

# GROUP –B STREPTOCOCCAL GENITAL INFECTION AND PREMATURE RUPTURE OF MEMBRANES

By

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## ABSTRACT

**Background:** Premature rupture of membranes (PROM) is an obstetric condition that involves spontaneous amniotic fluid leakage at least one hour before onset of labor complicates 5-10% of all deliveries. Its etiology is multi-factorial as polyhydramnios, cervical incompetence, congenital uterine abnormality, trauma and previous cervical biopsy.

**Objective:** To assess the effect of vaginal colonization with group B streptococcal infection on the incidence of premature rupture of membranes and how to prevent its complications in pregnant women.

**Patients and methods:** This was a prospective study included the period between December 2018 till May 2020 and was conducted on one hundred and forty (140) pregnant women suffered from vaginal infection with group B streptococcal infection selected from the antenatal Care Clinic of the Obstetrics and Gynecology Department of Al-Azhar University Hospitals and Sedi Salem General Hospital. Pregnant women with single viable fetus, gestational age after 28 weeks, and those with no past history of premature rupture of membranes were included in this study. Those with polyhydramnios, UTI, dead fetus, Diabetes mellitus, congenital fetal malformation, multiple pregnancies and with fibroid disease were excluded from this study.

**Results:** The presence of vaginal infection increase the incidence of premature rupture of membranes, especially if those infections were due to streptococci group B, premature rupture of membranes increased.

**Conclusion:** The presence of vaginal infections increased the incidence of PROM more.

**Keywords:** Group B streptococcal infection, PROM, Pregnant women.

## INTRODUCTION

The etiology of previable PPROM is multi-factorial. It is hypothesized that a weakness in the chorio-amniotic membrane occurs as a result of either membrane stretch or degradation of the extra-cellular matrix (Mohan *et al.*, 2018).

The etiology of PROM is diverse. It includes polyhydramnios, cervical incompetence, uterine abnormality, trauma and previous cervical conization or cone biopsy. Other factors that have been implicated include past obstetric history of PROM, black race, smoking of cigarettes, poor nutrition and genital infections.

Genital infections are implicated in morbidities among women of reproductive age group especially during the pregnancy period. Inflammatory cells produced by genital infections are implicated in weakening of the fetal membranes among pregnant women thus causing premature rupture of membranes (PROM). Genital infections have been found to be associated with PROM. Women with bacterial vaginosis (BV) were more likely to develop PROM compared with women without BV (*Nakubulwa et al., 2015*). The evidence that Group B streptococci (GBS) may be a cause of PROM was supported by the fact that GBS causes inflammatory responses in fetal membranes in experimental and epidemiological studies (*Peltier et al., 2012*).

Numerous risk factors for GBS vaginal colonization have been identified both biological and socioeconomic in nature. Biological factors include a history of PROM (*Alp et al., 2016*), gastrointestinal GBS colonization (*LeDoare and Heath, 2013*), and increased maternal age (*Patras and Nizet, 2018*).

Intrapartum antibiotic prophylaxis (IAP) is recommended for women with preterm pre-labor rupture of membranes, but not for women in preterm labor with intact amniotic membranes, nor for women with pre-labor rupture of membranes at term or near term (36 weeks gestation and above). The latter is based on evidence from studies including women with membrane rupture duration under 12 h, and there may be a benefit from IAP in women with prolonged rupture of membranes (>18 h) (*Kobayashi et al., 2016*).

The aim of the study was to assess the effect of vaginal colonization with group B streptococcal infection on the incidence of premature rupture of membranes and how to prevent its complications in pregnant women.

## PATIENTS AND METHODS

This was a prospective study included the period between December 2018 till May 2020 and was conducted on one hundred and forty (140) pregnant women with Premature Rupture of Membranes selected from the antenatal Clinic of the Obstetrics and Gynecology Department of Al-Azhar Main University Hospital and Sedi Salem General Hospital.

### Inclusion criteria:

- Single viable fetus.
- Gestational age after 28 weeks.
- Premature rupture of membranes.

### Exclusion criteria:

- Pregnancies with polyhydramnios.
- Pregnancies with UTI.
- Dead fetus.
- Diabetes mellitus.
- Congenital fetal malformation.
- Multiple pregnancies.
- Pregnancies with fibroid disease.

All patients were subjected to Complete medical history taking, clinical examinations and laboratory investigations (complete blood picture, urine analysis "for pus cells", cytological examination for vaginal discharge and culture of the vaginal discharge for detection of streptococcal infection and its type).

**Follow-up:** All patients positive for group B streptococcal infection were followed for reaching the end time of delivery.

**Statistical analysis:**

Analysis of data was done using Statistical Program for Social Sciences version 22 (SPSS Inc., Chicago, IL,

USA). Quantitative variables were described in the form of mean and standard deviation. Qualitative variables were described as number and percent. Qualitative variables were compared using Chi-square (X<sup>2</sup>) test or Fisher’s exact test when frequencies were below five. P value < 0.05 is considered significant.

**RESULTS**

The age of cases ranged between 22-35 years with a mean age of 29.19±3.4 years. The gestational age of the studied women

ranged between 35-40 week with a mean gestational age of 37.4±1.7 weeks (**Table 1**).

**Table (1): Demographic data of cases of the study**

Variable	Range	Mean±S.D
Age (years)	22-35	29.19±3.4
Gestational Age (weeks)	35-40	37.4±1.7

One hundred and five cases of the study (105/140, 75%) had fever during presentation while 35 cases (35/140, 25%) didn't have fever, all cases of the study

had lower abdominal pain (140/140, 100%), while 115 cases (115/140, 82.1%) had vaginal discharge and 25 (25/140, 17.9%) (**Table 2**).

**Table (2): Clinical data of cases of the study**

Variables \ Data	Yes		No		P value
	No	%	No	%	
Fever	105	75%	35	25%	0.01*
Lower abdominal pain	140	100%	0	0.0%	0.001*
Vaginal discharge	115	82.1	25	17.9	0.01*

During laboratory examination of cases all cases of the study had leukocytosis (140/140, 100%), also all cases of the study when subjected to urine analysis found pus cells of different rages

(140/140, 100%), while 115 cases (115/140, 82.1%) had positive vaginal smear for organisms and 25 (25/140, 17.9%) of the vaginal smear didn't had organism in the vaginal smear (**Table 3**).

**Table (3): Laboratory data of cases of the study**

Variables \ Data	Yes		No		P value
	No	%	No	%	
Leukocytosis	140	100%	0	0.0%	0.001*
Urine analysis for pus cells	140	100%	0	0.0%	0.001*
Vaginal smear	115	82.1	25	17.9	0.01*

After culturing and incubation of the positive cases of vaginal smear (115/140, 82.1%) we found 30 cases (30/115, 26.1%) had mixed organism in the culture, 65 cases (65/115, 56.5%) had

streptococcus group B bacteria, 17 cases (17/115, 14.8%) had fungus in the culture while only three cases (3/115, 2.6%) had staphylococci in the culture (**Table 4**).

**Table (4): Organisms in the culture and incubation of the vaginal smear of cases of the study**

Positive smear cases (n = 115)	No	%	P-value
Mixed	30	26.1%	0.033*
Streptococcus group B	65	56.5%	0.021*
Fungus	17	14.8%	0.222
Staphilococcus	3	2.6%	0.738

Twenty cases of our studied cases developed premature rupture of membranes (20/140, 14.3%) while the remaining ends their pregnancy with intact membranes (120/140, 85.7%). Eighteen of cases of premature rupture of membranes had streptococcal group B

infection (18/65, 27.7%) while only two cases of PMRM belonged to other infection (2/55, 3.6%) and the statistical analysis revealed that the presence of streptococcal vaginal infection predispose to PMRP (P = 0.008) (**Table 5**).

**Table (5): PMRM in cases of the study and its relation to type of infection in cases of the study**

Positive smear cases (n = 115) Type of infection	Yes		No		P-value
	No	%	No	%	
PMRM	20	14.3%	120	85.7%	0.033*
PMRM with SCGB	18	27.7%	47	72.3%	0.222
PMRM with other infection	2	3.6%	53	96.4%	0.316
	0.008		0.748		

## DISCUSSION

Premature rupture of membranes presents a serious problem because of their difficult prediction and the mechanisms involved are still unknown. RPM before the term is associated with approximately 50% of histological chorioamnionitis. Chorioamnionitis have found to be frequency associated with RPM between 15-100% of the cases of postpartum and postoperative infection (*Illia et al., 2018* and *Li et al., 2019*).

Premature rupture of membranes presented in 30-40% of preterm births, and is the most common cause of deliveries occurring between 20 weeks and 37 weeks of gestation. In addition, prematurity and low birth weight is leading causes of neonatal death (31%) in the world. Determining the most efficacious method to manage PROM in order to minimize its adverse impact on newborns is necessary and paramount to a positive outcome. Infection can be

associated with PROM as either a cause or a consequence (*Zeng et al., 2014*).

Preterm premature rupture of membranes is associated with maternal and fetal pathologies, contributing to the birth of premature infants.<sup>3</sup> The longer the time elapsed between rupture and delivery, the greater the chance of infection for both mother and fetus.<sup>4</sup> The most common cause of PPROM is spontaneous, which has a multifactorial etiology. It may be related to a structural defect in the membranes due to collagen deficiency or malformation, to the weakening of the membranes due to enzymatic destruction in inflammatory or infectious processes, and to sac exposure due to isthmus-cervix incompetence (*Hackenhaar et al., 2014*).

This was a prospective study that conducted on pregnant women suffering from vaginal infection with group B streptococcal infection selected from the Obstetrics and Gynecology Department of Al-Azhar Main University Hospital and Sedi Salem General Hospital.

Our results revealed that the mean age of women 29.19±3.4 years and the gestational age mean was 37.4±1.7 weeks.

*Lee and his colleagues (2018)* found that the age of pregnant women with GBS positive cultures was 32.6±4.6 years which were in agreement with our results (*Lee et al., 2018*).

Khan and his colleagues, reported in their study that GBS colonization occurred in pregnant women >40 years of age because ethnicity, obesity, low vitamin D intake, hygiene, sexual activity, health care occupation, and illiteracy have

also been associated with GBS vaginal carriage (*Khan et al., 2015*).

The presence of fever, vaginal pain and discharge were the common presenting symptoms.

*Hull and McLellan (2016)* reported found that vaginal discharge and painful vagina were the common presenting symptoms which run in line with our results.

The presence of leukocytosis in CBC, pus cells in urine and the organism in vaginal smear are the common evidence.

*Lee and his Colleagues (2018)* found that leukocytosis is a mandatory finding in cases of pregnant women with PROM with GBS positive cultures.

Streptococci were the common organism in our series, followed by mixed infection, fungi and the least was staphylococci.

*Zeng and Coworkers (2014)* found in their studies that Streptococcus infection was the common form of vaginal infection. *Wu (2011)* and *Yang with his Colleagues (2012)* found that mixed infection was the common form and the least common organism was staphylococci.

Our study revealed that the presence of vaginal infections increases the incidence of PROM and the most common organism causes PROM was the streptococci group B.

*Jassir and his Colleagues (2017)* found that GBS reported in 48.4% of cases of their study which run in lines with our results.

## CONCLUSION

The presence of vaginal infections in general increases the incidence of premature rupture of membranes especially with group B streptococci which increases the incidence of PROM more.

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علاقة الإلتهابات التناسلية المنتمية للميكروب السبى  
المجموعة (ب) والإنفجار المبكر للأغشية الجنينية  
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**خلفية البحث:** يؤدى الانفجار المبكر للأغشية الجنينية إلى التسريب التلقائى للسائل الأمنيوسى قبل بداية الولادة بمايقرب من الساعة وهو يكون 5-10% من كل المضاعفات الخاصة بالولادات. ولهذا الانفجار المبكر للأغشية العديد من الأسباب منها زيادة السائل الأمنيوسى حول الجنين، وعدم كفاءة عنق الرحم، والعيوب الخلقية للرحم، الإصابات وعينات عنق الرحم السابقة. ولأن الإلتهابات التناسلية متورطة فى العديد من الحالات المرضية التى تصيب النساء فى السن الإنجابية فقد وجد أنها تصاحب الانفجار المبكر للأغشية الجنينية.

**الهدف من البحث:** تقييم تأثير وجود إلهابات بالميكروب العقدى المجموعة ب بمهبل السيدات الحوامل على معدل إنفجار الأغشية الجنينية وكيفية منع حدوث مضاعفاتها على الحوامل.

**المريضات وطرق البحث:** إشملت هذه الدراسة على مائة وأربعين من السيدات الحوامل واللائى يعانين من إلهاب بالميكروب العقدى المجموعة ب. وقد تم إختيارهم من عيادة متابعة الحمل الخاصة بقسم النساء والتوليد بمستشفيات جامعة الأزهر ومستشفى سيدى سالم المركزى بوزارة الصحة. وقد شملت الدراسة السيدات ذوات الحمل الوحيد، العمر الجنينى أكثر من 28 أسبوع، عدم وجود تاريخ مسبق يؤكد حدوث إنفجار للأغشية الجنينية بينما إستبعدت الحوامل اللائى يعانين من زيادة فى كمية السائل الأمنيوسى، إلهابات مجرى البول، وفاة جنينية، مرض السكرى، العيوب الخلقية الجنينية، الحمل المتعدد والأورام الليفية للرحم.



**GROUP –B STREPTOCOCCAL GENITAL INFECTION AND...**

**نتائج البحث:** وجود التهابات مهبلية تزيد من معدل حدوث الانفجار المبكر للأغشية الجنينية عموماً بينما وجود التهابات ناتجة عن الميكروب العقدي المجموعة ب تزيد أكثر من حدوث مثل هذه الانفجارات للأغشية الجنينية.

**الاستنتاج:** وجود الإلتهابات المهبلية بالميكروب العقدي المجموعة ب يزيد من حدوث الانفجار المبكر للأغشية الجنينية. العلاج المبكر للإلتهابات يمنع الانفجار المبكر للأغشية الجنينية مع منع حدوث مضاعفاتها.

**الكلمات الدالة:** الالتهابات التناسلية - الميكروب السبحي المجموعة ب - الانفجار للأغشية الجنينية .