Original Research Article

Association of vaginal infections in Preterm labour

Srilakshmi Yarlagadda*, Sajana G., Prasuna J. L. Narra

Department of Obstetrics and Gynecology, Dr. Pinnamaneni Siddhartha Institute of Medical Sciences and Research Foundation, Chinoutapally, Krishna, Andhra Pradesh, India

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*Correspondence:
Dr. Srilakshmi Yarlagadda,
E-mail: ysiri531@gmail.com

ABSTRACT

Background: Preterm labour is defined as onset of regular uterine contractions associated with cervical changes between 28-37 completed weeks of gestation. Prematurity is the cause of 85% neonatal morbidity and mortality. Preterm labour has multiple etiologies. Vaginal infections have been associated with increased risk for preterm labour. Screening for genitourinary infections antenatally, especially in high risk cases, prompt recognition and treatment decrease the incidence of preterm labour.

Methods: Ours was a prospective and retrospective observational study done at Dr. Pinnamaneni Siddhartha Institute of Medical Sciences and Research Foundation from April 2016 to February 2018 in the Department of Obstetrics and Gynaecology. The aim is to study the association of vaginal infections in preterm labour. A total of 116 women in preterm labor were studied. After clinical examination, CBP, CUE, Ultrasound, urine culture and sensitivity were done. Vaginal swab was taken from posterior fornix and sent for culture and sensitivity and gram staining .Culture and sensitivity were done in the Department of Microbiology at our Institute.

Results: Out of 116 women in preterm labour, urinary tract infection was seen in 27.58% women. *E. Coli* was the commonest microorganism isolated in urine (15.51%). Vaginal infections were seen in 33.62% women. Candida was the commonest microorganism isolated in HVS cultures.

Conclusions: Screening for genitourinary infections in pregnancy is necessary, especially in high risk cases. Early detection and prompt treatment of genitourinary infections decrease the incidence of preterm labor, thereby decreasing the neonatal morbidity and mortality associated with prematurity.

Keywords: Preterm labour, Urinary tract infection, Vaginal infections

INTRODUCTION

Preterm labour is defined as onset of regular uterine contractions associated with cervical changes between 28 to 37 completed weeks of gestation.

Preterm birth is the leading cause of neonatal morbidity and mortality. 85% of neonatal morbidity and mortality is due to premature birth. The American Association of Paediatrics and ACOG 1997 proposed the following criteria to diagnose preterm labour.

- Uterine contractions of 4 in 20 minutes or 8 in 60minutes plus progressive cervical changes.
- Cervical dilatation of >1cm.
- Cervical effacement of >80%.

In the developed countries, the incidence of preterm birth is 5-10%, whereas it is around 25% in developing countries.[1] Worldwide incidence of premature birth ranges between 6-11%.[2]

Most of the times, the cause of preterm labour is unknown, but many conditions have been associated with

an increased risk of preterm delivery. 30-40% of all cases of preterm birth are induced because of maternal or fetal complications. The remaining 60-70% are likely due to subclinical infective or inflammatory causes, especially genitourinary tract, cervical dysfunction, multiple gestations, idiopathic and possible social, environmental and nutritional interactions.[3]

The most serious outcome of preterm labour is often associated with adverse maternal and neonatal outcomes related to infection.[4] Prostaglandins which are released because of infection stimulate uterine contractions leading to preterm labour. Preventive measures can prevent preterm labour and adverse neonatal outcome.

So, the present study was undertaken to study the role of vaginal infections in preterm labour. The main objective is to study the association of vaginal infections in preterm labour.

METHODS

This was a prospective and retrospective observational study done at Dr. Pinnamaneni Siddhartha Institute of Medical Sciences and Research Foundation from April 2016 to Feb 2018 in the Department of Obstetrics and Gynecology. The NICU at our hospital is well equipped and considering the facilities available in it, 28 weeks was taken as the lower limit for the period of viability in the present study.

Pregnant women between 28-37 weeks of gestation who set into spontaneous preterm labour only were included in the present study. Gestational age was assessed basing on the last menstrual period and dating scan.

Women who had uterine contractions of 4 in 20min or 8 in 60 min associated with cervical dilatation of ≥1cm and effacement of >80% between 28-37 completed weeks of gestation were included in the study.

Inclusion criteria

- Pregnant women between 28-37 completed weeks of gestation who set into spontaneous preterm labour.

Exclusion criteria

- Pregnant women with <28 weeks and >37weeks of gestation.
- Pregnant women with APH
- Pregnant women with PROM
- Pregnant women with IUD
- Any pregnant woman whose pregnancy was terminated preterm for any maternal or fetal cause.

Written informed consent was obtained from enrolled women. Detailed history was taken with respect to age, parity, socioeconomic status, residence, previous pregnancy outcomes and for the presence of any risk factors in index pregnancy including genitourinary and respiratory infections, GDM, anaemia, hypertensive disorders, heart disease or any other medical disease, obstetric risks like hydramnios, multifetal gestation, malpresentation and uterine anomalies.

A thorough systemic and obstetric examination was done. Speculum examination was done to visualise cervix and vagina and to rule out cervical and vaginal infections.

Per vaginal examination was done to note cervical length and dilatation. CBP, CUE, Obstetric Ultrasound for cervical length, AFI, EFW, placental localisation and separation were done.

Swab from the posterior fornix of vagina was taken and sent for gram staining and culture sensitivity. Midstream urine sample was sent for culture and sensitivity.

Microbiological analysis and antimicrobial sensitivity testing of urine and high vaginal swab were done in the Department of Microbiology at our institute. All patients were monitored for features of sepsis like fever, maternal tachycardia, uterine tenderness and foul smelling vaginal discharge.

Since this study comes under descriptive statistics, results were analysed by calculating percentages.

RESULTS

In the present study, out of 2040 pts who delivered beyond 28 weeks between April 2016-Feb 2018, 116 women presented in preterm labour. The incidence of preterm labour at our institute was 5.68 %.

Table 1: Age.

Age (N=116)	No	%
< 20 years	38	32.75
20-25 years	26	22.41
25-30 years	22	18.96
30-35 years	20	17.24
35 years	10	8.62

In the present study, majority of women who delivered preterm were in teenage (32.75%).

Table 2: Gravida.

Gravida (N=116)	No	%
Primigravidas	25	21.55
G 2	27	23.27
G 3	46	39.65
G 4	18	15.51

In the present study, 21.55% were primigravidas, 23.27% were second gravidas, 39.65% were third gravidas and 15.51% were fourth gravidas.

Table 3: Booked/unbooked.

Booked cases	66	56.89
Unbooked cases	50	43.10

56.89% were booked cases at our institute, but they had irregular antenatal checkups. 43.10% were unbooked cases.

Table 4: Socioeconomic status (SES).

SES (N = 116)	No	%
Lower	47	40.51
Lower middle	43	37.06
Upper middle	16	13.79
Upper	10	8.62

It was evaluated according to Kuppuswamy classification. 40.51% belonged to lower SES, 37.06% to lower middle, 13.79% to upper middle and 8.62% to upper class.

Table 5: Body Mass Index (BMI).

BMI	No of cases	%
Underweight	52	44.82
Ideal	36	31.03
Overweight	16	13.79
Obese	12	10.34

Majority (44.82%) had underweight in the present study. The weight gain during index pregnancy is also low.

Table 6: Residence.

Residence	No of cases	%
Rural	82	70.69
Urban	34	29.31

70.69% lived in rural areas around the hospital and 29.31% lived in urban areas.

Table 7: Previous H/O abortions.

No. of abortions	No of patients	%
One abortion	16	13.79
Two abortions	20	17.24
Three abortions	9	7.75

Table 8: Previous H/O preterm deliveries.

No of prev preterm deliveries	No of patients	%
1 PTL	12	10.34
2 PTL	17	14.65
3 PTL	9	7.75

It was observed in the present study that 38.79% (45/116) had previous H/O one or more abortions. It has significant association with preterm labour in index pregnancy. 13.79% had previous one abortion, 17.24% had previous 2 abortions and 7.75% had previous 3 abortions.

32.75% in the present study had previous history of one (or) more preterm deliveries. 10.34% had previous one preterm delivery, 14.65% had previous 2 preterm deliveries and 7.75% had previous 3 preterm deliveries. It has significant association with PTL in index pregnancy.

Table 9: Risk factors for preterm in index pregnancy.

Risk factor	No of cases	%
UTI	32	27.58
Vaginal infections	39	33.62
GDM	8	6.89
Anaemia	24	20.69
Hypertensive disorders	26	22.41
URTI	18	15.51
Bronchial asthma	5	4.31
Heart disease	3	2.58
Pyrexia	16	13.79
Multifetal gestation	5	4.31
Hydramnios	12	10.34
Uterine anomalies	3	2.58
Malpresentations	10	8.62

It was observed that 74.13% (86/116) patients had one (or) multiple risk factors for preterm in index pregnancy. In the present study, 27.58% had UTI and 33.62% had vaginal infections, which was significant. 6.89% had GDM and 20.69% had anemia.

Hypertensive disorders were noted in 22.41%. Upper respiratory tract infections were seen in 15.51%. 3 patients had uterine anomalies, one with bicornuate uterus unicollis and 2 patients had septate uterus. 2.58% had congenital heart diseases and 4.31% had bronchial asthma. 13.79% (16/116) had fever, out of which 6 patients responded to antimalarials. 4.31% had twin pregnancies and 8.62% had malpresentations, the commonest being breech presentation. Hydramnios was seen in 10.34% cases.

Table 10: Bacteriological profile in urine sample

Micro organism	No of urine samples	%
E. coli	18	15.51
Klebsiella	4	3.44
Candida	3	2.58
Acinetobacter	1	0.86
S.aureus	6	5.17
Sterile	68	58.62
Contaminated	12	10.34

UTI was seen in 27.58% cases. *E. Coli* was the commonest microorganism cultured in urine (15.51%).

Other microorganisms isolated were *Klebsiella, Candida, Acinetobacter and Staphylococcus aureus*.

Table 11: Bacteriological profile in vaginal samples

Microorganism	No. of HVS samples	%
Candida	36	31.03
Staphylococcus aureus	1	0.86
Mixed microbes	2	1.72
Sterile	77	66.37

Vaginal infection was seen in 33.62% cases which was significant. Candida was the commonest microorganism (31.03%) seen in HVS cultures. Other organisms isolated were Staphylococcus aureus and mixed microbes.

DISCUSSION

In the present study, out of 2040 patients who delivered beyond 28 weeks between April 2016-Feb 2018, 116 cases presented in preterm labour. The incidence of preterm labour at our institute was 5.68%. This is in close agreement to the world-wide incidence of preterm labour.

Fernandes F et al reported an incidence of preterm labour at 7.81% in their study.[5] Beck S et al reported an incidence of 6 to 11% and Copper et al reported at 7 to 11%.[2,6] However, Uma S et al in their study reported the incidence of preterm labour as 22%.[7] The varied incidence in different studies may be due to differences in socioeconomic status, literacy and awareness of antenatal care among the pregnant women.

Age

Majority of women were in teenage in the present study (32.75%). 22.41% were between 22-25years. Extremes of age group accounted for 41.37% cases. This is in comparison with the study done by Samim A et al in Iraq, 2006, who reported that 36.5% of cases of preterm labour were in extremes of reproductive age group.[8] In the study by Fernandes F et al.[5] 15.8% were in extremes of age group and 18.8% were in extreme age group in the study done by Renay Weiner et al in Kenya.[9] This difference could be because more teenage and elder women were present in the present study.

Gravida

In the present study, 21.55% were primigravida and 78.44% were multigravidas.

In a longitudinal case series examining demographic and obstetric data of 17493 deliveries conducted in a referral centre in Israel by Shlomo E et al, preterm delivery rate was higher in grand multipara (93% among grandmultipara).[10] In the study by Fernandes F. et al.[5] 45.11% were primigravidas and 54.39% were multigravidas. In the study done by Singh U et al, 47% were primigravidas and 53% were multigravidas.[7] Also, in a study conducted by Etuk SJ et al, 41.94% were primigravidas and 58.06% were multigravidas.[11] The increased incidence of preterm labour in multigravidas in the present study could be because more number of younger women conceived with low interconception interval, malnutrition, anemia and genito-urinary infections.

In the present study, 56.89% were booked cases and 43.1% were unbooked cases. Though 56.89% were booked cases at our institution, they didn't come for regular antenatal checkups and so complications like anemia, UTI, genital infections, hypertensive disorders were more in them leading to preterm labour. 40.51% belonged to lower socioeconomic status and 37.06% to lower middle class. Because malnutrition, anemia and increased chances of infections were more in these women, the incidence of preterm labour was also high among them.

In the present study, 44.82% had underweight and majority (70.69%) lived in rural areas. The incidence of anemia, malnutrition and genitourinary infections was also high in these women which might have led to preterm labour

Past obstetric history

In the present study, it was observed that 38.79% had previous h/o abortion and 32.75% had previous h/o preterm delivery which were significant.

In the study by Fernandes F et al 35% had previous h/o abortions and 12.11% had previous h/o preterm births.[5] In a case control study done in Iraq by Samim A et al.[8] 15% had h/o previous pretermbirths. In the study by Kiran P et al.[12] 14.4% had previous h/o preterm births and 14.4% had previous h/o abortions.

Risk factors for preterm in index pregnancy

Out of 116 women who delivered preterm in the present study, it was observed that 86 women (74.13%) had one or more risk factors.

Vaginal infections were noted in 33.62% women in the present study. The commonest organism isolated in HVS cultures was Candida species. The other organisms were Staphylococcus aureus and mixed microbes.

In the study done by Pradeep Raju S et al the incidence of vaginal infections was 58.06% in women with preterm labour.[13] Incidence of vaginal infections was high when compared to the study conducted by Fernandes F et al who reported an incidence of 8.29%.[5] Samim A et al reported an incidence of 7.24% of women with vaginal infection in preterm labour.[8] UTI was noted in 27.58% of cases. The commonest organism isolated was *E. Coli*

(15.51%). The other organisms isolated were *Candida, Acinetobacter and S. Aureus.*

Samim A et al reported 40% incidence of UTI in their study and Pandey Kiran et al. reported 20.34% incidence of UTI in their study.[8,12] Fernandes F et al reported 13.65% incidence of UTI. The difference could be due to the differences in the criteria used to diagnose UTI, whether clinically based (or) by urine culture.[5] Anemia was seen in 20.69% cases.

Hypertensive disorders were seen in 22.41% cases. This is comparable to the studies by Fernandes F et al, who reported an incidence of 21.07% of hypertensive disorders in preterm labour, Etuk SJ et al at 23.8%. Shreshta S et al reported hypertensive disorders in preterm labour at 13.3 % and Taskeen Rehana et al at 14% in their studies.[5,11,14,15] The increased incidence of hypertensive disorders in the present study could be because, being a tertiary care centre with good NICU facilities, most of the women with high risk pregnancies were referred to our institute. GDM was seen in 6.89% In the present study. Shannon F. Fernandes et al reported an incidence of 3.41% in their study and Taskeen Rehana et al reported at 4%.[5,15] Hydramnios was noted in 10.34% cases in the present study in contrast to the studies conducted by Fernandes F et al at 1.46%, Shreshta S et al at 0.7% and Kiran P et al at 0.79%.[5,12,14] Uterine anomalies were noted in 2.58% cases. One woman had bicornuate unicollis uterus and 2 had septate uterus. Kiran P et al reported uterine anomalies at 4.82% in their study.[12] The difference may be because some uterine anomalies were not diagnosed before. Congenital heart disease (VSD with left to right shunt) was seen in 2.58% cases and bronchial asthma in 4.31% cases. 15.51% had upper respiratory tract infections in the present study which may be a causative agent for preterm labour. 13.79% cases had pyrexia. Out of which, 6 women responded to antimalarials and the rest had viral fever. Fever during the antenatal period is an important risk factor for preterm labor and IUD. Malpresentations were seen in 8.62% cases, commonest being breech presentation. Fernandes SF et al reported an incidence of 18.54% malpresentations in their study and Rehana T et al reported at 21 %. Malpresentation is an important risk factor for preterm labour.[5,15] 4.31% had twin gestation in the present study which is a risk factor for preterm delivery. Fernandes SF et al reported twin gestation in their study at 9.77%.[5]

CONCLUSION

Prematurity is the cause of 85% neonatal morbidity and mortality. Vaginal infections significantly contribute to the preventable causes of preterm labor. It is always advisable to screen the antenatal women for the presence of asymptomatic genitourinary infections. Early recognition and prompt treatment of vaginal infections aid in the prevention of preterm labor and the associated neonatal morbidity and mortality of premature neonates.

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