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# AN OBSERVATIONAL STUDY ON THE RELATIONSHIP BETWEEN UROGENITAL INFECTIONS AND PREMATURE RUPTURE OF MEMBRANES.


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## ABSTRACT

**Introduction:** Urogenital infections are common causes of premature rupture of membranes (prom). The present study was aimed at correlating the colonization of the organisms and possible infections in the vagina and urinary tract of mothers presenting with premature rupture of membranes. **Materials And Methods:** 96 high vaginal swabs and urine of patients with premature rupture of membranes were subjected to bacteriological studies according to the recommended procedures. **Results:** Out of 56 and 40 cases of PROM and PPROM, 25% and 32.5% had vaginal infection respectively (Table 1) & 16.1%and 27.5% showed urinary tract infection respectively (Table 2). The most common organism isolated from high vaginal swab culture was Candida followed by Enterococcus and E.Coli. The most common organism isolated from urine culture was E.Coli, followed by Enterococcus in both PROM and PPROM cases. **Conclusion:** Urogenital infections constitute major risk factors for premature rupture of membrane.


**KEYWORDS :** Prom, Pprom.

## INTRODUCTION

In most pregnancies labor begins at term in the presence of intact fetal membranes.[1]Without intervention they usually remain intact until they spontaneously rupture near the end of the first stage of labor. However,8-10% of term Pregnancies [2] and up to 60% of preterm deliveries are preceded by the prelabour rupture of the membranes.[3]

PPROM - preterm prelabour rupture of membranes is a spontaneous rupture of the membrane between 28-37 weeks of gestation without the onset of regular uterine contractions.

PROM - Premature rupture of membranes is the spontaneous rupture of membranes after 37 weeks of gestation before the onset of regular uterine contractions. The time interval from prom to spontaneous labor suggests that 60% of women go into spontaneous labor within 24 hours of rupturing their membranes. The most serious outcome of preterm labor, preterm premature rupture of membranes is often associated with adverse maternal and neonatal outcomes related to infections. [4]

At term 8-10% of pregnant women present with premature rupture of membranes. These women are at increased risk for intrauterine infection when the interval between the membrane rupture and deliveries is prolonged. It has been estimated that 10% of perinatal deaths are directly or indirectly attributable to PROM.[5]

There is growing evidence associating upper genital tract infection with PROM.[6,7] One possible mechanism by which infection might act is through adhesion from the cervical/vaginal area and replication in the placenta, the deciduas, and the membranes. Another hypothesis is that several organisms that are commonly present in the vaginal flora, including group B streptococcus, Staphylococcus aureus, and microorganisms that cause Bacterial vaginosis secrete proteases that degrade collagen and weakens the fetal membranes leading to PROM. [8,9]

During infection there is the release of inflammatory markers like IL-1, IL-6, and tumor necrosis factor, these lead to an increase in metalloproteinase, which is responsible for collagen degradation, hence there is a decrease in the tensile power of the membrane and leads to its rupture.

Researchers have postulated that PROM may be the result of direct bacterial insults that necrotize tissues leading to host-mediated auto-destruction.[10] Infection with E.Coli, S.aureus, C.albicans, and Bacterial vaginosis is strongly associated with PROM. Bacterial vaginosis and E.Coli infection are independent risk factors.[11] PROM may result in immediate risk factors such as cord prolapse, cord compression, and placental abruption, and later problems such as maternal and neonatal infections as well as the use of interventions such as caesareans and instrumental vaginal deliveries. [12]

The incidence of neonatal infections for infants born to mothers with PROM range from 1-2.6%.[13]Antibiotics has become an important part of the recent advances in the treatment of PROM. Many studies have demonstrated that antibiotic therapy decreases maternal and neonatal morbidity.[14,15]

## METHODS

This is an Observational study performed between September 2019 to June 2020 in the Labor unit of the Department of Obstetrics and Gynaecology in St. Stephens Hospital Delhi after obtaining ethical committee approval. 96 patients were included in the study that fulfills the inclusion criteria. On admission, a detailed history was recorded regarding medical & surgical or obstetric complications. Gestational age was confirmed by LMP or 1st-trimester USG. Rupture of the membrane was suspected if the patient's history suggested either a sudden gush of fluid or slow persistent watery vaginal discharge per vagina. PROM was confirmed by visualization of the flow of amniotic fluid from the cervix by asking the patient to cough. The pooling of amniotic fluid in the posterior fornix is seen with the speculum examination under aseptic precaution. High vaginal swab was taken under aseptic precaution during speculum examination from the posterior fornix with sterile, cotton tip swab, before doing per vaginal examination. Swab was sent for culture & sensitivity in the department of microbiology, st Stephens hospital Delhi. Urine was collected & sent to Urine routine microscopy & culture & sensitivity in the department of microbiology st

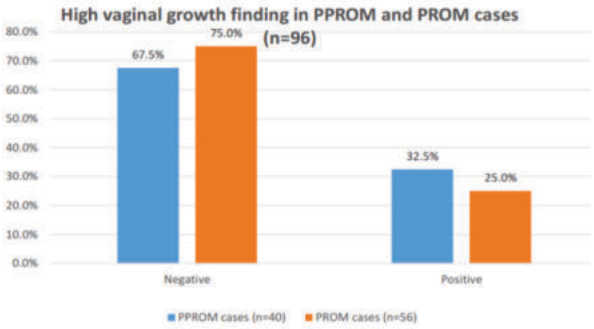
Stephens hospital Delhi. The collected data were transformed into variables, coded, and entered in Microsoft Excel. Data were analyzed and statistically evaluated using the SPSS-PC-17 version. Quantitative data were expressed in mean± standard deviation or median with interquartile range and depends on normality distribution difference between two comparable groups were tested by student's t-test (unpaired) or Mann Whitney _U' test while qualitative data were expressed in percentage. Statistical differences between the proportions were tested by chi-square test or Fisher's exact test. _P' value of less than 0.05 was considered statistically significant.

## RESULTS

### Table No 1 High Vaginal Swab Growth Finding In Pprom And Prom Cases (n=96)

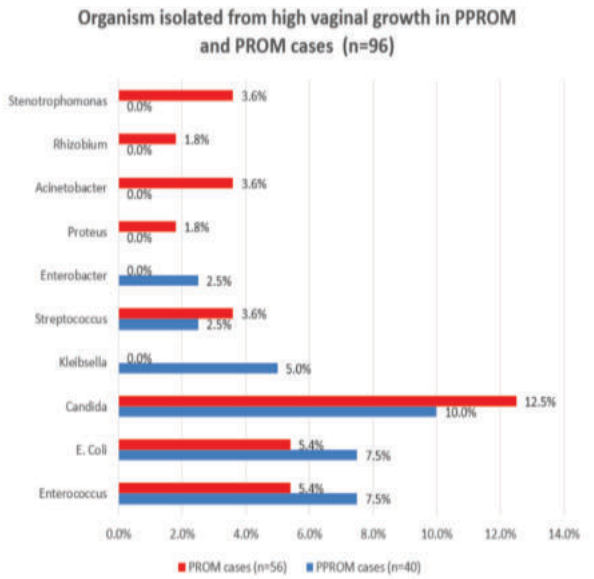
| High vaginal swab growth | PPROM cases (n=40) | | PROM cases (n=56) | | Total (n=96) | |
|---|---|---|---|---|---|---|
| | No. | % | No. | % | No. | % |
| Negative | 27 | 67.5 | 42 | 75.0 | 69 | 71.9 |
| Positive | 13 | 32.5 | 14 | 25.0 | 27 | 28.1 |

P-value = 0.42




### Graph No. - 1

- In our study out of the 96 cases of PPROM and PROM high vaginal swab culture study, 27 (28.1%) cases were positive and 69 (71.9%) cases were negative.
- In PPROM group 32.5% (n= 40) and in PROM group 25% (n=56) cases were positive for high vaginal swab culture.



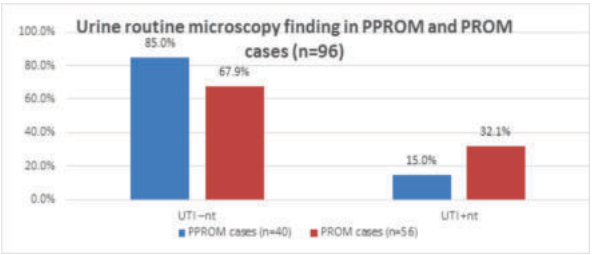

### Graph No. - 2

- From the 96 high vaginal swabs analyzed in this study, 10 different types of the pathogen were isolated.
- Candida was the most common frequently isolated organism (11.4%) in high vaginal swabs culture in this study, followed by the Enterococcus (6.2%), E.Coli (6.2%), and Streptococcus (3.1%).

### Table No. - 2 Urinary Tract Infection On Basis Of Urine Routine Microscopy Finding In Pprom And Prom Cases (n=96)

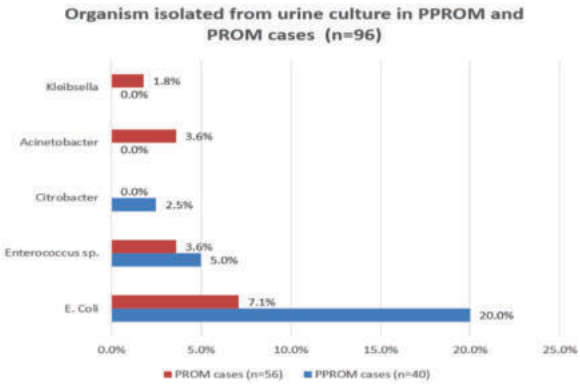
| Urinary tract infection | PPROM cases (n=40) | | PROM cases (n=56) | | Total (n=96) | |
|---|---|---|---|---|---|---|
| | No. | % | No. | % | No. | % |
| Absent | 34 | 85.0 | 38 | 67.9 | 72 | 75.0 |
| Present | 6 | 15.0 | 18 | 32.1 | 24 | 25.0 |

P-value = 0.05




### Graph No - 3

Out of 96 patients studied 15% (n= 40) of PPROM cases and 32.1% (n=56) of PROM cases had urinary tract infection.




### Graph No - 4

- From the 96 cases of urine culture, analyzed in this study, 5 different types of the pathogen were isolated.
- E.Coli was the most common frequently isolated organism (12%) in urine culture in this study followed by Enterococcus (4%), Citrobacter (1%), Acinetobacter (2%), Kleibsiella (1%).

## DISCUSSION

### High Vaginal Swab Culture

In our study, 32.5% of PPROM cases (n=40) and 25% of PROM cases (n=56) were high vaginal swab culture positive.

However in.

- Lakshmi N. Et al [16] reported that out of 55 cases of PROM, 69% showed HVS culture positive.
- M.Bharathi et al [17] observed 39 of PROM cases (48.75% ) were HVS culture positive.
- Dr.Anitha.K.Gopal et al, [12] reported 51 of PROM cases (54.8%) were vaginal swab culture positive.
- Shivaraju P et al, [18] reported 70% of the PPROM cases (n=10) and 29.16% of the PROM cases(n=24) as high vaginal swab culture positive.

| STUDY (YEAR) | SWAB /SAMPLE | ISOLATED ORGANISM (most common ) |
|---|---|---|
| Aboyeji et al 19 (2009) | Endocervical & high vaginal swab | Gardenella vaginalis (29.1%) |
| Richard et al20 (2013) | High vaginal swab | Candida albicans(21%) |
| Lakshmi et al16 (2013) | High vaginal swab | Enterococcus (27%) |
| M .Bharathi et al17 (2013) | High vaginal swab | Staphylococcus aureus |

| | | |
|---|---|---|
| Taralekar et al21 (2014) | High vaginal swab | E.Coli (18%) |
| Shivaraju P et al18 (2015) | High vaginal swab | Coagulase-negative staphylococcus aureus (23.4%) |
| Dr.Anitha et al12 ( 2017) | High vaginal swab | E.Coli (33.3%) |
| saghafi et al22 (2018) | Endocervical culture | E.Coli (24.2%) |
| PRESENT STUDY (2020) | High vaginal swab | Candida (11.4%) followed by Enterococcus &E.Coli (6.2%) |

### Urinary tract infection

In our study, 15% of the cases of PPROM (n=40) and 32.1% of the PROM cases had a urinary tract infection.

However in the study-

- Lakshmi N. et al,[16] 11% of the cases of PROM (n=55) had urinary infection.
- Hackenhaar et al,[23] showed 3.4% of the PPROM had urinary tract infection during pregnancy.
- C. Karat et al,[24] studied 6% (n=150) of cases of PPROM had urinary tract infections at the time of admission.

### Urine Culture

In our study, 27.5% of PPROM cases (n=40) and 16.1% of PROM cases (n=56) had urine culture positive, out of which the most common isolated organism was E.Coli followed by Enterococcus. A comparative table of different studies is this-

| STUDY | ORGANISM ISOLATED |
|---|---|
| Lakshmi N et al,16 (2013) | E.Coli (3%) |
| Present study | E.Coli (12%) |

## CONCLUSION

The conclusion is drawn from the present study as follows -

- The number of cases of PPROM in our institute during the study period was 40 and the number of cases of PROM in our institute during the study period was 56.
- The number of positive high vaginal swab culture in PPROM was 13 (n=40) and in PROM was 14 (n=56).
- The number of positive urine cultures in PPROM was 11 (n=40) and in PROM was 9 (n=56).
- The most common organism isolated from high vaginal swab culture was Candida followed by Enterococcus and E.Coli. The most common organism isolated from urine culture was E.Coli, followed by Enterococcus in both PPROM and PROM cases.

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