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Genitourinary Infection in Preterm Delivery and its association with Neonatal Sepsis and Neonatal Shock

Gynaecology

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ABSTRACT

Aim: To study the association of Genito-urinary Infection in Preterm Delivery and its association with Neonatal Sepsis and Neonatal Morbidity
Study Design and Methodology: The hospital based Cross sectional study was conducted on Preterm Delivery patients admitted in Delivery ward in Tertiary Care Institute in Year 2016. The sample size was 80. Along with the routine investigations, High Vaginal swab was taken along with Urine examination and Urine Culture. Presence of either positive High Vaginal Swab or positive Urine Culture was considered as Genito-urinary Infection. Post-delivery, the newborn infants was examined for Sepsis and Neonatal Morbidity.
Results: Out of the 80 Preterm Delivery patients, 35 patients showed presence of Genito-urinary Infection. Post-delivery, Neonatal Sepsis and Neonatal Morbidity was common in patients with Genito-urinary Infection ($p < 0.05$). Control of Genito-urinary infections will definitely help to ensure better neonatal outcome.

KEYWORDS:

Preterm Delivery, Genito-urinary Infection, Neonatal Sepsis

Introduction

Social and economic development of a nation is often reflected by the existing infant and child mortality rates[1]. Globally, with the availability of better healthcare facilities and other reasons, the mortality rates are on decline. The Neonatal mortality remains a big concern. Neonatal mortality accounts for 41% of all global deaths among children below five years[2]. The decline in Neonatal mortality is seen in both early and post neonatal period. But, the relatively larger decline in the post-neonatal period compared to the neonatal period may be attributable to the relatively high emphasis and global support for Primary Health Care workforce development and programs such as nutrition, vaccination and health promotion, relative to hospital-related workforce and infrastructure investments that are necessary for neonatal mortality reduction, particularly in rural areas[4]. Also, the decline in neonatal mortality is slower than in the post-neonatal period, and neonatal mortality rates have increased as a proportion of under-five mortality rates.

India has made significant strides in reducing both infant mortality and under-five mortality but has been unable to achieve the Millennium Development Goal (MDG) by 2015[5,6,7,8]. India currently accounts for nearly 28% of the global deaths among newborn children[9,10]. Neonatal mortality rates are higher among rural dwellers of India, who make up at least two-thirds of India's population. In India, National Family Health Survey (NFHS) datasets show that neonatal deaths have increased as a proportion of under-five deaths from 45% in NFHS-1 (1992) to 52% in NFHS-3 (2005–06)

Despite recording a 33% decline in neonatal deaths between 2000 and 2009, about 900,000 neonates died in India in 2009[11].

The government of India has implemented programs such as the Janani Surakhsha Yojana (JSY) and "Home-based New Born Scheme" to improve maternal and child birth outcomes, their impact on reducing neonatal deaths has been limited[12,13]. The global causes of Neonatal mortality includes pre-term birth, asphyxia, sepsis, pneumonia, congenital anomalies and diarrheal diseases. In India prematurity and low birth weight, infections and birth asphyxia accounted for 78% of all neonatal deaths in 2005[9,10].

Preterm labor is defined as the onset of labor prior to 37 completed weeks of gestation i.e. 359 days from first day of last menstrual period.

Preterm delivery affects one in 10 births (11%) in USA[14] and even greater births in developing countries and causes 40-75% neonatal deaths[15]. Incidence of preterm labor is 23.3% and of preterm delivery 10-69% in India[16].

Identifying and treating the underlying cause of preterm labor would potentially decrease perinatal morbidity and mortality. Unfortunately, the etiology in most cases of preterm labor is unknown. Among the causes, Genitourinary infection is one of the commonest cause of preterm labour[17]. Compelling evidence now exists that infection is not only associated with preterm delivery but that it is a causative factor[18,19].

Mortality from infection is higher for premature infants. Early onset neonatal infection occurs within the first 5 days of life and is usually caused by organisms acquired during intrauterine or intrapartum stages. Genito-urinary tract infections are important cause of Pre-term Delivery as well as early onset of Neonatal Infection. Neonatal sepsis and shock are the common manifestations of the Neonatal Infection.

Material and Methods

This is a prospective study carried out in an institution (Tertiary care center) for Obstetrics during period from January 2015-January 2016. The study sample included all patients presenting with preterm labor and / or PROM (preterm premature rupture of membranes) who delivered a preterm baby. Complete clinical examination of the patients was done.

High vaginal swab was taken for bacterial culture and antibiotic sensitivity test to identify any ascending infection. Sample collection for High vaginal swab patient was kept in lithotomy position. Evaluation of vaginal smear vaginal smear were air dried, subjected to gram staining and evaluated under magnification (1000x). The diagnosis was done on the basis of clue cell, predominant gram negative bacilli or coccobacilli and pus cells. Urine routine examination and urine culture was done. Mid stream urine collected with all aseptic precautions in a plain sterile bulb and culture tube and sent to microbiology laboratory. Presence of positive High Vaginal Swab or positive Urine Culture was considered as Genito-urinary Infection. Post-delivery, the Newborn Infants were examined for Sepsis and Neonatal Sepsis.

Results

Table 1

Age of the Pregnant Woman		
< 20 Years	17	21.25 %
20 to 35 Years	52	65 %
> 35 Years	11	13.75 %
Weeks of Gestation		
<28	2	2.5 %
29-32	16	20 %
33-36	62	77.5 %
High Vaginal Swab (HVS)		
Positive	23	28.75 %
Negative	57	71.25 %
Urine Culture		
Positive	24	30 %
Negative	56	70 %
Genito-urinary Infection*		
Present	35	43.75 %
Absent	45	56.25 %
Neonatal Sepsis		
Present	29	36.25 %
Absent	61	76.25 %
Neonatal Shock		
Present	22	27.5 %
Absent	58	72.5 %

(*Either HVS smear positive for Bacterial Vaginosis or Urine Culture positive)

Most of the pregnant women belong to age group 20 to 35 years (65%). Almost 78% had 33 to 36 weeks of gestation prior to the Preterm labour. High Vaginal Swab (HVS) was positive in 23 out of 80 women (28.75%), whereas Urine Culture was positive in 24 out of 80 women (30%). Genito-urinary Infection is seen in 35 pregnant women (43.75%). The neonatal outcome as Neonatal Sepsis was seen in 29 Preterm Infants. Neonatal Shock is seen in 22 out of 80 Infants (27.5%).

Table 2

Association of Genito-urinary Infection and Neonatal Sepsis in Preterm Infants

Genito-urinary Infection	Neonatal Sepsis		Total
	Present	Absent	
Present	19	16	35
Absent	10	35	45
Total	29	51	80

Out of 80 pregnant women, 35 had Genito-urinary Infection (either HVS smear positive for Bacterial Vaginosis or Urine Culture positive). Total 19 neonates born to those women developed Neonatal Sepsis. The association between maternal Genito-urinary Infection and Neonatal Sepsis in Preterm Infants was found to be statistically significant. (p value = 0.003, OR = 4.156)

Table 3

Association of Genito-urinary Infection and Neonatal Shock in Preterm Infants

Genito-urinary Infection	Neonatal Shock		Total
	Present	Absent	
Present	18	17	35
Absent	40	5	45
Total	58	22	80

Out of 80 pregnant women, 35 had Genito-urinary Infection (either HVS smear positive for Bacterial Vaginosis or Urine Culture positive). Total 18 neonates born to those women developed Neonatal Shock. The association between maternal Genito-urinary Infection and Neonatal Shock in Preterm Infants was found to be statistically significant. (p value = 0.000, OR = 7.556)

Discussion

Preterm births are associated with higher morbidity and mortality. Preterm birth is the most important single determinant of adverse infant outcome in terms of both survival and quality of life[20]. The incidence of Preterm deliveries are increasing in all countries. The reasons include better obstetrical interventions, better utilization services, etc. In USA, percentage of infants delivering before 37 weeks is continuously rising from 11% in 1998 to 12.3% in 2003[21]. Similar trends are seen in UK also[22]. Preterm birth rates have been reported to range from 5% to 7% of live births in some developed countries, but are estimated to be substantially higher in developing countries[3]. Amongst the developing countries, India has a high incidence of preterm labor; reported incidence varies from 10 to 21%[15,16,23].

Genito-urinary Infections are a major cause of Preterm labour[23,24]. Many authors highlighted the role of E. coli and other microorganisms causing Genito-urinary infections, leading to early onset of labour[25,26,27,28]. Several studies[29] have indicated that Neonatal sepsis remains one of the leading causes of morbidity and mortality among preterm infants. Although advances in neonatal care have improved survival and reduced complications in preterm infants, sepsis still contributes significantly to mortality and morbidity[30,31]. The present study also highlights the association of Genito-urinary infections and Neonatal Outcomes as Sepsis and Shock.

Conclusions

Preterm births are associated with adverse neonatal outcome like Neonatal Sepsis and Shock. Morbidity and mortality is also very high. The risk factors like maternal Genito-urinary infection should be treated and pregnant women should be counselled about genital hygiene. Family planning, genital hygiene, treatment of sexually transmitted diseases, control of Genito-urinary infections will definitely help to ensure better neonatal outcome.

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