Original Article

Obst. & Gynae

Role of PH and Leukocyte Count in Prediction of Preterm Labour

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ABSTRACT

Objective: The objective of this study was to determine the significance of pH and leukocyte count in the prediction of preterm labour.

Study Design: Case control study.

Place and Duration: This study was carried out at Department of Obstetrics and Gynaecology Nishtar Hospital Multan from from 01-04-2008 to 30-09-2008 and 01-11-2008 to 01-05-2009.

Materials and Methods: Women seeking antenatal care at outpatient department of Obstetrics & Gynaecology, Nishtar Hospital Multan between 22-28 weeks of gestation with singleton pregnancy were enrolled in this study. Vaginal pH was measured using a pH paper and leukocyte count by making a slide of vaginal secretions from posterior fornix and were sent to pathologist for counting number of leukocytes. Women with high pH and leukocyte count were enrolled to group A (cases) and those having normal pH were included in the group B (controls). These women were followed till delivery and the number of women going into preterm labour were counted and matched with the results of pH and leukocyte counts.

Results: Mean age was 25.80±48 years in cases and 24.61±0.56 years in controls. Low socioeconomic status was evident in 43(61.43%) cases and 34(48.57%) controls, while 27(38.57%) case and 36(51.43%) controls had middle socioeconomic status.

Preterm labour was observed in 42(60%) cases and 7(10%) controls, while preterm premature rupture of membrane was evident in 30(42.86%) cases and 9(12.86%) controls.

Mode of delivery was vaginal in 44(62.86%) cases and 54(77.14) controls. 26(37.14%) cases and 16(22.86%) controls had lower segment caesarean section.

Conclusion: Significantly more number of women with elevated pH and leukocyte count likely to have preterm delivery.

Key Words: Preterm labour (PTL), Bacterial vaginosis (BV), LSCS

INTRODUCTION

Preterm labour is defined as the presence of uterine contraction of sufficient frequency and intensity to effect progressive effacement and dilatation of the cervix prior to term gestation (between 20 and 37 weeks)[1].

Incidence of preterm labour is 5-10% over the last three decades[2]. Preterm labour and delivery are major cause of perinatal morbidity and mortality especially in developing countries[3]. Bacterial colonization and or infection of lower and upper genital tract may result in local inflammation prompting a cascade of events that ultimately leads to spontaneous labour and delivery[4].

Normal pH of vagina ranges from 3.8-4.2. it has regulatory and protective mechanism for the vaginal environment, the change in pH value indicates disturbance in the ecosystem of decreased number of micro-organism in the vaginal environment[5]. Elevated pH was associated with clue cells, trichomoniasis and mixed infection. Bacterial vaginosis in early pregnancy can be detected reliably by Gram stain. The risk of preterm labour in the presence of maternal infection is thought to be 30-50%[6,7]. Preterm birth contributes significantly to perinatal morbidity and mortality. Parents are particularly anxious about risks of later disability and handicap. These risks are especially significant below 28 weeks gestation[3].

So preventable and treatable causes should be identified to reduce the emotional and economical burden on the parents and the country

MATERIALS AND METHODS

The study was carried out in the outpatient department of Nishtar Hospital Multan from 01-04-2008 to 30-09-2008 and 01-11-2008 to 01-05-2009. Non probability purposive sampling technique was used. It was a case control study of one hundred and forty pregnant women. Women seeking antenatal care at outpatient department of Obstetrics & Gynaecology, between 22-28 weeks of gestation with singleton pregnancy were enrolled in this study. An informed consent was taken and approval from hospital ethical committee was taken. These women underwent a sterile speculum examination during which vaginal pH was measured using a pH paper and leukocyte count by making a slide of vaginal secretions from the posterior fornix and were

sent to the pathologist for counting number of leukocytes.

Women with high pH and leukocyte count were enrolled to group A (cases) and those having normal pH were included in the group B (controls). Others having borderline or low pH and leukocyte counts were excluded. These women were followed up till delivery and the number of women going into preterm labour were counted and matched with the results of pH and leukocyte counts.

RESULTS

Present study was conducted on 140 pregnant women of 22-28 weeks of gestation. Out of these, 70(cases) had elevated pH and leukocyte count (≥5), while the other 70 had normal pH and leukocyte count (controls).

The descriptive statistics showed that mean age ± S.E.M. (standard error of mean) was 25.80±48 years in cases and 24.61±0.56 years in controls. Mean age ± S.E.M. pH in cases was 5.28±0.01 and in controls 4.04±0.01. Mean age ± S.E.M. leukocyte count/oil field in cases was 5.29±0.01 and in controls was 4.35±0.02.

There were 38(54.29%) cases (alkaline pH and leukocyte count) and 44(62.86%) controls (acidic pH and leukocyte count), between the age of 16-25 years. 31(44.29%) cases and 24(34.29%) controls were between 26-35 years. Whereas 1 (1.42%) case and 2(2.85%) controls were between 36-45 years.

Equal number of women were primipara in both groups [39(55.71) vs 39(55.71)] and same number of women 31(44.29%) each were multipara in both groups.

Low socioeconomic status was evident in 43(61.43%) cases and 34(48.57%) controls, while 27(38.57%) case and 36(51.43%) controls had middle socioeconomic status.

Preterm labour was observed in 42(60%) cases and 7(10%) controls, while preterm premature rupture of membrane was evident in 30(42.86%) cases and 9(12.86%) controls.

Mode of delivery was vaginal in 44(62.86%) cases and 54(77.14) controls. 26(37.14%) cases and 16(22.86%) controls had lower segment caesarean section.

Table No. 1: Demographic features of patients

Age (in years)	Cases	Controls
16-25	38(54.29%)	44(62.86%)
26-35	31(44.29%)	24(34.29%)
36-45	1(1.42%)	2(2.85%)
Parity		
Primipara	39(55.71)	39(55.71)
Multipara	31(44.29%)	31(44.29%)
Grand-multipara	0(0%)	0(0%)
Socio-economic status		
Low	43(61.43%)	34(48.57%)
Middle	27(38.57%)	36(51.43%)

Table No. 2: Preterm Labour

Preterm labour	Cases	Controls	p-value
Yes	42(60%)	7(10%)	0.001
No	28(40%)	63(90%)	0.01
Total	70(100%)	70(100%)	

Table No. 3: Preterm Premature Rupture of Membranes

Preterm labour	Cases	Controls	p-value
Yes	30(42.86%)	9(12.86%)	0.01
No	40(57.14%)	61(87.14%)	0.01
Total	70(100%)	70(100%)	

Table No. 4: Mode of delivery

Preterm labour	Cases	Controls
Vaginal	44(62.86%)	54(77.14)
LSCS	26(37.14%)	16(22.86%)
Total	70(100%)	70(100%)

DISCUSSION

Preterm labour and delivery is common obstetric problem and is the leading cause of perinatal morbidity and mortality, especially in the developing countries[8]. The incidence ranges between 5%-12.5% in developed countries and 25% in developing countries[9,10].

The sequelae of preterm birth include immediate complications, specifically mortality, and significant morbidity mental retardation, vision impairment and cerebral palsy. In long term, children born low birth weight have an increased risk for cardiovascular disease, such as myocardial infarction, stroke and hypertension as an adult, an increased risk for diabetes as an adult, and a possible increase in cancer risk[10,11].

For the mother, delivering preterm increases her risk of a subsequent preterm delivery[12]. In our study, in 70 cases (with elevated pH level and leukocyte count), 42 (60%) had preterm labour and 30(42.86%) had preterm premature rupture of membranes. In 70 controls (with normal pH level and leukocyte count), 7(10%) had preterm labour and 9 (12.86%) had preterm premature rupture of membranes. These results show that more number of women with raised pH and leukocyte count had preterm labour or PPROM.

Jazayeri et al[13], in a prospective study of vaginal pH as a predictor of preterm delivery, have reported that after the first trimester, a vaginal pH of 5.0 or greater was associated with increased risk of preterm delivery.

Riedewald et al[14] concluded that elevated ph values are due to disturbed vagina flora and they recommend vaginal pH measurement for a quick detection of infection in cases with preterm labour.

Viehweq et al[15] concluded that in contrast to normal pregnancies there is a relation between a pathological pH value (>4.5) and consequent preterm birth in pregnancies with preterm labour.

Yamada et al[17] concluded that polymorphonuclear leukocyte (PMNL) and granulocyte elestase are abundant in the vagina of patients with preterm labour which suggests that PMNL may be involved in the pathogenesis of preterm labour

Jong-Chou Chang et al[17] suggested that the vaginal pH may be a useful clinical screening parameter for the identification n of disturbances of the microflora.

Preterm birth is a complex and unresolved public health problem that correlates strongly with poverty, socioeconomic status and level of education among women giving birth[18]. In our study, all patients belonged to low or middle socioeconomic status.

CONCLUSION

Our study concludes that significantly more number of women with elevated pH and leukocyte count likely to have preterm delivery.

REFERENCES

1. Ross MG, Eden RD. Preterm labor. [Online] 2008[cited 2009 December 15]. Available from: URL: http://emedicine.medscape.com/article/ 260998-overview.htm
2. Svigos JM, Robinson JS, Vigneswaran R. Prelabor rupture of the membranes. In: James DK, Steer PJ, Weiner CP, Gonik B, editors. High Risk Pregnancy 2nd ed. London: WB Saunders;1999.p.1015–1024.
3. Baker PN, editor. Obstetrics by ten teachers. London: Hodder Arnold; 2006.
4. Ramsey PS, Lyon MD, Goepfert AR, Cliver S, Schwebke J, Andrews WW, et al. Use of vaginal polymorphonuclear to epithelial cell ratios for the prediction of preterm birth. Obstet Gynecol 2005; 105(1):139-44.
5. Jahic M, Nurkic M, Fatusic Z. Association of the pH change of vaginal environment in bacterial vaginosis with presence of Enterococcus faecalis in vagina. Med Arh 2006;60(6):364-8.
6. Kurki T, Sivonen A, Renkonen OV, Savia E, Ylikorkala O. Bacterial vaginosis in early pregnancy and pregnancy outcome.Obstet Gynecol 1992;80(2):173-7.
7. Othman M, Neilson JP, Alfirevic Z. Probiotics for preventing preterm labour. Cochrane Database Syst Rev 2007;(1):CD005941.
8. Weismiller DG. Preterm labour. Am Fam Physician 1999;9:593-602.
9. Anumba DOC. Management of women with previous preterm birth. Obstet Gynecol Reprod Med 2007;188-91.
10. Hoyert DL, Mathews TJ, Menacker F, Strobino DM, Guyer B. Annual summary of vital statistics: 2004. Pediatrics 2006;117(1):168-83.
11. Tufail A, Hashmi AH, Naheed F Risk Factors for preterm labour in a Rural Cohort. Med Channel 2009;15(2):55–7. 11.
12. Spong CY. Prediction and prevention of recurrent spontaneous preterm birth. Obstet Gynecol 2007; 110(2 Pt 1):405-15.
13. Jazayeri A, Arnold H, Jazayeri MK, Spellacy WN. A prospective study of vaginal pH as a predictor of preterm delivery. J Matern Fetal Neonatal Med 2002;11(1):30-3.
14. Riedewald S, Kreutzmann IM, Heinze T, Saling E. Vaginal and cervical pH in normal pregnancy and pregnancy complicated by preterm labor. J Perinat Med 1990;18(3):181-6.
15. Viehweg B, Junghans U, Stepan H, Voigt Th,Faber R. Usefulness of vaginal pH measurements in the identification of potential preterm births. Zentralbl Gynakol. 1997;119 Suppl 1:33-7.
16. Yamada , Minakami H, Matsubara S, Yatsuda T, Sato I. Changes in polymorphonuclear leukocytes in the vagina of patients with preterm labor. Gynecol Obstet 1998;45:32-4.
17. Chang JC; Hsu TY; Hsieh CH; Hsu YR; Tai MC; Chen LF. Vaginal and cervical ph measurements in normal-pregnancy and preterm labor. J Matern fetal Invest 1997;7:193-6.
18. Savitz DA, Kaufman JS, Dole N, Siega-Riz AM, Thorp JM, Kaczor DT. Poverty, education, race, and pregnancy outcome. Ethn Dis 2004 Summer;14(3):322-9.

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