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Premature Rupture of Membrane Its Factors and Maternal Outcome

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Abstract
Background and objectives:
PROM is the rupture of membranes before the onset of labour. When it occurs at or beyond 37wks is term PROM and when membrane ruptures before 37wks it is known as preterm PROM (PPROM). PROM occurs in approx 10% of all pregnancies with majority of cases occurring after 37wks. Thus PROM is an important obstetrical event and is a challenge to the obstetrician to end this untoward event into an acceptable outcome for both mother and the foetus. The present study was carried out to find the various effect of PROM on mother and also to know the rupture and onset of labour interval, induction delivery interval and management protocol. Aim is to minimize various ill effects on mother with best management protocol.
Methods:
This is an analytical study done at Darbhanga Medical College and Hospital, Laheriasarai, Bihar during the period of 10.01.2012 to 10.01.2013. Inclusion criteria - gestational period 28-40wks, singleton live foetus, primigravida or multigravida. Total 184 cases of PROM including 63 cases of PPROM presented during my study. Among them 11 patients including 2PPROM cases were excluded on basis of exclusion criteria. 5 patients including 1PPROM could not complete the study. Finally A total of 168 cases of PROM including 60 cases of PPROM were enrolled for study.
Results:
Study shows that term PROM is more common than PPROM. PROM is associated with various factors like parity, socio economic status, presentation of the foetus. Its cause is most commonly infection either lower genital tract infection or UTI. Pregnancy outcome in cases of PROM depends on the gestational age, parity, and ripeness of cervix. And the mode of delivery is mostly vaginal delivery either spontaneous or induced. Study highlights the major complication of PROM and their incidence in relation to the mode of delivery.
Conclusion:
PROM is associated with various factors and its management is diverse and controversial so the obstetrician needs to make a good clinical assessment and to take up the right treatment at the right time in order to have both healthy mother and healthy baby.
Keywords: *PROM, chorioamnionitis, placental abruption, puerperal sepsis*

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I. Introduction

Premature rupture of membrane (PROM) is the rupture of membranes before the onset of labour. PROM at term is the rupture of foetal membranes prior to the onset of labour at or beyond 37wks of pregnancy. When membrane rupture before 37wks it is known as preterm PROM (PPROM). PROM occurs in approx 10% of all pregnancies with majority of cases occurring after 37wks. The exact cause of PROM is not known but various factors have been attributed as its etiological factors. There is evidence that reproductive tract infection and associated inflammatory changes are responsible for many instances of PROM. Other factors includes nutritional deficiency of ascorbic acid, copper, zinc and iron. PROM is also associated with smoking and cocaine abuse. PROM is also associated with genetic factors. PROM is also associated with pregnancy related complication like multiple pregnancy, polyhydroamnios and marginal cord insertion. PROM is associated with significant maternal, foetal and neonatal risks. Maternal complication of PROM includes chorioamnionitis, post partum infectious morbidity, placental abruption in 4% to 5% with PROM. Foetal and neonatal complication includes prematurity and infection. Hazards of prematurity includes respiratory distress syndrome, necrotizing enterocolitis, interventricular haemorrhage, sepsis and foetal death. Oligohydroamnios resulting from preterm prolonged PROM may cause oligohydroamnios tetrad. Thus PROM is an important obstetrical event and is a

challenge to the obstetrician to end this untoward event into an acceptable outcome for both mother and the foetus. The present study was carried out to find the various effect of PROM on mother and also to know the rupture and onset of labour interval, induction delivery interval and management protocol. Aim is to minimize various ill effects on mother with best management protocol.

II. Materials And Methods

This is an analytical study done at Darbhanga Medical College and Hospital, Laheriasarai, Bihar during the period of 10.01.2012 to 10.01.2013. Study population composed of pregnant mothers of 28wks to 40wks of gestation who were admitted with PROM. **Inclusion criteria** - gestational period 28-40wks, singleton live fetus, primigravida or multigravida. **Exclusion criteria** - pregnancies with PROM but having following characteristic were excluded from the study- multiple pregnancy, polyhydroamnios, congenital malformations ,antepartum haemorrhage, gestational and pre gestational diabetes and heart disease in pregnancy. Total 184 cases of PROM including 63 cases of PPROM presented during my study. Among them 11 patients including 2PPROM cases were excluded on basis of exclusion criteria. 5 patients including 1PPROM could not complete the study. Finally a total of 168 cases of PROM including 60 cases of PPROM were enrolled for study. Statistical analysis- data collected was analyzed methodically by standard statistical method.

III. Observations

- ***Incidence of PROM and PPROM in study population*** - total numbers of pregnancy observed during the study period were 1578. Incidence of PROM is 11.66% and incidence of PPROM is 3.99%.
- ***Distribution of PROM cases in study population in relation to gestational period (fig. 1)*** **-** it was found that incidence of term PROM is 64.28% and that of PPROM is 35.72%.
- ***Relation of PROM with parity in study population (fig. 2)*** - majority of cases were distributed between primigravida and grand multipara.
- ***Distribution of PROM in study population with respect to maternal age* (*fig. 3)*** - it is evident from the table that highest number of PROM occurs in age group of 20-25years.
- ***Distribution of patients on basis of socio economic status (fig. 4)*** - incidence was found highest in low socio economic status 62.5%.
- ***Incidence of PROM in relation to presentation (fig. 5)*** **-** incidence is higher with breech and transverse lie.
- ***Latent period observed in term PROM and PPROM* (*fig. 6*)**-Among 108 term PROM 11 cases underwent elective caesarean section due to various reasons and among 60 PPROM cases 8 underwent elective caesarean section.
- ***Latent period in relation to parity* (*fig. 7)*** - table shows that 2^{nd} , 3^{rd}, 4^{th} gravida went into labour within 12 hrs whereas grand multipara took more than 24hrs.
- ***Latent period in relation to ripeness of cervix (fig. 8)*** **-** shows that ripened cervix assisted in onset of labour.
- ***Incidence of pregnancy outcome in term PROM (fig. 9)*** **-** in term PROM spontaneous onset of labour occurs in 79.63%.
- ***Outcome of induction of labour with oxytocin in term PROM*** - 54.54% shows normal vaginal delivery after induction with oxytocin, 36.36% had emergency caesarean section and 9.09% and instrumental delivery.
- ***Incidence of pregnancy outcome in PPROM (fig. 9)*** **-** 46.67% had induced vaginal delivery and 30% spontaneous vaginal delivery.
- ***Incidence of chorioamnionitis (fig. 10)*** **-** risk of chorioamnionitis is higher in PPROM (26.67%) than in term PROM (6.48%).
- ***Incidence of placental abruption (fig.10)*** **-** this is also slightly higher in PPROM.
- ***Incidence of PPH (fig. 10)*** - is also higher in cases of PPROM (13.33%) and in term PROM is 10.18%.
- ***Incidence of puerperal sepsis in respect to mode of delivery*** **-** incidence was found higher with caesarean delivery (31.03%) than in vaginal delivery (11.90%).
- ***Maternal morbidity in relation to latent period*****.-**it is observed that that longer the latent period higher is the maternal morbidity. It approaches to 14.29% if latent period is higher than 48hrs.

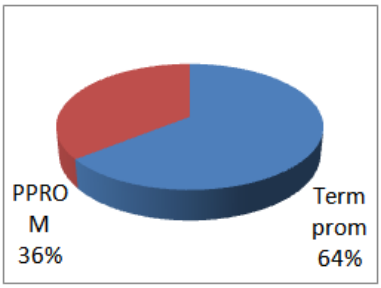
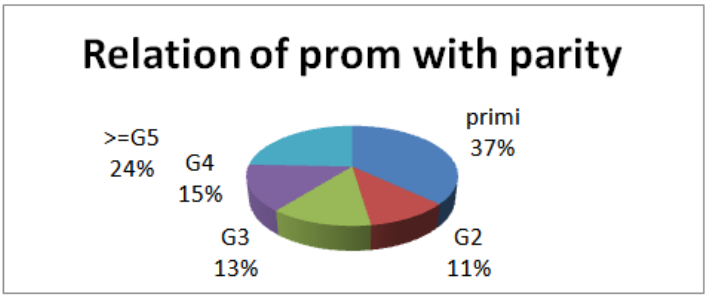


Fig 1



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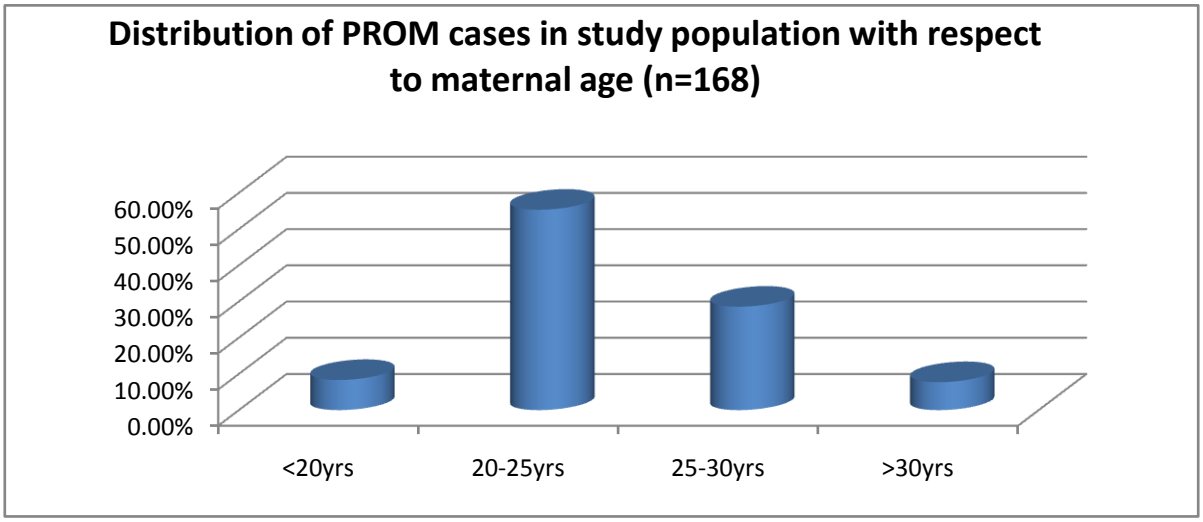

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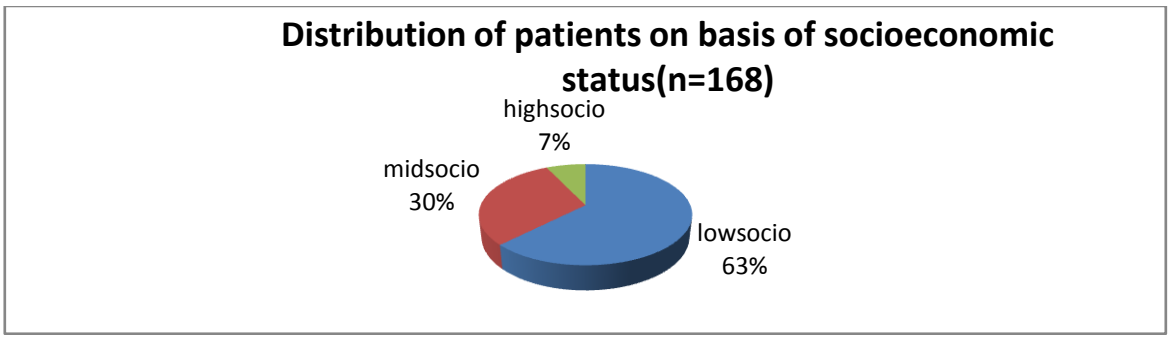

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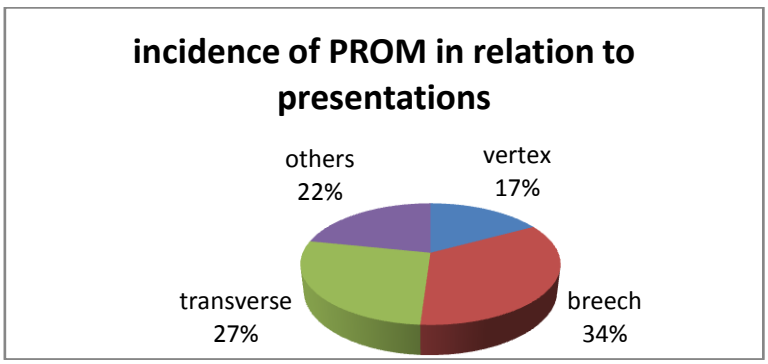

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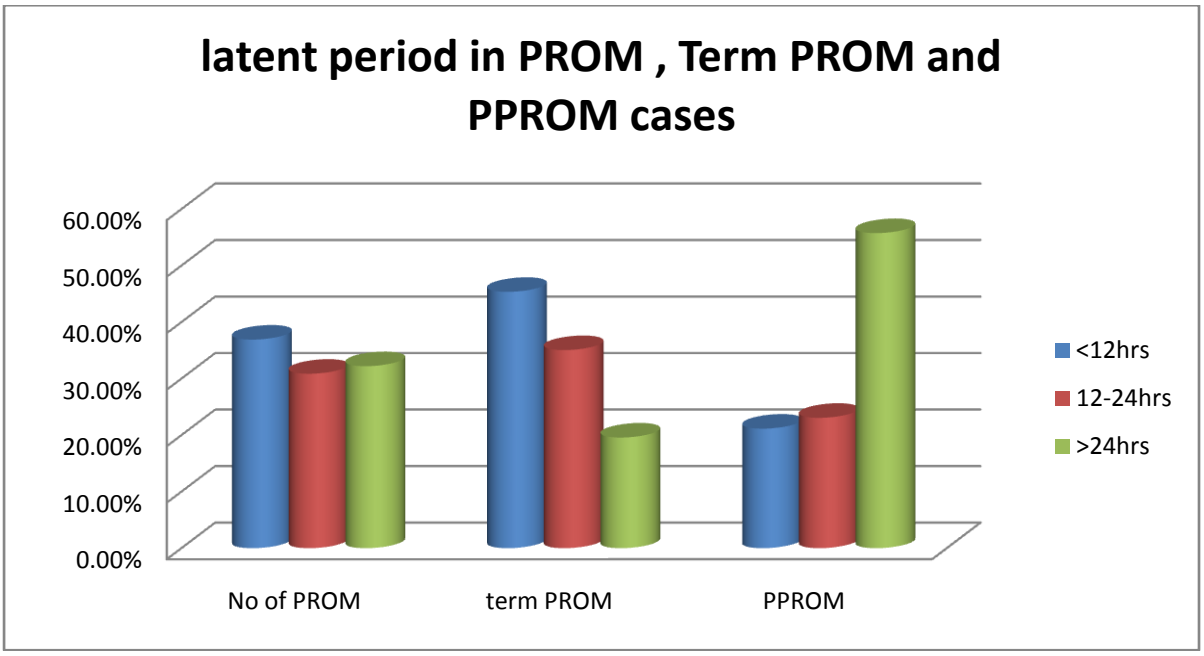

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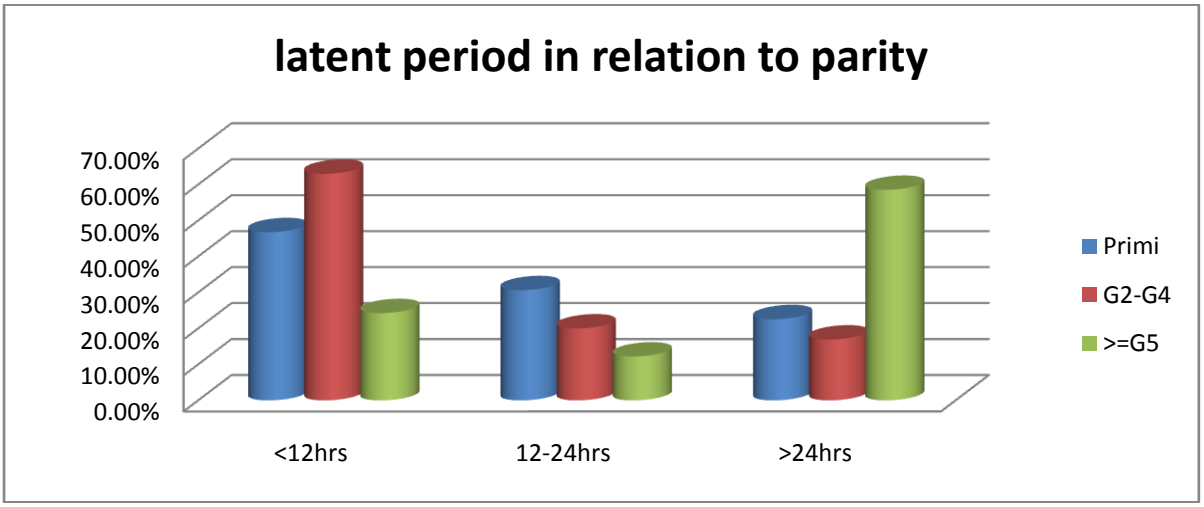

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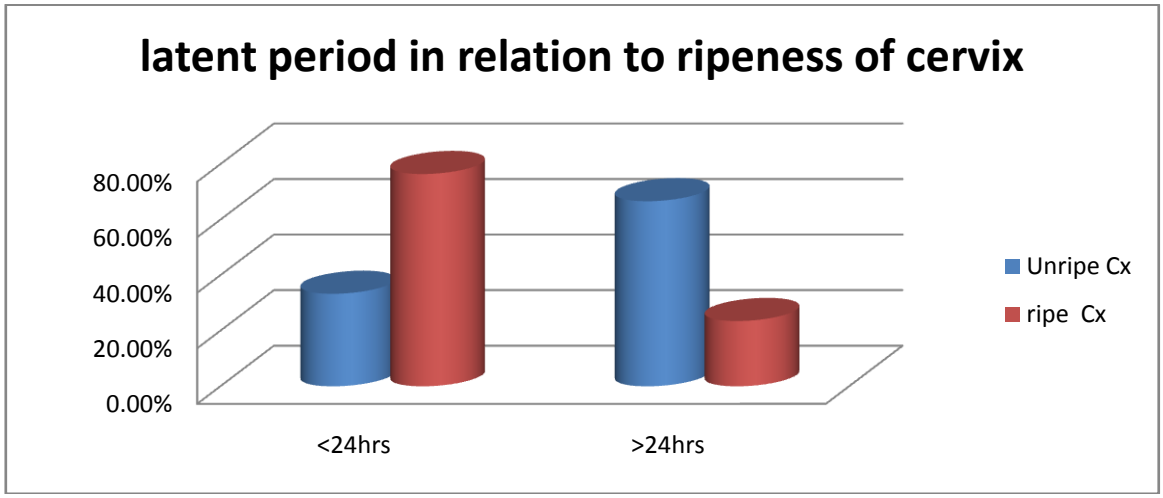

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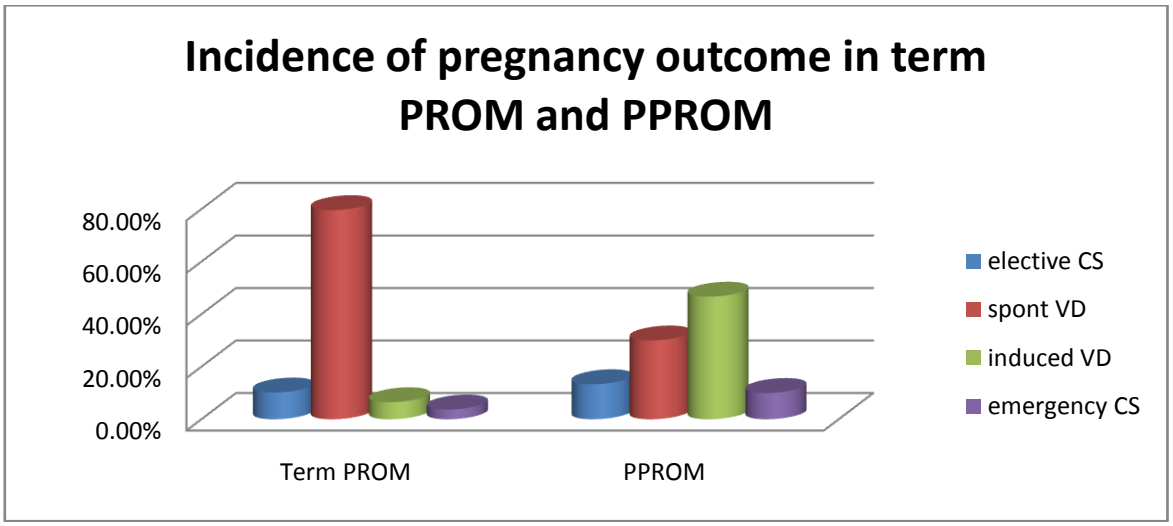

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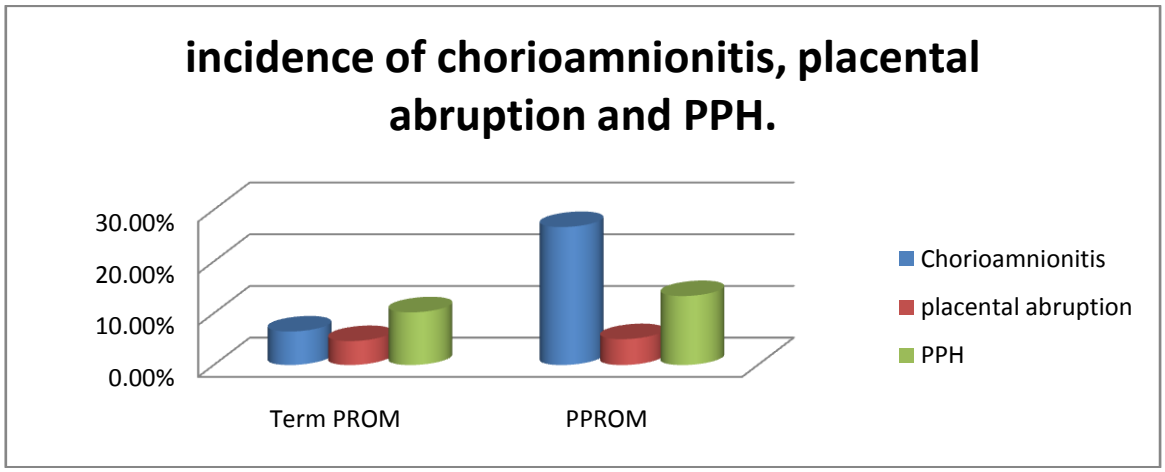

Fig 10

IV. Discussion

Study shows that incidence of overall PROM is 11.66% and that of PPROM is 3.99%. This closely simulates the study of Arias F(2004) et al [1] according to which incidence of PROM varies from 2.7% to 17% of all pregnancy. According to Penny C (2005) et al [2] incidence of PPROM is 2%. Modena AB (2004) et al [3] reported that PROM complicates 10% of all pregnancies and 2%-4% of preterm pregnancy. My study shows that most of the cases of PROM occurs after 37wks of gestation (64.28%). Study shows that incidence of PROM is highest in nulliparous and in grand multipara. There is increase in incidence of PROM with parity. Also there is increase in incidence of PPROM with parity. According to Lee T (2003) [4] et al the risk of recurrence of PROM in subsequent pregnancy is 16%-17%. Some studies have shown even higher recurrence rate (20%-30%). Highest number of PROM occurs at the age group of 20-25yrs i.e 55.35% because it is at this stage maximum numbers of pregnancy occurs followed by 28.57% of PROM occurring at the age of 25-30yrs. It is evident that incidence of PROM as well as that of PPROM is higher in low socio economic status. Women of low socio economic status usually associated with nutritional deficiency and anaemia which increases the risk. Women with BMI<19kg/m2 are associated with high risk of PROM. Naeye and Agarwal (1978) and Ferguson S.E, Smith GN (2002) also stated increased risk of PROM in low socio economic status. Most common cause of PROM is infection[6,14.16,17]. Infection accounts for 33.93% cases of PROM. Infection includes both lower genital tract infection and urinary tract infection. Anaemia is the second most common cause of PROM. The chorioamniotic membranes are connective tissue structure and their tensile strength is determined by their fibrous connective tissue. Ascending microbial invasion of the uterine cavity may weaken the fibrous connective tissue by a direct effect of the bacterial products or indirectly by inducing acute inflammation of the deciduous and chorioamniotic membranes. PROM is also associated with the presentation of the fetus. Study shows that PROM is associated maximum with breech presentation (20.83%) that too

maximum with footling presentation, followed by transverse lie ((16.67%) and is least associated with vertex presentation (10.44%). In vertex presentation it is most common with occipito posterior position.

For management of patients with PROM latent period of labour was observed in case of both term and preterm PROM. Latent phase was diagnosed according to WHO latest partographic evaluation according to which latent phase was considered till cervical dilatation remained <4cm. Study shows that maximum numbers of PPROM cases had latent phase of more than 24hrs while that in case of term PROM maximum cases went into active phase of labour in less than 12hrs. Thus this shows that there is an inverse relation between the gestational age and the latent phase. This is in accordance with the study of Hannah ME(1996)et al and Savitz DA(1997) et al. Sedak et al (2000) stated that younger the fetus by gestational age longer one has to wait after rupture of membranes for delivery unless induction of labour or caesarean section is done.

Latent period for onset of labour also depends on the parity. Study shows that in primigravida (77.41%) have latent period of less than 24hrs. Most of the 2^{nd} , 3^{rd} and 4^{th} gravid patients with PROM at term have latent phase of less than 24hrs whereas in grand multipara maximum (58.54%) will have latent period of more than 24hrs. Cervical ripening also have important relation with the latent phase. PROM with ripened cervix have latent phase of <24hrs. Grant JM and Serley(1992) and Hannah and ohlsson (1996) stated that bishop score>6 decreases the latent phase.

At term PROM my study shows that maximum numbers (79.63%) of cases had spontaneous vaginal delivery and only 6.48% needed induction of labour and only 3.70% had caesarean after induction and most common indication was failure of induction. This is in accordance with study of M.D.Raut and H.Dora (1987) and Kappy et al(1979) found that 80% of patient of term PROM go into spontaneous labour within 24hrs. However randomized controlled trials have concluded that planned early birth (through oxytocin administration) leads to reduced maternal infections, reduced neonatal intensive and special care admissions and greater maternal satisfaction. Mode of delivery is not compromised by choosing planned early birth or expectant management [9,12,13,15]. In this present study patient was kept under observation for 24hrs in expectancy of spontaneous onset of labour, and in failure of this labour was induced mainly by oxytocin. My study shows that among patients who were induced with oxytocin most of them had vaginal delivery either normal (54.54%) or instrumental delivery (9.09%). According to clinical practise guidelines no.13, July 2010, Association of Ontario midwives offer clients with PROM >37wks the option of induction or expectant management. In cases of PPROM there is higher incidence of induced labour compared to spontaneous vaginal delivery. Chorioamnionitis is the most common maternal complication of PROM[6,10,16]. My study shows the overall incidence of chorioamnionitis in PROM is 13.69%. Arias F (2004) also stated that overall risk of chorioamnionitis in PROM is approximately 20% and incidence is less than 10% in PROM after 36wks. According to John M(2006)et al incidence in PPROM may be as high as 33%. In my study risk of chorioamnionitis in term PROM is 6.48% and in PPROM is 26.67%. This incidence is slightly lower than previous study may be due to higher antibiotic coverage. Study shows that higher number of vaginal examination is the strong predictor of chorioamnionitis. Women with PROM having more than 8 vaginal examinations are at increased risk of chorioamnionitis. Other factors that increase the risk of chorioamnionitis are liquor stained with meconium, nulliparity, duration of active labour >12hrs and latent phase of 24hrs to 48hrs. Since PPROM has longer latent period so the risk is higher. Other complication of PROM is placental abruption [11] and overall risk is 4.76% which is in accordance with the study of Vintzileos AM (1987) who reported the incidence 4%-7%. PPH is another common complication of PROM which is found to be 11.3% in my study. The incidence is high mainly due to increased association of placental abnormalities, retained placenta, prolonged labour , chorioamnionitis and post partum endometritis. There is also risk of puerperal sepsis in PROM and incidence in my study is 11.90%. The risk is higher with caesarean section (31.03%) than compared to vaginal delivery(7.38%). Puerperal sepsis was diagnosed by raised maternal temperature, foul smelling vaginal discharge, excessive lochia, tender uterus and sub involution . Study shows that risk increases with following factors-chorioamnionitis, caesarean delivery, duration of latent phase and active labour. Arias F (2004) stated only 5.1% cases of puerperal sepsis in vaginal delivery and risk increases by five times in case of vaginal delivery. According to Breese(1961) maternal morbidity was calculated to be 1.3% when latent period was <24hrs and 4.8% when latent period is >24hrs this is in conformity with my study. Use of prophylactic antibiotic has greatly reduced the rate of maternal morbidity in cases of PROM.

V. Conclusion

PROM is a major challenge to the obstetrician. It complicates approx 11% of all pregnancies. Term PROM is more common than Preterm PROM. PROM is associated with multiple risk factors. Primigravida and grand miltipara have high risk of PROM. PROM is found to be associated with low socio economic status, with maternal age 20-25yrs and is more common in breech and transverse presentation. Most common cause of PROM is infection both lower genital tract infection and urinary tract infection followed by anaemia.

Management of PROM are often diverse and controversial. Duration of latent phase for PROM is inversely related to the gestational age of pregnancy. Most patients of term PROM goes into spontaneous labour and only few needs induction of labour or operative intervention. Chorioamnionitis is the most common complication and is inversely related to the gestational age. Other complications are placental abruption, PPH and puerperal sepsis and is more common with PPROM and with caesarean delivery.

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Disclosure
Authors declare no conflict of interest.

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