

## Association of Urogenital infections with preterm labor

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### Abstract

**Objective:** To find out the prevalence of urogenital infections in term and preterm labor and to find out association between urogenital infections and preterm labor.

**Methods:** This study was a hospital based case control analytical type of observational study conducted in Dept. of Obs. & Gynae, SMS Medical College, Jaipur from August 2015 to August 2016. All patients coming with preterm labor after 28 weeks and before 37 completed weeks of gestation without rupture of membranes (cases)- Group A. All patients at completed or more than 37 weeks of gestation with no history of preterm labor, matched to the case group with respect to age and parity (controls)- Group B. They were selected according to inclusion and exclusion criteria. Patients were evaluated after informed consent and detailed history was taken and examination done. Midstream urine was sent for cytology and culture. Samples from posterior fornix of vagina were taken with sterilized swabs under direct vision using Cusco/Sims speculum before first vaginal examination and were studied for gram stain characteristics and culture by standard methods. Microorganisms isolated on culture were noted.

**Results:** Both groups were matched according to age, religion, literacy, rural/urban and socioeconomic status characteristics. The urogenital infection was seen in 29 women in preterm labor compared with 8 women in term labor. The result was statistically significant.

**Conclusion:** Recognizing and treating the women having urogenital infections at a stage, when it has not become clinically evident, will decrease the percentage of women going into preterm labor and will improve the perinatal outcome.

**Keywords:** Urogenital infection, Preterm labor

### Introduction

According to the ICD10 definition of preterm labor is the spontaneous onset of labor before 37 completed weeks of gestation. It is the leading cause of neonatal morbidity and mortality. About 6-8% of all deliveries are preterm and of these about two-thirds occur between 34 and 37 weeks of gestation(1). WHO has estimated that 9.6

% of all births globally (about 13 million) in 2005 were preterm(2). In 2010 it is estimated that 14.9 million babies worldwide (around 11.1% of all births) were premature(3). India is the biggest contributor to the world's prematurity burden, with almost 3.6 million premature births-accounting for 23.6% of around 15 million global pre-term births-reported each

year(4). Of these, 13% are live pre-term births.

Thus, diagnosing and treating infections associated with preterm labor represent a very attractive area for interventions to prevent dire neonatal outcome.

This prospective case-control study was designed to see the association between preterm labor and urogenital infections

### **Aims and objectives**

To find out the prevalence of urogenital infections in term and preterm labor and to find out association between urogenital infections and preterm labor.

### **Materials and methods**

This study was a hospital based case control analytical type of observational study conducted in Dept. of Obs. & Gynae, SMS Medical College, Jaipur from August 2015 to August 2016. Sample size was calculated as 93 in each of the 2 groups at alpha error 0.05 and power 80%; assuming prevalence of urogenital infections in preterm group to be 35% and term group 17.3% including 95% confidence interval. Hence, for study purpose 100 subjects were taken in each of the 2 groups assuming 10% attrition/dropouts/ loss to follow up. Written informed consent was taken. All patients coming with preterm labor after 28 weeks and before 37 completed weeks of gestation without rupture of membranes (cases- group A). All patients at completed or more than 37 weeks of gestation with no history of preterm labor, matched to the case group with respect to age and parity (controls- group B). Inclusion criteria: Singleton pregnancy with known LMP and regular menstrual cycles and women presenting after 28wk of gestation. Exclusion Criteria: Congenital anomalies of uterus and cervix; incompetent cervix; sexually transmitted diseases; multiple pregnancy; abnormal placentation and preterm premature rupture of membranes. Patients of both groups were

evaluated and detailed history (including menstrual history, obstetrical history, past and family history) was taken. General and systemic examination was done. Routine blood investigations and ultrasound were done.

Samples from posterior fornix of vagina were taken with a sterilised swab under direct vision using Sim's speculum and sent for gram stain and culture. Midstream urine was collected and sent for cytology and culture. The above samples were sent for aerobic culture immediately to the Microbiology Department, SMS Medical College and Hospital with all aseptic precautions. These samples were inoculated on blood agar and Mac Conkey's agar using semi-quantitative method of inoculation. The culture plates were incubated at 37<sup>0</sup>C for a duration of 24-48 hrs. Isolates were identified by standard methods. If growth was present then antibiotic sensitivity testing was performed and if no growth was seen then samples were inoculated in a thioglycolate broth and from there inoculated on blood agar and Mac Conkey's agar.

Statistical analysis was done. Qualitative data were analyzed by using Chi square test and Quantitative data were analyzed by using Z – test.

### **Observation and results**

The data thus obtained were analyzed and the observations made are summarized in the ensuing tables. Table no. 1 enlists intergroup comparison of different demographic variables as age, residence, religion, literacy, socioeconomic status, history or prior preterm labor and booking status of women.

By analyzing the above data it can be concluded that past history of preterm birth is a significant cause of preterm labor; the prevalence of urogenital infections in women with preterm labor is more compared with women at term gestation and

significant association was found between prevalence of urogenital infections and

history of preterm birth and preterm labor in present pregnancy.

**Table 1: Intergroup comparison of demographic parameters.**

Demographic parameters		Cases	Controls	P value	Statistical significance
Mean age (mean ± SD )(years)		24.5±3.30	23.68±3.14	>0.05	Not significant
Religion	Hindu	72	78	>0.05	Not significant
	Muslim	28	22		
Residence	Hindu	54	41	>0.05	Not significant
	Muslim	46	59		
Literacy status	Literate	37	68	<0.001	Highly significant
	Illiterate	63	32		
Socioeconomic status	Upper	0	0	>0.05	Not significant
	Upper middle	15	16		
	Upper lower	10	16		
	Lower middle	36	34		
	Lower	39	34		
History of preterm labor	Absent	85	97	<0.01	Highly significant
	Present	15	3		
Booking status	Booked	18	64	<0.01	Highly significant
	Unbooked	82	36		

**Table 2: Shows the details of only urine, only vaginal swab and both urine and vaginal swab infections in the two groups.**

Result	Vaginal swab culture		Urine culture		Both	
	Group-A	Group-B	Group-A	Group-B	Group-A	Group-B
Positive	21	5	17	5	9	2
Negative	79	95	83	95	72	93

**Distribution according to findings of Urine culture of group-A & group-B subjects**

U/C findings	Group		Total
	A	B	
E.coli	7 (7.00)	3 (3.00)	10 (5.00)
Enterococcus faecalis	3 (3.00)	1 (1.00)	4 (2.00)
Candida albicans	1 (1.00)	1 (1.00)	2 (1.00)
Coagulase negative staphylococcus aureus	2 (2.00)	0 (0.00)	2 (1.00)
Candida species other than candida albicans	1 (1.00)	0 (0.00)	1 (0.50)
Micrococci	1 (1.00)	0 (0.00)	1 (0.50)
proteus vulgaris	1	0	1

	(1.00)	(0.00)	(0.50)
Pseudomonas	1 (1.00)	0 (0.00)	1 (0.50)
Negative	83 (83.00)	95 (95.00)	178 (89.00)

**Distribution according to findings of Vaginal swab culture of group-A & group-B subjects**

Vaginal swab culture findings	Group		Total
	A	B	
<b>E.coli</b>	11 (11.00)	3 (3.00)	14 (7.00)
<b>Staphylococcus aureus</b>	2 (2.00)	1 (1.00)	3 (1.50)
<b>Enterococcus faecalis</b>	3 (3.00)	0 (0.00)	3 (1.50)
<b>Klebsiella</b>	2 (2.00)	0 (0.00)	2 (1.00)
<b>Candida albicans</b>	2 (2.00)	0 (0.00)	2 (1.00)
<b>Proteus vulgaris</b>	1 (1.00)	0 (0.00)	1 (0.50)
<b>Pseudomonas species</b>	0 (0.00)	1 (1.00)	1 (0.50)
<b>Negative</b>	79 (79.00)	95 (95.00)	174 (87.00)
<b>Total</b>	<b>100 (100.00)</b>	<b>100 (100.00)</b>	<b>200 (100.00)</b>

**Distribution according to SES and positive finding of various test of group A & group B subjects.**

SES	Vaginal swab culture		Urine culture	
	Group-A	Group-B	Group-A	Group-B
Lower	8 (38.09)	1 (20.00)	3 (17.65)	2 (40.00)
Lower Middle	9 (42.86)	4 (80.00)	12 (70.59)	3 (60.00)
Upper lower	1 (4.76)	0 (0.00)	1 (5.88)	0 (0.00)
Upper Middle	3 (14.29)	0 (0.00)	1 (5.88)	0 (0.00)
<b>Total</b>	<b>21 (100.00)</b>	<b>5 (100.00)</b>	<b>17 (100.00)</b>	<b>5 (100.00)</b>

**Distribution of History of pre term birth and positive finding of various test of group A & group B subjects.**

History of pre term birth	Vaginal swab culture		Urine culture	
	Group-A	Group-B	Group-A	Group-B
Absent	15 (71.43)	4 (80.00)	8 (47.06)	4 (80.00)
Present	6 (28.57)	1 (20.00)	9 (52.94)	1 (20.00)
<b>Total</b>	<b>21 (100.00)</b>	<b>5 (100.00)</b>	<b>17 (100.00)</b>	<b>5 (100.00)</b>

**Discussion**

The two groups were compared using the standard tests of significance and conclusions were drawn after matching according to age, religion, literacy, rural/urban and socioeconomic status characteristics. Table 1 shows that mean age of both the groups is almost similar. 82/100 women in case group were unbooked and 63/100 women in caes group were illiterate which was significantly more than those of control group. According to modified Kuppuswamy's socioeconomic scale(50), the two groups were comparable for living standard. It was analysed that the rate of urogenital infections is higher in lower socioeconomic class in both groups A and B as compared to the upper class. Thus it was observed that patients belonging to lower socioeconomic class had more chances of infection.

Past history of preterm labor was present in 15 women in group A compared to 3 in group B, which was statistically significant. Verma Indu et al (2014)(5) and Pandey et al. (2010) (6) also reported that past history of preterm births was a significant contributory factor for preterm labor.

On analysis of data it was found that the urogenital infection was seen in 29 women in Case Group A compared with 8 women in Case Group B.

In group A, 17 women had urine culture positive while only 5 women in group B had urine culture positive. This shows that women in preterm labor had more incidence of urinary tract infection than their counterparts with term pregnancy.

Most common organism in urine isolated in both the groups was E.coli. Other organisms cultured are enterococcus faecalis, Candida Albicans and other species of candida, Coagulase negative Staphylococcus Aureus, Micrococci, Proteus Vulgaris and Pseudomonas.

Vaginal cultures were positive in 21 patients in group A and 5 patients in group B. The

prevalence of genital infections is 4 times higher in preterm gestation as compared to term gestation.

Predominant organisms cultured from vaginal swab are gram negative bacilli and gram positive cocci. Grams staining of the vaginal smear are consistent with the culture reports. E.coli is the most common organism cultured, 11 in group A and 3 in group B.

In a study by Chhabra and Patil (2001) (7), 14 % urine infection and 28 % cervical colonization in women with preterm labor were reported. Lajos et al(2008) (8) reported the prevalence of endocervical colonization to be 14.20 % in preterm labor or premature of membranes. McPheeters et al.(2005) (9) who reported 17.1 % of urinary tract infection in women with preterm labor and 10.9 % in women without preterm labor. According to Gonclaves et al(2002) (10) intrauterine infections are a major cause of preterm labor, with or without intact membranes and accounts for approximately 25% of cases. Lamont(2003) (11) , concludes that infection is responsible in 40% of cases and earlier the abnormal genital tract colonization is detected the greater is the risk of adverse outcome. Wright et al(1998) (12) identified urinary tract infection (UTI) as a significant risk factor, contributing to 7% of preterm births.

**Conclusion**

Intrauterine infection is a major cause of preterm birth, and it also may have devastating neonatal consequences, such as cerebral palsy. In developing countries, like ours, improvement in socio-economic condition, education, nourishment, life style and personal hygiene, family planning and antenatal care will reduce the risk of preterm labour. Continued education and counselling about the risk factors and the possible preventive aspects of preterm labour help women. During pregnancy, local treatment restoring normal vaginal flora and acidity without systemic effects could be effective

in preventing preterm labour. Urogenital infections contribute significantly to the preventable causes of preterm labor. Adequate diagnosis and treatment of urogenital infections during the prenatal period is necessary; and the importance of these infections in determining the outcome of pregnancy and the health of the newborns must be evaluated. This will help in a long way in decreasing the incidence of preterm labor, preterm births, and the associated neonatal morbidities.

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