

Original Research Article

# Bacteriological study of genitourinary cultures in preterm labour cases in teaching hospitals – 1 year study

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## Abstract

**Background:** Bacterial infections are one of the commonest causes of preterm labour. Incidence of preterm labour accounts for 13% of live births in India. Preterm labour accounts for increased neonatal mortality and morbidity.

**Material and methods:** In this study, vaginal swabs, urine culture and sensitivity, vaginal culture and sensitivity were collected from patients with preterm labour. Total 90 cases were studied and results analysed.

**Results:** Commonest organisms found were Escherichia coli, Staphylococcus aureus.

**Conclusion:** Genitourinary infections constituted 37% of all cases of preterm labour.

## Key words

Chorioamnionitis, Cultures, Preterm labour, Tocolysis, Vaginal swab.

## Introduction

### Definition of preterm labour

Preterm labour is defined as onset of labour prior to 37 weeks or 259 days of gestation with cervical effacement and dilatation.

### Etiological factors

Threatened abortion, life style factors like smoking, poor maternal weight gain, low socio economic status, illicit drug use, teenage pregnancy, racial and ethnical disparity, uterine

and cervical abnormalities, prior preterm births, infection and idiopathic.

### **Infections**

Infections are most clearly recognised and most widely studied cause of preterm birth. Infections are responsible for 20-40% of all cases of preterm births in various studies [1]. The most vigorous criteria for diagnosing infections as etiological causes of preterm labour are by

- Positive cultures and
- By polymerase chain reaction in amniotic fluid.

Most accepted mechanism of infection causing preterm birth is ascending infection [2]. According to this theory, breakdown in the normal physiological barriers separates the products of conception from bacterial and vaginal flora. The vaginal bacteria ascends and colonise the decidua and chorion and eventually invade the amniotic fluid and the foetus. The fundamental support for this theory comes from the fact that microorganisms that are found in the amniotic fluid are similar to those found in the vagina. Under normal circumstances, foetal membranes are separated from the vaginal flora by endocervical mucous. It is possible that unrecognised cervical changes causes disruption of endocervical mucous and facilitates ascending infection. On the other hand the colonisation of the lower genital tract flora might also cause pre mature rupture of membranes. Infection or inflammation of the products of conception may manifest clinically as incompetent cervix or preterm labour or pre mature rupture of membranes. The ability of the bacteria to produce or not to produce metallo-proteinases that degrades the amnion and causes rupture of membranes or it is due to peculiarities in the host bacteria relationship. Infection may be overt or subclinical. When amniotic infection is present the diagnostic test and the treatment of the same should be done irrespective of clinical presentation. The bacteria frequently found are *Ureaplasma ureolyticum*, *Mycoplasma hominis*, *Gardenerella vaginalis*, *Fusobacterium* species,

Group B Streptococcus, *PeptoStreptococcus*, *Escherichia coli* and *Enterocoli* [3]. In majority the infection may be polymicrobial. The concurrent organisms isolated are *Ureaplasma ureolyticum*, *Mycoplasma hominis*. But the virulent organisms are Group B streptococcus and *Escherichia coli* [4, 5]. The best way to demonstrate amniotic fluid infection is by culture of amniotic fluid which is generally not undertaken due to hazards or amniocentesis [2]. On the other hand, infection can be indirectly determined by

- Maternal C- reactive protein
- Vaginal and cervical swab cultures
- Urinary microscopy and culture

### **Materials and methods**

**Aim:** To determine genitourinary infection as a cause of preterm birth.

**Material:** This was a prospective study of 90 cases of preterm labour admitted in King George Hospital from January 2012 to December 2012.

### **Methodology**

- Vaginal and cervical swab, urine microscopy and culture and sensitivity were done in all 90 cases and results are analysed.
- Corticosteroids and prophylactic antibiotics and short term tocolysis with isoxsuprine, Nifedipine and Nitro glycerine given.

### **Results**

83.3% of patients showed urinary tract infection in urine microscopy as per **Table – 1**. In most of the cases urine cultures were sterile (87.7%). Positive cultures were obtained in 11 patients (12.2%). *Escherichia coli* were the most common organism isolated in the cases found positive as per **Table - 2**. In majority of the cases vaginal swab cultures were sterile (86.6%). *Staphylococcus aureus* was the most common organism isolated in majority of cases found positive as per **Table - 3**.

**Table - 1:** Distribution of patients according to urine microscopy. (N = 90)

UTI (+)	15 (16.6%)
UTI (-)	75 (83.3%)

**Table - 2:** Distribution of patients according to urine culture and sensitivity. (N = 90)

Sterile	79 (87.7%)
Staphylococcus aureus (Photo - 1)	3 (3.3%)
E. coli (Photo - 2)	5 (5.5%)
Coagulase (-) Staphylococcus aureus	2 (2.2%)
Klebsiella	1 (1.1%)

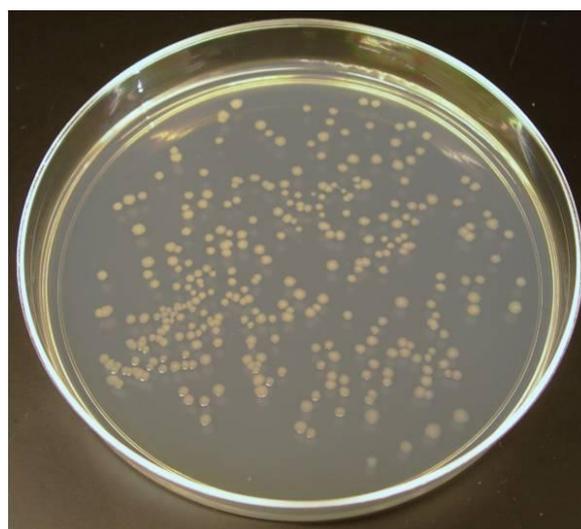
**Table - 3:** Distribution of patients according to vaginal swab culture and sensitivity. (N = 90)

Sterile	78 (86.6%)
Staphylococcus aureus	6 (6.6%)
Coagulase (-) Staphylococcus aureus	3 (3.3%)
Streptococcus	1 (1.1%)
Klebsiella	2 (2.2%)

**Photo - 1:** Staphylococcus aureus.



**Photo - 2:** Escherichia coli.



## Discussion

The present study was comparable to the study conducted by Alka, et al. [6] with genitourinary infections (37.7%) being the most common risk factor for preterm labour. 21.1% of patients had urinary tract infection in the present study. In the study conducted by Alka, et al. [6] incidence of UTI was 20% as per **Table - 4**. Similar findings were reported by Pandey, et al., (2010) [7], Chhabra, et al., (2001) [8] and Singh, et al., (2007) [9] who found an incidence of 20.34%, 14% and 8.4% respectively confirming that UTI was an important risk factor for pre term labour. But in the majority of cases, urine culture and sensitivity were sterile, and in the cases where urine culture were positive, Escherichia coli was the most common organism isolated and in the study conducted by Alka, et al. as per **Table - 5**.

**Table - 4:** Comparative analysis of risk factors for preterm labour. (N = 90)

	Alka, et al. (2014) [8]	Present study
UTI	20%	21.1%
Vaginal infection	26%	16.6%
Fever	10%	10%
Threatened abortion	6%	4.4%
Previous preterm delivery	12%	11.1%
History of abortion	21%	18.8%

**Table - 5:** Comparative analysis of urine culture and sensitivity. (N = 90)

	Alka, et al. (2014) [8]	Present study
<b>E. coli</b>	40%	45.5%
<b>Staph. Aureus</b>	15%	45.5%
<b>Klebsiella</b>	10%	9%
<b>Others</b>	35%	-
<b>Total number of positive cultures</b>	20%	11 (12.2%)

16.6% of the patients in the present study had vaginal infection presenting as leucorrhoea. In Alka, et al. study 26% of the patients had vaginal infection. In majority of cases in the present study, vaginal swab cultures were sterile (78.8%) and positive cultures were found in 13.3% of the cases compared to 26% in Alka, et al. study as per **Table - 6**. Singh, et al., (2007) found positive vaginal culture in 12.25% patients and Deka, et al., (1997) [5] found that cervical infection was present in as many as 55% patients with preterm labour. Similarly Chhabra, et al., (2001) found that genital tract colonisation was a common risk factor for preterm labour seen in 28% patients. Staphylococcus aureus was the most common organism isolated in majority of the cases in the present study. Other common organisms were Klebsiella, Streptococcus. E. coli was the most common organism isolated in the Alka, et al. study. Singh et al., (2007) found that E. coli and Staph aureus were the commonest organisms (32% of each) isolated. In the study conducted by Deka, et al. (1997) most commonly isolated organisms were Staphylococcus aureus, microaerophilic gram positive non sporing bacilli and PeptoStreptococci. This means that it is important to diagnose genitourinary infections early and treat it aggressively to prevent preterm labour. It is advisable to start a broad spectrum antibiotic after the diagnosis of preterm labour was made which covers the common organisms responsible for urinary tract and vaginal infections. The prophylactic antibiotics given in the study, ampicillin or amoxicillin were broad spectrum antibiotics belonging to penicillin

group of drugs which covers Escherichia coli, Staphylococcus aureus which were the common organisms for genitourinary infections [10].

**Table - 6:** Comparative analysis of vaginal swab culture and sensitivity. (N = 90)

	Alka, et al. (2014) [8]	Present study
<b>Staph. Aureus</b>	15.38%	75%
<b>Klebsiella</b>	16.6%	11.53%
<b>Streptococcus</b>	-	8%
<b>Others</b>	60%	-
<b>Total</b>	26 (26%)	12 (13.3%)

## Conclusion

- Genito urinary infections were found to be most common risk factor for preterm labour (37.7%).
- 21% of the patients presented with symptoms of urinary tract infections, urine microscopy positive in 16.6% of the patients.
- Urine culture and sensitivity was positive in 5 patients with Escherichia coli being the most commonly isolated organism (5.5%).
- In majority of cases urine and high vaginal swab sent for culture and sensitivity were sterile.
- Staphylococcus aureus was commonly isolated from vaginal swab (7.7%).

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