ORIGINAL ARTICLE

A CASE CONTROL STUDY ON CORRELATION BETWEEN GENITOURINARY INFECTION AND PRETERM LABOUR

Udaykumar M Patel[1], Parul S Jani[1], Chunilal R Kakani[2]

Author's Affiliation: [1]Assistant Proffessor; [2]Professor, Department of Obstretics & Gynecology, Dharpur Medical College, Patan
Correspondence: Dr Uday M Patel, Email: udaypatel1810@gmail.com

ABSTRACT

Background: Genitourinary infections leading to pre term labour is well known fact since long. However the issue still prevail in developing countries like India.

Objectives: This study was conducted to find out the prevalence of genitourinary infections in the preterm delivery and compare it with the full term deliveries.

Patients and methods: A case control study was undertaken in a tertiary care centre. The study comprise of 50 cases of pre term delivery between 28-37 weeks of gestation (case group) and 50 full term cases for comparison (control group). All the cases were subjected to microbiological analysis for bacterial (aerobic), fungal and protozoal examination by two high vaginal swabs and urine samples for routine examination, bacteriological examination, culture and antibiotic sensitivity. Statistical analysis was carried out using chi square and student "t" test.

Results: In the case group (Group A) of 50 cases of PTL the frequency of genital tract infection, urinary tract infection (UTI) and combined genitourinary infection (GUI) was 44%, 30% and 16% respectively as compared to 10%, 6% and 0% in the Group B, suggesting a statistically significant relationship of prevalence of genital as well as urinary tract infection in patients with preterm labour. The most common causative organisms of UTI were, Escherichia coli (14%) and Klebsiella pneumoniae (12%), while Gardnella vaginalis (16%) and Candida albicans (14%) were found to be commonly associated with genital tract infection. The number of low birth weight babies was significantly higher in intervention group than in the normal group.

Conclusions: Integration of a simple infection screening programme into routine antenatal care may reduce the incidence of preterm labour and improve perinatal outcome.

Key words: Preterm labour, genitourinary infections, intrauterine infections, bacterial vaginosis.

INTRODUCTION

Preterm labour (PTL) is defined as "onset of labour with intact membranes after 28 weeks and before 37 weeks of gestation". About 6-8% of all deliveries are preterm and of these about two-thirds occur between 34 and 37 weeks of gestation[1]. PTL is a heterogeneous condition with numerous associated social and medical risk factors. PTL and delivery is a major cause of perinatal morbidity and mortality in developing countries. The birth of preterm infants is a social, emotional, physical and financial burden not only on the parents but the society as well. Maternal infections of urogenital tract are a relatively frequent cause of preterm labour. The microorganisms may produce large amount of phospholipase A2, an enzyme capable of liberating arachidonic acid from the phospholipids leading to synthesis of prostaglandins by placental membranes thus initiating the process of labour. The association between asymptomatic bacteruria and preterm delivery is controversial. But the overall high rate of incidence of preterm delivery does seem to favour the existence of a strong association between urinary tract infection (UTI) and preterm labour. Assessment of the magnitude is very essential to tackle the problem. There is overwhelming evidence that infection is a major cause of spontaneous preterm labour. Nu-

merous studies have shown the relationship between the genitourinary infections and preterm labour but no study has ever documented how to go about its prevention in a large scale at peripheral level[2,3]. The simplicity and effectiveness of the model is very essential to ideally decrease the prevalence and to initiate the early intervention so as to prevent preterm labour especially in the rural areas which accounts for 65-70% of the total population of India.

METHODOLOGY

The present study included 100 cases which were divided into two clusters: Group A comprised of 50 cases of preterm labour, selected randomly, between 28 weeks to less than 37 weeks of gestation attending the O.P.D./labour ward of Obstetrics and Gynaecology department at tertiary care centre. Group B comprised of 50 normal cases selected randomly for comparison, which carried the pregnancy to full term without any complication. The vaginal swabs and urine samples for culture and antibiotic sensitivity were taken at 28 weeks and at the time of antenatal visit at 37 weeks or more. These patients did not have any history of discharge, bleeding or leaking per vaginum. Patients with antepartum haemorrhage, anaemia, multiple gestation, polyhydramnios, uterine anomaly, fibromyoma uterus, rupture of membranes, pregnancy induced hypertension, eclampsia and those who received antibiotic therapy within 30 days of onset of labour were excluded from the study.

RESULTS

The demographic profile was almost similar in both the clusters. Mean age group was 22.88 years in preterm labour group (group A) while it was 23.82 years in group B. In group A primipara women were 72% while in group B it was 74%.

Table 3 and table 3 shows distribution of various micro-organism found in vaginal swab and urine in group A as well as group B. In urinary tract infection Escherichia coli was the commonest organism while in vaginal infection Gardnerella vaginalis was the most commonest organism followedby Candida albicans.

As shown in table 4 Genital tract infection was present in 44% women in group A while it was there in 10% women in group B. The difference is statistically significant (<0.001). Similarly urinary tract infection was also significantly higher in group A.

Table 1: Demographic profile of preterm labour and full term women

Demographic characteristics	Group A(%)	Group B(%)
Number of patients	50	50
Age of the patients (yrs) (Mean±SD)	22.88 ± 4.74	23.82 ± 4.07
Parity status		
Primipara	36 (72.0)	37 (74.0)
Multipara	14 (28.0)	13 (26.0)
Educational level		
Illiterate	24 (48.0)	27 (54.0)
Up to primary	18 (36.0)	15 (30.0)
Secondary and above	8 (16.0)	8 (16.0)
Antenatal Registration	29 (58.0)	32 (64.0)

Figure in parenthesis indicate percentage

Table 2: Microorganisms isolated from the vaginal swabs of preterm labour and normal term women

Microorganism	Group A (N=50)	Group B (N=50)
Escherichia coli	3 (6.0)	1 (2.0)
Klebsiella pneumoniae	0 (0.0)	1 (2.0)
Streptococcus agalactiae	1 (2.0)	0 (0.0)
Candida albicans	7 (14.0)	2 (4.0)
Gardnerella vaginalis	8 (16.0)	1 (2.0)
Other	3 (6.0)	0 (0.0)

Figure in parenthesis indicate percentage

Table 3: Microorganisms isolated from the urine sample of preterm labour and normal term women

Microorganism	Group A (N=50)	Group B (N=50)
Escherichia coli	7 (14.0)	1 (2.0)
Klebsiella pneumoniae	6 (12.0)	2 (4.0)
Streptococcus agalactiae	2 (4.0)	0 (0.0)

Figure in parenthesis indicate percentage

Table 4: Comparison of cases in preterm labour and women with term pregnancy according to the type of infection

Type of infection	Group A (N=50)	Group B (N=50)	P value*
Genital tract infection	22 (44.0)	5 (10.0)	<0.001
Urinary tract infection	15 (30.0)	3 (6.0)	<0.001
Genito urinary infection#	8 (16.0)	0 (0.0)	-#

*Chi-square test applied for calculation of p value; p value was not calculated as one of the cell value is zero; #Patiet having infection in genital as well as urinary tract; Figure in parenthesis indicate percentage

Table 5: Comparison of cases in preterm labour and women with term pregnancy according to the birth weight of babies

Birth weight category	Group A (N=50)	Group B (N=50)	P value
Low birth weight	32(64.0)	12 (24.0)	<0.001
Normal weight	18 (36.0)	38 (76.0)	

Figure in parenthesis indicate percentage

Women in both group were also evaluated for birth weight of their child and it was found out that in group A 80% babies were low birth weight while in group B 24% babies were low birth weight. This difference was statistically significant.

DISCUSSION

The findings of this retrospective study revealed that the majority of the patients with preterm labour were primigravida and more than half of them directly come for the delivery. These findings are almost comparable to the earlier study done by Trivedi et al[2]. This reflects on the level of awareness about the significance of antenatal care which ultimately depends upon the two interrelated conditions, i.e. education and socioeconomic conditions. Infections are responsible for preterm labour in 40% of cases and earlier the abnormal genital tract colonisation, the greater is the risk of adverse outcome[3]. Intrauterine infection is a major cause of preterm labour with or without intact membranes and accounts for 25% of all cases of PTL[4]. In this study, genital tract infection was detected as the causative factor in 44% of cases which is similar with the findings of study done by Lamont[3] but slightly different from the results obtained by Gonclave et al[4]. The reason for this difference is mainly due to the fact that in this study, we examined patients with intact membranes only.

The prevalence of vaginal infection was significantly higher in the study group than in the normal group. The incidence of detection of infection in the intervention group was highest for *Gardnerella vaginalis* followed by *Candida albicans, T. vaginalis, E. coli* and *Streptococcus aglacticiae* in descending order. *G. vaginalis* was reported to be highly significantly related to PTL, while detection of *C. albicans* and *T. vaginalis* did not have much statistically significant association with PTL. These findings of our study are almost comparable to the earlier studies done by Paul et al[5], Michael et al[6], Yim et al[7] and Sangita et al[8] with some variations especially regarding the prevalence of bacterial vaginosis. This is mainly attributable to a small limitation, as we studied the population only for *G. vaginalis* and not for anaerobic *Bacteroides*, and *Mycoplasma.*

UTI was found to be a significant prevalent factor in most cases of PTL in this study which correlates with the similar findings in some other studies[9]. According to Naheed et al[10] asymptomatic bacteruria was found to be a causative factor for PTL as 21.4% of bacteriuric women went into PTL ($p<0.05\%$) as compared to 4.9% non bactriuric women, the most common offender in such cases being *E. coli.* Meis et al[11] reported bacteruria in 6.2% of cases of PTL. Eight (16%) patients in the present study, had infection of urinary tract as well as genital tract as compared to normal group where it was nil, suggesting the significance of prevalence of combined genitourinary infection in patients of preterm labour.

In recent years, the birth weight of premature babies has been regarded as an important determinant of pregnancy outcome, such that preterm birth is no longer identified solely by gestation age but also in terms of birth weight below 2.5 kg. In our study 64% of the patients delivered preterm babies with birth weight below 2.5kg which suggests a highly significant association of low birth weight with PTL and the similar results are quoted by Bique Osman et al[12].

CONCLUSIONS

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. Inspite of scarcity of specialized services, no antenatal mother should be deprived of these services. The tests and diagnostic procedures followed by us can be easily reproduced at any peripheral health centre as they are highly cost effective. The timely antibiotics, according to sensitivity of infectious organisms, can arrest preterm labour and prevent preterm births and low birth weight babies. The crux of our study is aimed at prevention of irreversible damage, that is, rupture of membranes so as to prevent the preterm labour and also to decrease the maternal as well as the infant mortality and morbidity by employing the cost effective methods to cover a larger section of the society.

REFERENCES

1. Chowdhary RNN. Production and prevention of preterm labour. *The Journal of Obs and Gynae* 1998; **48**(4): 37-41.

2. Trivedi DR, Nagpal SP. Preterm delivery: a common obstetric problem. *The Journal of Obs and Gynae of India* 1995; **45**(3): 380-4.

3. Lamont RF. Infection in prediction and antibiotics in prevention of spontaneous preterm labour and preterm birth. *BJOG* 2003; **110**(Suppl 2): 71-5.

4. Gonclaves LF, Chaiworapongsa, *et al.* Intrauterine infection and prematurity. *Ment Retard Dev Disabil Res Rev* 2002; 3-13.

5. Meis PJ, Robert L, Goldenberg, *et al.* The preterm prediction study: significance of vaginal infection. *Am J Obst Gynae* 1995; **173**(4): 1231-5.

6. Michael FE, Diejomaoh, Vincent O, *et al.* Correlation between bacterial vaginosis and adverse pregnancy outcome. *Medical Principles and Practice* 1999; **8**(3): 222-9.

7. Yim SF, Lyon DJ, Chung TK, *et al.* A prospective study of the microbiological environment of the genitourinary tract in Hong Kong Chinese women during pregnancy. *Aust NZJ Obstet Gynaecol* 1995; **35**(2): 178-81.

8. Sangita, Mittal A, Chandra P, *et al.* Incidence of *Gardnerella vaginalis* in preterm labour. *Obst Gynae Today* 1999; **4**(5): 299-303.

9. AI-Jawadi TA. Identification of the high risk pregnancy and its outcome: a cohort study. Mosul Medical College University of Mosul, MSc Thesis.1998: 29-32.

10. Naheed F, Shakeela Y, *et al.* Prevalence and complications of asymptomatic bacteruria during pregnancy. *Professional Med J* 2006; **13**(1): 108-12.

11. Meis P, Goldenberg R, Lams J, *et al. Am J Obstet Gynecol* 1995; **172**: 548.

12. Bique ON, Folgosa E, Gonzalez C, *et al.* Low birth weight and genital infection. An incident case referent study. *Gynecol Obstet Invest* 1995; **40**(3): 183-9.