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INCIDENCE AND SIGNIFICANCE OF UROGENITAL INFECTIONS & PREVENTIVE STRATEGIES OF PRETERM LABOUR AND PREMATURE RUPTURE OF MEMBRANES

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ABSTRACT

Objective: To know the incidence of infections in preterm labour (PTL), premature rupture of membranes (PROM), neonatal morbidity and preventive strategies of preterm labour.
Methods: study consists of 100 urine and vaginal samples obtained from patients with preterm labour / PROM. The study group includes patients admitted into NRI General Hospital Labour Ward.
Results: Out of 100 total cases 58% PROM, 35% PTL, and 7% PROM &PTL. Among 100 patients 59% unbooked, 41% booked. The infection was more prevalent between 18 to 24 years of age (74%). 75% patients were between 30 and 37 weeks. The infection was more common among primigravidae (60%). Various pathogens were isolated in PROM & PTL patients.

INTRODUCTION

Preterm labour is the leading cause of neonatal morbidity and mortality. The rate of preterm labour in India at present is around 21%. India contributes 23.6% of preterm births of total global incidence. Premature baby will have higher rates of cerebral palsy, sensory deficits, leading disabilities and respiratory illness. The neonatal management involves high expenditure due to incubator equipment cost and the mangement of preterm babies with neurological deficiencies. It is necessary to prevent preterm labour not only in view of cost but also to provide healthy baby. The morbidity associated with preterm birth after extending to later life, results in enormous physical, psychological and economic problems(Petrou, 2005 and Petrou*et al*., 2003).The incidence of PROM varies between 2 – 18% (Gemn LG. Mishell and Dr. Mortonde, 1970).

Objectives

1. To correlate the presence of potential Pathogens in high vaginal swab and urine with adverse pregnancy outcomes.
2. To look for colonization of organisms which were isolated from the high vaginal swab or urine of the mother.

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The following important various symptoms; signs and investigations were studied in suspected preterm labour cases.

- H/o Back pain
- Vaginal discharge.
- Menstrual like cramps.
- Pelvic pressure or heaviness.
- Cervical length by TV USG.

MATERIALS AND METHODS

Material for two studies consists of 100 urine and vaginal samples obtained from patients with PTL / PROM. The study group included patients admitted to NRIGH labour ward.

Data Collection

Maternal age, LMP / EDD, gestational age, parity, fever, burning micturition, leaking PV at the time of admission , or in previous pregnancy, cervical length by TV USG were collected in a pre designed proforma.

Inclusion criteria

Spontaneous labour at 28 – 36 wks.
Rupture of membranes at 28 – 36 wks.

Exclusion criteria

1. Women with multiple pregnancy.
2. Women with hydramnios.

After ascertaing patients PTL / PROM

- H/o use of antibiotics recorded.
- High vaginal swab taken under strict aseptic precautions and sent for c/s.
- Urine was collected from mid stream clean catch in a sterile wide mouthed container and sent for culture. The culture medium used was MacCanky Agar medium for gram negative bacteria and faecal streptococci and blood AGAR for streptococci& proteus.

RESULTS

Table 1. Distribution of Cases

Total Cases	Number	Percentage
PROM	58	58
PTL	35	35
PROM/ PTL	07	07

Fig 1. Distribution of Cases

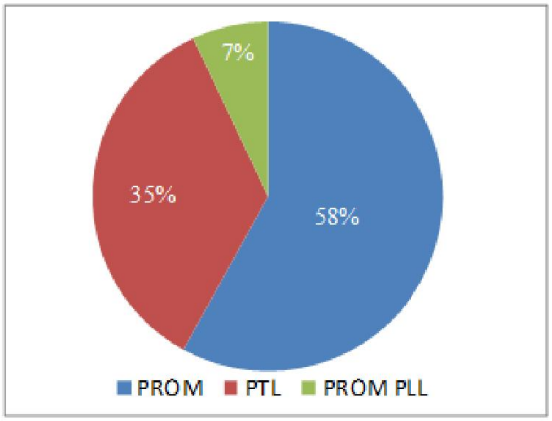

Table 2. Distribution of cases in booked and unbooked

Category	No. of Cases	Percentage
Booked	59	59
Unbooked	41	41

Fig 2. Distribution of cases in booked and unbooked

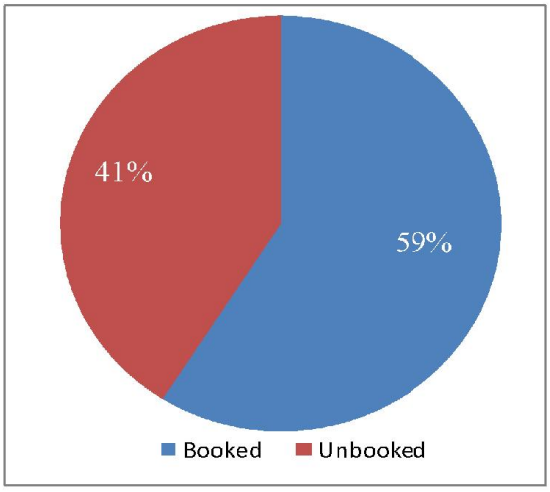

Table 3. Distribution - Maternal Age wise

Maternal Age	No. of cases	Percentage
18-24	74	74
25–30	25	25
31-36	01	01

Fig. 3. Maternal -Age wise

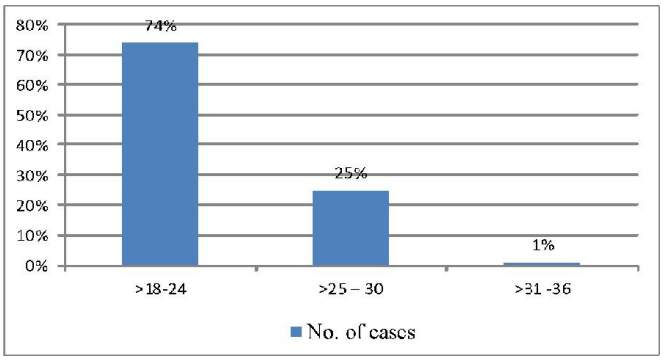

Table 4. Distribution - Parity Wise

Gravidity	Number of cases	Percentage
Primi	60	60
Gravida – 2	29	29
Gravida – 3	10	10
Gravida – 4	01	01

Fig 4. Distribution - Parity Wise

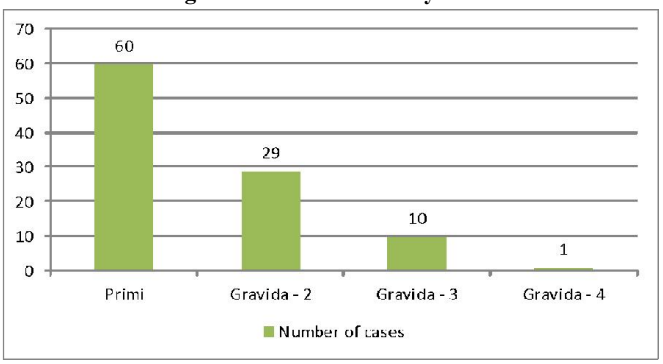

Table 5. Distribution -Gestational age wise

Gestation in weeks	No. of cases	Percentage
28 - 30wks	15	15
31 - 33wks	24	24
34 – 36wks	61	61

Fig 5. Distribution -Gestational age wise

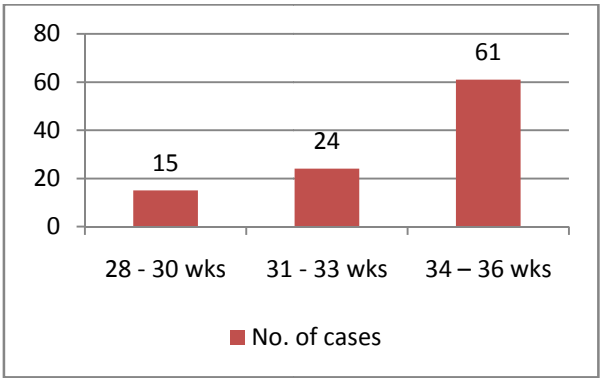

Table 6. Distribution of cases - Maternal age wise

Maternal age	PROM	PTL	PROM – PTL
18-24	22	18	3
25-30	7	6	2
31-37	1	0	0

Fig 6.Distribution of cases- Maternal age wise

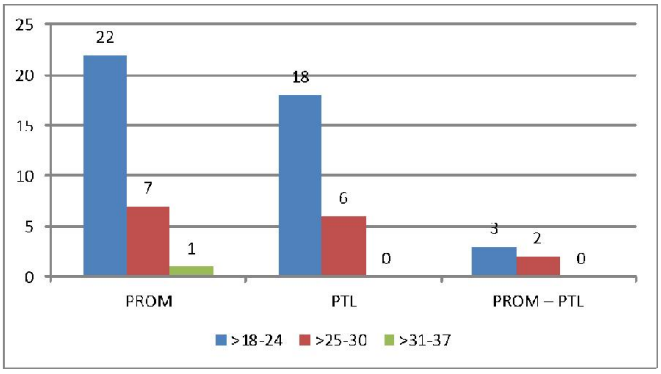

Table 7.History of previous abortions and pre-term delivery

No.of Cases	Number	Percentage
Abortions	25	25
PTL	09	09

Table 8. Incidence of infection

Cases	Number	Infections (+Ve)	Infections (-Ve)
PROM	58	35 (60%)	23 (40%)
PTL	35	24 (70%)	11 (30%)
PROM & PTL	7	4 (57%)	3 (43%)

Table 9. List of pathogens isolated from vaginal infections in 58 cases of PROM

Organism	No.of Positive
Entero coccus species	13
Klebsiella	5
Citrobactar species	1
E. Coli	4
Proteous	2
Pseudomonas	1
Staphylo coccus	1
Coagulate –ve staphylo coccus	1
Group A strepto coccus	2
Candida	4

Table 10. Pathogens isolated from vaginal swab among 35 cases of PTL

Organism	No. of Positive
Entero coccus species	9
Klebsiella sp.	4
E .Coli	3
Pseudomonas	3
Strepto coccus A	2
Stayphylo coccus aureus	1
Coagulate –ve staphylo coccus	1
Candidae	3

Table 11. Pathogens Isolated from vaginalswab among 7 cases of PROM, PTL

Organism	No. of Positive
Entero coccus species	2
Klebsiella sp.	1
Proteus	-
Streptococcus A	1
Coagulate +ve staphylo coccus	-

Table 12. Pathogens isolated from urine of PROM and PTL.

Organism	PROM	PTL
E-Coli	3	2
Strepto coccus	2	-
Klebsiella	-	1
Citrobacter	1	-
Pseudomonas	-	1

DISCUSSION

The infection in the lower genital tract causes, PROM and late preterm labour. The current study suggests that the causes in majority of PROM cases were maternal latent urogenital infection. The study shows 63% patients (PTL & PROM) had genital infections and 10% Urinary Tract Infections. The age group 18–24 yrs appears to be the most vulnerable age to acquire urogenital infections (74%). Ajit Mehta (1971) and Akthar *et al*. (1979) have also showed high incidence of recurrent urogenital infections (40.3 and 30-50%) in the age group of 20 – 25yrs. It may be due to high incidence of sexual activity and urogenital infection.

Trivedi *et al*. in 1995 found that most of the unbooked cases presented with Preterm labour. This study shows PROM, Preterm labour occurred at 34-36wks gestation (56%). Raunt *et al*. (1988) and Mehta etal, Agarwal etal[7] showed the incidence of 65% at 35-36wks of gestation. 63% was showing growth from cervical swab cultures. The commonest organisms were Enterococcus (Petrou *et al*., 2003), Klebsiella (Knox *et al*., 1950), *E.Coli* (Raunt and Dora, 1988), Candida (Raunt and Dora, 1988), Citrobactar species (Petrou *et al*., 2003), Proteus, Pseudomonas, Staphylo coccus coagulate +ve, Group A, B haemolytic Streptococci.Often 10% showing growth in urine – the predominant organism was E.Coli, followed by Staphylococcus[2], Klebsiella, Citrobactar, Pseudomonas.

Jai Bhagavan Sharma etal, Lavanya etal, showed the incidence of urinary tract infections among PROM and PTLwas 8.4%. Lind Hilebrael etal showed *E.coli* as predominant pathogen in U.T.I resulting in PROM, PTL.The Toxins release cytokines and prostaglandins, which promote uterine contractions. Asymptomatic bacteruria, Gonococcal cervicitis, Group B Streptococcus and Bacterial Vaginosis are strongly associated with preterm delivery. The relation between infection, and spontaneous preterm birth was described 60 yearsago (1950), by Knoxerd Hoerner (Knox *et al*., 1950). The rate of prematurity continues to rise as highly sensitive, clinically useful diagnostic techniques as well as effective therapeutic interventions were lacking.

Over the past 20yrs studies suggest that in about 25-40% of patients, Preterm labour is due to activation of localized infection (intrauterine infection) (Elovitz, 2006; Elovitz and Mrinalini, 2004; Goldenberg *et al*., 2000; Goncalves *et al*., 2002 and Romero *et al*., 1992).80-90% of thes cases showedpolymorphs in fetal membranes.Similar findings were noted in patients with asymptomatic bacteruria and Bacterial vaginosis infections. The risk of foetal bacteriemia is significantly greater, in most of the cases where amniotic fluids c/s were positive. Before 30wks of gestation among spontaneous preterm labour, 50% are aggressive with ascending genital tract infection (Watts *et al*., 1992; Russell,

1979 and Romero *et al*., 1989). The commonest organisms are genital mycoplasma hominis, urea plasma urealyticum, Anaerobes, group B Streptococcus, Gardenella vaginalis, Gram -ve cocci, including E.coli. Maternal genito urinary and reproductive tract infections have implicated as risk of 15-25% of Preterm Labours (Hillier *et al*., 1991 and McGregor *et al*., 1990). In women with PPROM, foetal inflammatory response syndrome (FIRS) was associated with oligohydramnios. Oligohydramnios is being explained by redistribution of blood flow away from kidneys. We must do investigations like Urine examination, Urine c/s, FFN estimation, Serum estradiol, cervical length by USG (TVS), CRP, high vaginal swab c/s, for candida, TV, BV, infection detection, vaginal cytology for hormonal study to understand the etiology of preterm labour. Even though in many cases its not possible to do all the investigations, one should do possible investigations to confirm the cause of preterm labour.

There was 50% reduction in incidence of preterm labour after the treatment of asymptomatic bacteruria in pregnant women. The other pathogens likeCytomegalovirus, ParavovirusB19, Adenovirus and fungal - Candida Albicans have been detected in amniotic fluid samples (Liesnard *et al*., 2000). Next to infections, hormonal deficiency (↓ progesterone) is common for PTL. To confirm this, even today vaginal cytology (maturation Index) is very much useful. We have done the same in some cases and got good results in both first and early second and even late second trimesters. We used 17 alpha hydroxy progesterone caproate weekly or vaginal route progesterone and tocolytics in acute cases. Internal os sphincter deficiency is common with congenital anomalies which were taken care by cervical stitch& tocolysis. Perse cervical insufficiency is very rare.

- Tocolysis can be done most commonly now a days by Nifidipine 20mg BID – TID. Tocolysis in infective etiology is best done by Indomethacin 75mg once a day with Ranitidine 150mg twice a day. In some indicated cases tocolysis can be done by β mimitics like Terbutaline, low dose Isoxy Suprine Hydrochloride IV with hydration in acute cases.
- In one study by Samartha Ram H. *et al*. (2014) the time required for AFOD (amniotic fluid optical density) value to reach from 0.40 to 0.98 (surge) is around 8 days. AFOD estimation further helps us to predict the number of days required for completion of maturity. This helps to avoid unnecessary waiting indefinitely for the onset of spontaneous labour.

This way Many times preterm pregnancies can be prolonged to term or near term once the etiology of preterm labour is established and treated with tocolytics, antibiotics, cervical stitch and along with injection Betamethasone (12mg) 2 doses 24hrs apart whenever required before 34 wks of pregnancy and the delivery time guided by AFOD. Thus the need of incubators,cost of newborn care can be minimised.

Preterm infants

The infants survived from preterm birthsare likely to suffer from cardiorespiratory problems, Mental Retardation, Cerebral palsy. Human neonates born after exposure to infection exhibit↓mean diastolic BP, ↑incidence of perivascular leucocytes ↑vulnerbility to cerebal palsy due to chorio amnionitis in uterus (2002), ↓risk of RDS, ↑risk of bronchopulmonary dysplasia (BPD), Persistant pulmonary hyper tension of new born. Persistent brain damage leads to lifelong neurological impairment such as mental retardation, cerebral palsy, learning andbehavioural deficits (Flood and Malone, 2012). In cases of histological evidence of chorio amnionitis, if the child is born as an early preterm, baby will have speech delay and hearing loss at 18 months of age and also "Retinopathy of Prematurity" (ROP) (Moscuzza *et al*., 2011). In women with PPROM, foetal inflammatory response syndrome (FIRS) was associated with oligohydramnios. Oligohydramnios is being explained by redistribution of blood flow away from kidneys. We must do investigations like Urine examination, Urine c/s, FFN estimation, Serum estradiol, cervical length by USG (TVS), CRP, high vaginal swab c/s, pap smear for candida, TV,BV, infection detection, vaginal cytology for hormonal study to understand the etiology of preterm labour. In many cases it is not possible to do all the investigations. Even then we must do the possible investigations and confirm the cause for preterm labour before starting the treatment.

MANAGEMENT

Early diagnosis, acute tocolysis, corticosteroids, group B Streptococcus prophylaxis, Metronidazole aganist TV, BV. Vaginal progesterone (Progesterone rings vaginally weekly will be the best in future) and maintenance of tocolysis to prolong the gestational age.We should time the delivery by using AFOD and reduce preterm labour complications.

CONCLUSION

1. Recognition of infection and other causes of preterm labour provide new opportunities to treat and reduce the burden.
2. Urinary tract infections (UTI) during pregnancy were common causes of serious maternal morbidity& perinatal morbidity. This morbidity can be limited with appropriate screening& treatment of UTI.
3. Proper preterm surveillance and neonatal care by well equipped neonatal unit will improve the foetal outcome in premature rupture of membranes and preterm labour.

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