cases (n = 111) included in the study group included those with Apgar score of < 5 at 1 minute and needed resuscitation at birth and not having any congenital malformation or congenital infections. For each case, 2 pre selected new borns delivered before and after it served as control (n = 222) from whom congenital malformation and congenital infections were ruled out by clinical examination.

Proforma was made in which the details of following factors like age, height, weight, parity, socio economic status, and antenatal care of mother was recorded; events of pregnancy like preeclampsia, eclampsia, hydramnios, fetal growth retardation (FGR), ante partum haemorrhage (APH), transverse arrest of head (TAH), compound presentation, cord prolapse and mode of delivery were noted.

The high risk in various factors noted above were defined as shown in the table I (Queenan, 1985; Prichard et al. 1985).

OBSERVATIONS

Of the total 2316 deliveries during the study period, 111 (4.9%) patients of asphyxia occured as per definition. Univariate analysis with Fishers exact test of various clinico-epidemiological factors is shown in the table II.

Of the cases, 75 (67.5%) were term and 36 (32.5%) were preterm as compared to controls where 207 (93.2%) were term and 15 (6.8%) were preterm. There were significantly more preterm ($P < .05$) who developed asphyxia as compared to term babies. Normal vertex delivery occured in 34 (38.6%) of cases and 140 (163.1%) controls showing the protective effect of vertex presentation in asphyxia.

Of importance to realise is that many of the cases had multiple high risk factors, typical example of which is, a nutritionally deprived, young mother with inadequate antenatal care and fetal growth retardation. If all adverse factors are taken together they were present in 71.2% of the cases as compared to 19.4% of controls (p value < .05).

DISCUSSION

A significant association of adverse antenatal factors when taken together for the causation of asphyxia in cases were noted even though only few of the factors were individually significant viz. age, height, parity, inadequate ANC, eclampsia, fetal growth retardation, ante-

Table I

	Parameter	High Risk Category
1.	Age	< 18, > 35 years
2.	Height	< 145 mm
3.	Weight	< 40 kg
4.	Parity	≥ 5
5.	Education	Illiterate - no formal education
6.	Socio-economic status	Low group IV/V of Kuppaswamy classification
7.	Antenatal care	None / Inadequate
8.	Preeclampsia	BP > 140/90 on 2 occasions ≥ 6 hours apart + significant albuminuria (> 300 mg/day) + Edema
9.	Eclampsia	Generalised tonic clonic seizure + BP > 140/90 ± significant albuminuria
10.	Hydramnios	Clinically or >200 ml fluid by ultrasonography
11.	Fetal Growth Retardation	Clinical ie fundal height < 30 week of gestational age.
12.	Antepartum Haemorrhage	Any bleed per vaginum after 28 weeks of gestation
13.	Transverse arrest of head	During labour with good uterine contraction, head fails to rotate in 30 minutes at the level of ischial spines.
14.	Compound presentation	Presentation of any two parts of baby together

partum haemorrhage, transverse arrest of head, breech, forceps and caesarean section. Similar observation were make by DeSouza and Richards (1978) and Singh and Kalra (1978). In the later study the significant risk factors noted were malnutrition, assisted and operative delivery, eclampsia, APH, FGR and early onset of labour. In contrary to above Deorari et al. (1989) found only fetal distress to be significantly related to asphyxia.

Asphyxia occured significantly more with prematures as compared to mature. Similar observations were made by Donn and Naglie (1986) and attributed to higher rate of complications leading to prematurity and abnormal modes of

Table II

Showing presence of high risk factors as defined in Table I

Parameter	Cases n = 111	Control n = 222	P value
HIGH RISK ANTENATAL CONDITION			
1. Age	9 (8.1)	3 (1.4)	< .05
2. Height	21 (18.9)	30 (13.5)	NS
3. Weight	25 (22.5)	31 (13.9)	< .05
4. Parity	6 (5.4)	6 (2.7)	< .05
5. Illiteracy	52 (46.8)	87 (39.2)	NS
6. Low S. E. status	48 (43.2)	75 (33.8)	NS
7. No / Inadequate ANC	72 (64.9)	67 (30.2)	< .05
8. Pre eclampsia	13 (11.7)	15 (6.7)	NS
9. Eclampsia	4 (3.6)	1 (0.49)	< .05
10. Hydramnios	3 (2.7)	1 (0.49)	NS
11. Fetal Growth Retardation	28 (25.2)	22 (9.9)	< .001
12. Antepartum Haemorrhage	12 (10.8)	2 (.90)	< .001
13. Transverse arrest of head	14 (2.6)	1 (0.49)	< .001
14. Compound presentation	2 (1.8)	1 (0.49)	NS
15. Cord prolapse	3 (2.7)	1 (0.49)	NS
MODE OF DELIVERY			
16. Breech	4 (3.6)	1 (0.49)	< .05
17. Forceps	33 (29.7)	25 (11.3)	< .001
18 Caesarean section	41 (36.9)	56 (25.2)	< .05

Percentage given in parenthesis.

delivery used.

Significantly more abnormal modes of delivery were seen in cases than in the controls. Deorari et al. (1989) reported similar observation and attributed them to the reasons leading to abnormal modes of delivery but the modes by themselves could not be excluded as a contributory factor towards causation of asphyxia. Important observation made in the study was significantly higher vertex delivery in controls than in cases, showing that the vertex delivery had protective effect on baby from asphyxia.

Few factors like illiteracy and low socioeconomic status, though found

significant in many studies was not so in this study. This could be explained as preselection bias of the controls. Preeclampsia, compound presentation and cord prolapse as high risk factors for causation of asphyxia (Queenan, 1985) were not found so, because of the small sample size of the cases and controls and the rarity of these entities.

In view of these potential preventable high risk factors associated with causation of asphyxia, one can hope for significant reduction of such cases with improvement in antenatal care, early referral and action and the availability of paediatrician with adequate neonatal care facilities.

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