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GENITOURINARY INFECTION AND THEIR ASSOCIATION WITH PRETERM LABOUR: A CASE CONTROL STUDY

Obstetrics And Gynaecology

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ABSTRACT

Background and Objectives: Preterm birth is a major determinant of neonatal morbidity and mortality and has long term adverse consequences on health. Worldwide incident of preterm birth ranges between 6-11%.Whereas it is around 25% in developing countries.This study aims to study relation of genitourinary infection and preterm labour and to select an appropriate antibiotic therapy. **Materials and Methods:** A case control study was conducted from one year at the department of OBG, VIMS, Ballari. All pregnant women meeting the inclusion criteria and those who gave valid consent are recruited in the study.The women reporting to labour room in preterm labour pain were taken as study group (GROUP A).A detailed pelvic examination was done, vaginal discharge /secretions were collected with an ayre spatula from the posterior fornix for gram staining, culture and sensitivity. Midstream urine sample collected for culture and sensitivity. Microbiological analysis and antimicrobial sensitivity testing of urine and vaginal swab done in the Department of Microbiology at the Institute. The Women of gestational age of 28-37 weeks reporting to OPD for regular ANC Checkups without any symptoms were taken as control group (GROUP B) and sample collected for the study by the similar procedure and compared statistically. **Results:** Positive high vaginal swab and Urinary culture was seen in 77% and 65% of the case group respectively compared to control group. The average age of presentation was 21-25years and most of the women were primigravidae in either group i.e 43% and 37% respectively. Previous history of preterm labour was present in only 10% of case group. Commonest microorganism isolated in high vaginal swab was coagulase negative staphylococcus(33.8%) and in urine culture was E coli (21.5%) were sensitive to ceftriaxone, cefotaxime and nitrofurantoin and ceftriaxone respectively. **Conclusion:** Vaginal infection was1.5 times and Urinary infection was 2.6 times in preterm women compared to control in our study. This signifies the need of screening of women during antenatal checkup for the genitourinary infections, which allow us to pick up even asymptomatic cases. Making early diagnosis and treating them adequately with the antimicrobials i.e cephalosporins and nitrofurantoin in our setup will go a long way in decreasing the incidence of preterm labor, preterm births, and the associated neonatal and maternal morbidities.

KEYWORDS

Genital infection, urinary infection, preterm etc.

INTRODUCTION

Preterm birth is a major determinant of neonatal morbidity and mortality and has long term adverse consequences on health. Worldwide incident of preterm birth ranges between 6-11%.Whereas it is around 25% in developing countries. Foetus matures intrauterine until organ systems support the extra uterine life. Thus the degree of maturity is the foremost and main determinant for morbidity and mortality of the neonate. Born too soon babies are more prone for neurological disability, learning disabilities, injury to organs, chances of chronic illness, lifetime disability and death than the term newborns.[1,2]

Since there is no good direct measure for degree of maturity, gestational age calculated during pregnancy is used as a proxy measure of it. Complication of prematurity is the single major direct cause of neonatal negative sequel and is found to be a risk factor in at least half of all neonatal deaths. It also the second most common aetiology of under-5 mortality, the first being pneumonia. Preterm birth is a emotional, physical and financial burden to both parents and the society.[3,4] Preterm Neonates have their organ systems poorly developed. So they are at risk for many life-threatening conditions like hypothermia because they cannot produce and retain enough heat to maintain their body temperatures, respiratory distress syndrome (RDS) from deficiency in surfactant production and lung development, broncho pulmonary dysplasia (BPD), cardiovascular abnormalities including patent ductus arteriosus (PDA)and low blood pressure, intra ventricular haemorrhage (IVH),ineffective glucose regulation, necrotizing enterocolitis (NEC), infection and retinopathy of prematurity (ROP) greater the prematurity, greater is the risk of morbidity and death. Even borderline preterm infants have a risk for poor feeding and hyperbilirubinemia. Exponential relationship exists between mortality and immaturity. Births that occur before 34 weeks of gestation though contribute to about 3-4 % of all preterm birth, they account for the majority of neonatal deaths.[5]

Maternal urogenital infections are the frequent causes of it. Assessment of magnitude of preterm infection may help in formulating the protocol and to initiate the early intervention there by make an effort to prevent the onset of labour and hence the sequelae of it. This study was undertaken to study the relationship between genitourinary infect ion and preterm labour and to select appropriate antibiotic therapy in our institute.

MATERIAL AND METHODS

This case control study was conducted in department of OBG, VIMS, Ballari for one year. 100 women were recruited in each group. Women who gave valid consent and met inclusion criteria like Gestational age between 28 and 37+0 weeks, Singleton pregnancy, Intact membranes, Painful uterine contractions >4 in 20 minutes or 8 in 60 minutes, Cervical dilatation >1cm, Cervical effacement >80% were included in the study. Women with fallowing conditions were excluded from the study. Maternal factors like Pregnant women with <28 weeks and >/=37 weeks of gestation, Multiple gestations, Ante partum Hemorrhage, Premature Rupture of Membranes, Polyhydramnios, Severe Anemia, Preeclampsia, Diabetes Mellitus, Cervical surgery, Incompetent Cervix, Immuno compromised status, Antibiotic therapy in the last 4 days, Blood transfusion within last 7 days and fetal factors like Intrauterine growth restriction, Fetal malformations, Intrauterine death.

Women reporting to labor room in preterm labor pain were taken as study group (GROUP A) and sample collected as below mentioned procedure. A detailed pelvic examination is done under aseptic precaution. Vaginal discharge /secretions were collected with an Ayre spatula from the posterior fornix for gram staining, culture and sensitivity.

Midstream urine sample sent for culture and sensitivity. Microbiological analysis and antimicrobial sensitivity testing of urine and vaginal swab done in the Department of Microbiology at our Institute. Women of gestational age of 28-37 weeks reporting to OPD for regular ANC Checkups without any symptoms were taken as control group (GROUP B) and sample collected for the study by the similar procedure and compared statistically.

Statistical Analysis

The collected data were analysed with IBM.SPSS statistics software 23.0 Version. To describe about the data descriptive statistics frequency analysis, percentage analysis were used for categorical variables and the mean & S.D were used for continuous variables. To find the significant difference between the bivariate samples in Independent groups the Unpaired sample t-test was used. To find the significance in categorical data Chi-Square test was used similarly if the expected cell frequency is less than 5 in 2×2 tables then the Fisher's Exact was used. In all the above statistical tools the probability value .05 is considered as significant level.

RESULTS

54% of cases and 59% women in controls were in the age group of 21-25years. 34% women in cases and 37% women in controls belonged to upper middle class, middle and lower middle class of socio-economic status respectively. 43% in case group and 37% in control group were primigravidae. 10 women in case group and 3 patients in control group had previous history of preterm labour which are comparable statistically.(Table 1) 77women in case group, 50 women in the control group had positive vaginal swab (p= 0.0005) which is statistically significant. Among positive vaginal culture coagulase negative staphylococcus(33.8%) in case group and commensals 40% in control group are the commonest microorganism isolated (Table 2, Figure 1). 65 women in case group and 25 of control group had highly significant ($p < 0.01$) positive urine culture. Commonest microorganism isolated was e-coli(21.5%) in case group and coagulase negative staphylococcus(44%) in control group.(Table 3, figure 2) Majority of the organisms isolated in vaginal culture were sensitive to ceftriaxone (33%), cephotaxime(27.5%).(Table 4)

Majority of the organisms isolated in urine culture were sensitive to nitrofurantoin (24.5%), ceftriaxone (24%),cefotaxime (18%).(Table 5)

DISCUSSION

Average age of pregnant women was 21-25years in both case and control group .43% and 37% were primigravidae in either group. Age, parity, booking status and BMI parameters were comparable in both the groups. Women belonging to lower socio-economic group had significant genitourinary infection compared to control group, indicating lack of awareness regarding perineal hygiene and their poor practices. Previous preterm birth is the strongest risk factor for repeated preterm delivery. It occurs at a similar gestational age, with around 70% delivering within 2 weeks of the gestational age of their first preterm delivery. Pandey et al. also reported that past history of preterm births was a significant contributory factor for preterm labor and Verma et al also reported 61.11 % (11/18) of women with past history of preterm labor, but in this study previous pregnancy with preterm labor was seen in 10% multigravida in case group compared with 3% in Control group which were statistically comparable. [6,7] Iatrogenic premature birth contributes 30% of all premature deliveries. Iatrogenic premature birth also can occur with the elective delivery of a baby which was thought to be term due to errors in gestational age assessment. Medically-indicated preterm birth can be categorised into maternal and fetal cause of which severe preeclampsia, abruption of placenta, rupture of uterus, fetal distress and restriction of fetal growth with abnormal cardiotocograph are important direct causes Underlying maternal conditions like renal disorders, systemic hypertension, obesity and diabetes milletus increase the risk of maternal complications like, preeclampsia and medically warranted preterm delivery. Pre-eclampsia and abruptio placenta affects approximately 7% and 1% of all pregnancies respectively.[8]

Positive high vaginal swab(HVS) cultures were noted in 77% in the case group and 50% in control group which is of high statistical significance with p value 0.0005.which was consistent with other studies.[9,10,11,12] Commonest microorganism isolated in HVS in case group was coagulase negative staphylococcus(33.8%) followed by candida(14.30%) which were sensitive to ceftriaxone, cefotaxime. In control group 40% of cases commensals were isolated commonly, in a study done by Shivaraju P et al. Coagulase negative staphylococcus was the commonest isolated organism grown followed by candida pathological isolates were sensitive to ampicillin, cefotaxim and gentamicinand Srilakshmi Yarlagadda et al isolated Candida commonly. Index study showed urinary tract infection in 65% of case group compared to 25% of control group which is highly significant with p value 0.0005 which is in-consistent with many studies.[9,12,13,14] Dry climate, inadequate intake of water, ignorance about perineal hygiene may be the contributing factor. Commonest microorganism isolated in urine culture was E coli (21.5%) next organism was CONS(20%) which were most commonly sensitive to nitrofurantoin and ceftriaxone antibiotics compared to control group in which CONS were isolated commonly(44%), in a study done by Srilakshmi Yarlagadda et al. E. Coli was the commonest microorganism isolated in urine (15.51%). In this study majority of the organisms isolated in vaginal culture were sensitive to ceftriaxone(33%), cephotaxime (27.5%) and in urine culture majority were sensitive to nitrofurantoin (24.5%), ceftriaxone (24%), cefotaxime(18%). Recognizing and treating the women having urogenital infections at a stage when it has not become clinically evident, will decrease the percentage of women going into preterm labour and will improve the perinatal outcome.[7]

Asymptomatic upper genital tract infection plays a major role in the pathophysiology of early spontaneous preterm births, but a minority of near term preterm births showed relationship between genital tract microbial infection and spontaneous preterm birth. The study also showed that the availability and usefulness of markers to identify women with microbial genital infections, and the results of recent prospective clinical trials of antibiotic therapy to prevent preterm birth.[15] Interestingly both young age and poor obstetric history were also the risk factors.[16] Trials showed genitourinary infections in pregnancy are an important cause of preterm labour so preventative measures must be considered during the prenatal period.[17] Early screening and treatment are necessary to reduce morbidity and mortality resulting from premature labour and birth.[18]

CONCLUSION

Vaginal infection was1.5 times and Urinary infection was 2.6 times in preterm women compared to control in our study. This signifies the need of screening of women during antenatal check-up for the genitourinary infections, which allow us to pick up even asymptomatic cases. Making early diagnosis and treating them adequately with the antimicrobials i.e cephalosporin and nitrofurantoin in our setup will go a long way in decreasing the incidence of preterm labor, preterm births, and the associated neonatal and maternal morbidities.

Table 1

Comparison between H/O PTL with Groups

			Groups		Total	□ 2 - value	p-value
			Cases	Controls			
H/O PTL	No	Count	90	97	187	4.031	0.082 #
		%	90.0%	97.0%	93.5%		
	Yes	Count	10	3	13		
		%	10.0%	3.0%	6.5%		
Total		Count	100	100	200		
		%	100.0%	100.0%	100.0%		

No Statistical Significance at $p > 0.05$ level

Table 2

Comparison between Vaginal culture Organism isolated with Groups

			Groups		Total	□ 2 - value	p-value
			Cases	Controls			
Vaginal culture Organism isolated	Candida sp.	Count	11	6	17	18.426	0.031 *
		%	14.3%	12.0%	13.4%		
	Citrobacter sp	Count	8	2	10		
		%	10.4%	4.0%	7.9%		
	Commensals	Count	9	20	29		
		%	11.7%	40.0%	22.8%		
	CONS	Count	26	9	35		
		%	33.8%	18.0%	27.6%		
	E-COLI	Count	1	0	1		
		%	1.3%	0.0%	.8%		
	Enterobacter Sp	Count	3	1	4		
		%	3.9%	2.0%	3.1%		
	EnterococcusSp	Count	1	2	3		
		%	1.3%	4.0%	2.4%		
	Klebsiellasp	Count	5	3	8		
		%	6.5%	6.0%	6.3%		
	Staphylococcus aureus	Count	9	3	12		
		%	11.7%	6.0%	9.4%		
	Streptococcus Sp	Count	4	4	8		
		%	5.2%	8.0%	6.3%		
Total		Count	77	50	127		
		%	100.0%	100.0%	100.0%		

* Statistical Significance at $p < 0.05$ level

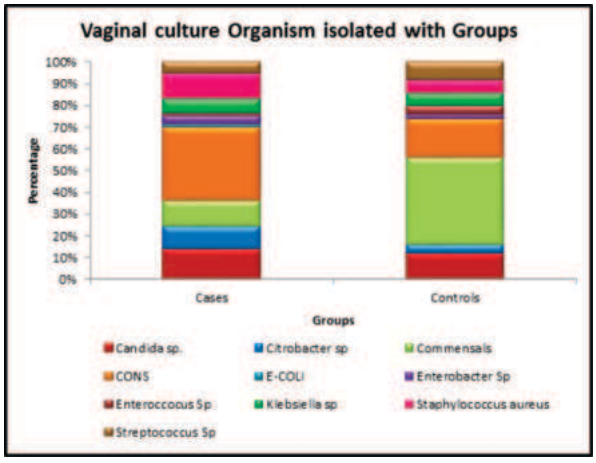

Figure 1

Table 3

Comparison between Urine culture Organism isolated with Groups							
			Groups		Total	χ^2 - value	p-value
			Cases	Controls			
Urine culture Organism isolated	Acinetobacter sp.	Count	5	0	5	14.908	0.094 #
		%	7.7%	0.0%	5.6%		
	Candida Sp	Count	2	3	5		
		%	3.1%	12.0%	5.6%		
	Citrobacter Sp	Count	7	0	7		
		%	10.8%	0.0%	7.8%		
	CONS	Count	13	11	24		
		%	20.0%	44.0%	26.7%		
	E coli	Count	14	3	17		
		%	21.5%	12.0%	18.9%		
	Enterobacter Sp	Count	2	1	3		
		%	3.1%	4.0%	3.3%		
	Insignificant bacteruiuria	Count	8	5	13		
		%	12.3%	20.0%	14.4%		
	KlebsiellaSp	Count	11	2	13		
		%	16.9%	8.0%	14.4%		
	staphylococcus aureus	Count	1	0	1		
		%	1.5%	0.0%	1.1%		
	Streptococcus Sp	Count	2	0	2		
		%	3.1%	0.0%	2.2%		
Total		Count	65	25	90		
		%	100.0%	100.0%	100.0%		
# No Statistical Significance at p > 0.05 level							

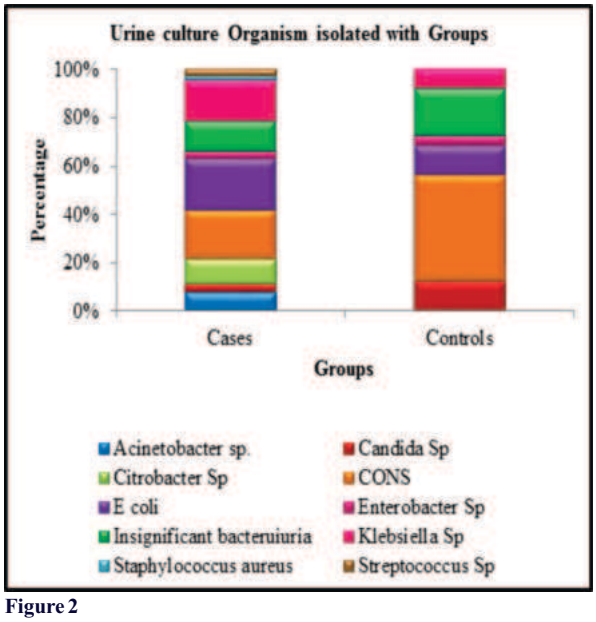

Figure 2

Table 4

Vaginal culture						
	Sensitive		Resistant		Intermediate	
	Frequency	Percent	Frequency	Percent	Frequency	Percent
Ceftriaxone	66	33.0	15	7.5		
Cefotaxime	55	27.5	16	8		
Amoxcilline	16	8.0	47	23.5	3	1.5
Gentamycine	34	17.0	44	22.0	3	1.5
Erythromycine	17	8.5	51	25.5	2	1.0
Ciprofloxacine	25	12.5	50	25.0	3	1.5
Cotrimoxazole	24	12.0	55	27.5	1	.5
Tetracycline	23	11.5	37	18.5		
Doxycycline	28	14.0	52	26.0	1	.5
Penicilline	10	5.0	71	35.5		
Piperacillin Tazo	1	.5	2	1.0		
Linizolid	4	2.0	2	1.0		
Imepenem	4	2.0	2	1.0		
Tobramycin	4	2.0	2	1.0		
Meropenem	2	1.0	4	2.0		

Table 5

Urine culture						
	Sensitive		Resistant		Intermediate	
	Frequency	Percent	Frequency	Percent	Frequency	Percent
Ceftriaxone	48	24.0	21			
Cefotaxime	36	18.0	38			
Amoxcilline	9	4.5	61	30.5	1	0.5
Gentamycine	20	10.0	49	24.5	4	0.5
Erythromycine	11	5.5	14	7.0	2	1.0
Ciprofloxacine	21	10.5	46	23.0	1	0.5
Cotrimoxazole	33	16.5	32	16.0		
Tetracycline	11	5.5	19	9.5		
Doxycycline	38	19.0	32	16.0	1	.5
Nitrofurention	49	24.5	22	11.0		

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