

FACTORS ASSOCIATED WITH PRETERM SPONTANEOUS BIRTH

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SUMMARY

An attempt has been made in this work to find out the contributory factors for the premature birth. 200 labour cases were studied, of which 120 were preterm and 80 were term labour. Preterm labour is more common among late (31-35 years) and early (below 20 years) reproductive age groups. It is more common among primi and grand multigravidae and is also found commner in low socio-economic (70%) than higher socio-economic group (6.6%). In preterm cases the incidence of perinatal mortality (15% and morbidity 13.3%) are found much higher than that of term labour cases (7.5%) and 5.0% respectively) Placental inflammation is frequent in both the groups preterm with and without rupture of membrane. The incidence of presence of micro-organisms in endocervix is higher in preterm cases (66.6%) than that of term labour cases (45.0%). The incidence of micro-organism in preterm cases is much higher in socio-economically deprived group (51.5%) than that of socio-economically well to do class (1.6%).

Premature birth is by far the most important problem in modern obstetrics in terms of mortality and morbidity of the infant. The dominant cause of perinatal death is prematurity and while the mortality rate of premature infants has been reduced by improved care, the incidence of prematurity has not declined. A reduction of the incidence of premature birth would lead to a decrease not only in perinatal mortality, but also in neonatal and infant morbidity. It is well documented

that the incidence of physical and behavioural sequelae is considerably higher in premature infants than in infants born at term. Expert care often reduces but can not eliminate these sequelae. The prevention of premature birth must therefore, be given the highest priority during the remaining part of the century.

The largest number of preterm labour are spontaneous with undetectable cause and high mortality.

The close association between premature rupture of membranes and preterm labour has been documented. It has been estimated that premature rupture of membranes occurs before preterm labour in 10

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to 40 per cent of the cases. If the cause of premature rupture of membranes is disclosed, the tragedy of premature labour may be averted in at least a small percentage of cases, leading to increased neonatal survival. Premature rupture of membranes has been rightfully blamed for many maternal and foetal complications, ranging from premature labour, prolonged labour, dry labour, maternal infection and increased chances of operative deliveries in the mother to intrapartum pneumonias, prematurity, neonatal infections, inflammation of the placenta and cord, and the like neonates. Premature rupture of membranes has a multifactorial origin, but we can conclude that inflamed membranes, can in part, be held responsible for premature termination (Knox and Hoerner *et al* 1950; Benirschke, 1967; Breeze, 1961 and Bourne, 1962).

The present study is an analysis of 200 cases, where bacteriological examination of endocervical secretion was carried out besides the other routine examination. The placenta and membranes were histologically examined for the evidence of infection in 58 cases of preterm labour. There were 120 cases of preterm labour. Thirty-six cases (30%) had premature rupture of membrane while there are 8 cases of term

labour and 14 cases (17.50%) had premature rupture of membrane while there are 8 cases of term labour and 14 cases (17.50%) had premature rupture.

Preterm patients are much more common in the age group of 31 to 35 years. The next common age period is below 20 years. It seems that preterm labour is commoner in late and early reproductive life. The age distribution of premature rupture of membranes in preterm cases is also found to be similar i.e. late and early reproductive life.

Primigravida and grand-multigravida were more prone to undergo preterm labour. Premature rupture of membranes in preterm cases was also found more in primigravida and grand multigravida.

Preterm labour is more common in the gestational age group of 30 to 33 weeks. Premature rupture of membrane is much more common during the gestational age period of 32 — 33 weeks.

Preterm labour is more common with poor socio-economic class of patients than high socio-economic class. Low socio-economic group of patients are more prone to undergo preterm labour than term labour.

TABLE I
Distribution of Gravida in Preterm Cases With and Without Premature Rupture of Membranes

Gravida	No. of cases	Preterm labour with premature rupture of membrane		Preterm labour without premature rupture of membrane	
		Number	Percentage	Number	Percentage
Primi	32	10	8.33	22	18.33
Second	20	2	1.67	18	15.00
Third	24	4	8.33	20	16.67
Fourth	20	6	5.00	14	11.67
More than fourth	24	14	11.67	10	8.33
Total	120	36	30.00	84	70.00

TABLE II
Relation of Gestational Age in Preterm Cases With and Without Premature Rupture of Membranes

Gestational age in weeks	No. of cases	Preterm labour with premature rupture of membrane		Preterm labour without premature rupture of membrane	
		Number	Percentage	Number	Percentage
28 - 29	22	4	3.33	18	15.00
30 - 31	28	6	5.00	22	18.33
32 - 33	38	16	13.34	22	18.33
34 - 35	18	6	5.00	12	10.00
36 - 37	14	4	3.33	10	8.34
Total	120	36	30.00	84	70.00

TABLE III
Relationship of Socioeconomic Condition with Preterm and Term Labour

Socio-economic condition	Preterm labour cases		Term labour cases	
	Number	Percentage	Number	Percentage
Low	84	70.00	46	57.50
Middle	28	23.33	22	27.50
High	8	6.67	12	15.00
Total	120	100.00	80	100.00

TABLE IV
Perinatal Mortality and Morbidity in Preterm and Term Labour

	Preterm labour cases		Term labour cases	
	Number	Percentage	Number	Percentage
Mortality	18	15.00	6	7.50
Morbidity	16	13.33	4	5.00
None	86	71.67	70	87.50
Total	120	100.00	80	100.00

Perinatal mortality and morbidity are found to be high in preterm labour cases than term labour cases.

Perinatal mortality is found to be increasing along with the duration of rupture of membrane. It is maximum when the duration of rupture of membranes is more than 48 hours.

Perinatal morbidity also bears the same

relation with the duration of rupture of membrane i.e. morbidity increases gradually with the increase in the duration of rupture of membranes.

The commoner organisms cultured from endocervix were staphylococcus albus, staphylococcus aureus, streptococcus B-haemolyticus and non-haemolyticus, E. Coli, the less commoner being anaerobic

TABLE V
Relation of Perinatal Mortality and Morbidity With the Duration of Rupture of Membrane

Duration of rupture of membranes in hours	No. of cases	Perinatal mortality		Perinatal morbidity	
		Number	Percentage	Number	Percentage
1 - 12	8	2	4.00	2	4.00
13 - 24	10	2	4.00	2	4.00
25 - 48	10	2	4.00	4	8.00
More than 48	22	6	12.00	8	16.00
Total	50	12	24.00	16	32.00

TABLE VI
Comparative Microbiology in Preterm Labour Cases With and Without Premature of Membrane (Total preterm cases 120)

Micro-organisms	No. of preterm	Premature labour with rupture of membrane		Preterm labour without premature rupture of membran	
		Number	%	Number	%
		Staphylococcus aureus (Coagulase positive)	16	8	6.67
Staphylococcus aureus (Coagulase negative)	14	4	3.33	10	8.33
Staphylococcus albus	24	10	8.33	14	11.67
Streptococcus B-haemolyticus	14	4	3.33	10	8.33
Streptococcus non-haemolyticus	10	2	1.67	8	6.67
Anaerobic streptococcus	6	2	1.67	4	3.33
E. coli	10	4	3.33	6	5.00
Pseudomonas species	4	0	0.00	4	3.33

TABLE VII
Relation of Socio-economic Condition With Positive Culture of Micro-organism in Total Preterm and Term Labour Cases

Socio-economic conditions	Positive culture in preterm labour cases (Total preterm cases 120)		Positive culture in term labour cases (Total term cases 80)	
	Number	Percentage	Number	Percentage
Low	62	51.67	26	32.50
Middle	16	13.33	8	10.00
High	2	1.66	2	2.50
Total	80	66.66	36	45.00

TABLE VIII
Grades of Placentitis in Different Weeks of Gestation in Preterm Labour Cases With and Without Premature Rupture of Membranes

Grades of placentitis	Total No. of cases studied	Preterm labour with premature rupture of membrane			Preterm labour without premature rupture of membrane		
		20-28 weeks		29-36 weeks	20-28 weeks		29-36 weeks
		Total cases			Total cases		
I	32 (61.54%)	28 (60.87%)	2 (7.14%)	26 (92.86%)	4 (66.67%)	2 (50%)	
II	16 (30.77%)	14 (30.43%)	9 (64.29%)	5 (35.71%)	2 (35.71%)	2 (100%)	
III	4 (7.69%)	4 (8.70%)	4 (100%)	—	—	—	
Total	52	46 (88.46%)	15 (32.61%)	31 (67.79%)	6 (11.54%)	4 (66.67%)	

streptococcus and pseudomonas species. In cases of preterm labour with premature rupture of membrane, the commoner organisms were staphylococcus albus and aureus (coagulase positive), the less commoner being staphylococcus aureus (coagulase positive), the less commoner being staphylococcus aureus (coagulase negative), streptococcus B-haemolyticus and non-haemolyticus, E. coli and anaerobic streptococcus.

Positive cultures of micro-organisms were found in more percentage of cases with lower socio-economic group of patients than higher socio-economic class in both preterm and term labour cases. Preterm labour, cases harbour micro-organism in more percentage of low socio-economic groups than term labour cases.

Placental inflammation is frequent in both the groups of preterm labour cases. The percentage of cases showing grade I and II placentitis in both the groups is quite similar, while only grade III can be colleted with premature rupture of membrane.

Discussion

The pathogens responsible for intrauterine infection are mostly amongst the normal inhabitants of the female birth canal (Benirschke and Driscoll, 1967 and Creatsas and Pavlator, 1981). The common culprits have been found to be E. coli (gram negative bacillus), anaerobic streptococci, staphylococcus pyogenes, staphylococcus epidermidis, streptococcus faecalis, lactobacilli, diphtheroids etc. It has been shown in *in-vitro* studies that E. coli endotoxins stimulates guinea-pig uterus and significantly increase the tone and frequency of the uterine musculature (wideman, 1964).

The membranes (specially amnion) can synthesize prostaglandin as well as serve

as a source of arachidonic acid to be used by decidua for the generation of prostaglandins. Previous work have established that non-esterified arachidonic acid is the obligate precursor of PGE₂ and PGF₂ alpha. The decidua and membranes contain glycerophosphates enriched with arachidonic acid (Schwartz and Schultz, 1975) and phospholipase A₂, an enzyme helping in the release of arachidonic acid from glycerophospholipids. (Grieves and Liggins, 1976). It has also been suggested that phospholipase A₂ activity found in the foetal membrane is localised, in part in the lysosomes (Gustavii, 1973). It is proposed that the lysosomes, in the decidua are maintained in a stable form throughout most of the pregnancy including preterm labour, lysosomal breakdown may be initiated by intrauterine infection, thereby releasing active phospholipase A₂ which frees arachidonic acid from phospholipid stores and makes it available for prostaglandin synthesis.

Prostaglandins have the capacity of initiating smooth muscle contraction, thereby causing cervical dilatation. The cervical membranes, already weakened by infection and devitalized due to stretching become unsupported due to the cervical dilatation

and membranes ruptured easily with minimum strain.

It is suggested that care should be taken for eradicating non-specific infection from cervix particularly in multiparous women so that amniotic membranes remain stable till term. In primigravida perhaps, adequate rest near the term will help in preventing premature labour.

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