

## Sexually Transmitted Diseases Do Not Discriminate; First Trimester Vaginal Bleeding is not Always a Threatened Abortion

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### Abstract

**Objective:** To determine the prevalence of sexually transmitted diseases during the first trimester of pregnancy in women who presented to the emergency department with complaint of vaginal bleeding. *Secondary measure:* To determine the prevalence of gonorrhea, Chlamydia, bacterial vaginosis and trichomonas in women who presented to the emergency department with any gynecological complaints during their first trimester of pregnancy.

**Methods:** Prospective study of consecutive women who presented to the ED at an urban tertiary referring hospital, level II trauma center. Study subjects included all women who presented during an eight month period, that were 16 years of age or older, first trimester of pregnancy with gynecologic complaints. Cognitively impaired and incarcerated women were excluded. PCR for gonorrhea and Chlamydia and wet mounts for bacterial vaginosis and trichomonas were obtained on all subjects during the pelvic exam.

**Results:** Study population of 122 subjects. The prevalence for a STD in our study population was 52.4% (64/122); 10/122 (8.2%) for gonorrhea, 36/122 (29.5%) for Chlamydia, and 18/122 (14.8%) for bacterial vaginosis or trichomonas. The prevalence of gonorrhea or Chlamydia in a subset of women with vaginal bleeding was 65.7%. Women who had vaginal bleeding had an OR of 7.05 for having a concomitant infection with chlamydia or Gonorrhea.

**Conclusion:** To our knowledge, our study is the first to demonstrate the prevalence and the clinical relevance of STD during the first trimester of pregnancy in women presenting with vaginal, in the ED.

### Introduction

Sexually transmitted diseases (STD) may cause serious consequences to pregnant women and their babies. STD can lead to maternal cancer, pelvic inflammatory disease and infertility; pregnancy risks include preterm labor, premature rupture of membranes and uterine infections. STD can be transmitted to the baby in-utero and during delivery. Fetal infectivity may cause low birth weight, conjunctivitis, blindness, pneumonia, sepsis, neurologic damage, fetal demise or stillbirth [1]. Emergency physicians (EP) are in a unique position to prevent many of these consequences by providing early diagnosis and treatment of STD in pregnant women. By convention, the majority of EP does not routinely test for STD during early pregnancy, especially with the presence of vaginal bleeding. In their 2010 STD guidelines, the CDC recommends all pregnant women be screened for Chlamydia, HIV, syphilis, and hepatitis B during their first prenatal visit. Screening for hepatitis C, gonorrhea, bacterial vaginosis, and trichomonas should be performed in the first trimester in symptomatic pregnant woman or those at risk for infection, including <25 years of age, previous infection, other STD infection, and multiple sexual partners [1]. The emergency department (ED) serves as the first prenatal visit for many women. To our knowledge, this is the first study to evaluate first-trimester pregnant women who present to the ED for STD.

The purpose of this study was to determine the prevalence of STD, specifically Chlamydia, gonorrhea, bacterial vaginosis (BV) and trichomonas during the first trimester of pregnancy in women who presented to the ED with complaint of vaginal bleeding. A secondary outcome measure was to determine the prevalence of the same STDs in women presenting to the ED in their first trimester of pregnancy with any gynecologic complaints.

### Materials and Methods

A prospective, consecutive study was performed that included all women in their first trimester of pregnancy that presented to the ED with gynecological complaints. This study was conducted over an eight-month period at a tertiary teaching hospital, level II trauma center with

an annual ED census of 40,000. The institutional review board approved the study.

Our length of study and sample size was based on a pilot study that was performed. Data was collected from patients who presented to the outpatient OB/GYN hospital walk-in clinic that were in their first trimester with gynecological complaints over a 4 month period. The results indicated that 21/64 (32%) of the women tested positive with PCR for Chlamydia or gonorrhea.

Research assistants enrolled all women, 16 years or older, in their first trimester of pregnancy, that presented to the ED with gynecologic complaints. Complaints included in our study were pelvic pain, vaginal discharge, dysuria or vaginal bleeding. Cognitively impaired and incarcerated women were excluded. Research assistants used data collection sheets at the time of the visit to collect basic information on each subject. Data collected included demographics, prior obstetrical and gynecological history, information on past and current prenatal care, social and medical histories, chief complaint, laboratory values and ultrasound results. Subjects were enrolled and data was collected during all ED shifts.

During the ED visit, routine urinalysis and blood tests (CBC, Chemistry panel, serum quantitative beta HCG, and Rh) were obtained on all subjects. All women had a formal transvaginal ultrasound to

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confirm a first trimester intrauterine pregnancy (IUP). EP attendings and EM residents obtained swabs for gonorrhea, Chlamydia, BV and trichomonas on all subjects during the pelvic exam. Although BV classification is not fully understood, the CDC classifies BV as an STD and is therefore included in our STD evaluation [1]. Wet mount specimen were obtained using a sterile cotton-tipped swab and placed in saline solution; while gonorrhea and Chlamydia test samples were obtained using a separate sterile dry transport, polyurethane tipped swab. Laboratory technicians processed wet mount specimens immediately by placing sample drops on dry microscope slides and cells counted using high power field microscopy. Laboratory technicians using strand displacement amplification PCR (BD ProbeTec™ ET System by Becton, Dickinson and Company; Sparks, MD) processed gonorrhea and Chlamydia specimens. Wet mount results for BV and trichomonas were reviewed during the primary ED visit, and subjects that were positive were treated according to the CDC guidelines [1,2]. Test results for gonorrhea and Chlamydia were reviewed after two days, and subjects with positive PCR were notified and received antibiotic treatment according to the CDC guidelines [2]. All patients were advised to follow up with primary doctor or obstetric-gynecologist for re-evaluation or to return to the ED if condition changed.

## Results

The sample population consisted of 128 patients; six subjects were excluded due to gestational age >12 weeks. Mean age of the 122 study subjects was 21 years (16-40), with 9 (7.4%) teenage pregnancies; 86/122 (70.5%) were unmarried. The majority of subjects were Hispanic and multiparous. Table 1 illustrates the number of subjects that were diagnosed with an STD stratified by ethnicity, parity and prenatal care. In this study there was no difference in ethnicity and being diagnosed with a STD between Hispanic and Caucasian women. (Chi-square P=0.844). Multiparous women had a higher prevalence of STD with 46.7% (42/90) compared to 37.5% (12/32) in primiparous women.

The most common chief complaints of subjects included in our study were vaginal bleeding and pelvic pain, 70/122 (57.4%) and 41/122 (33.6%), respectively. Twenty-one subjects (17.2%) had multiple chief complaints. No subjects had an ectopic or molar pregnancy by ultrasound.

The majority of women that tested positive for STD in this study had chief complaints of vaginal bleeding 23% (28/122) or pelvic pain 16% (19/122). Forty-five subjects had vaginal bleeding on physical exam of which 28 subjects (62.2%) had positive PCRs for gonorrhea or Chlamydia. In this study, pregnant women that presented with vaginal bleeding were more likely to have a cervical infection caused by gonorrhea or Chlamydia (OR 7.05: P<0.0001). The overall prevalence of STD in our study population was 52.4% (64/122). Gonorrhea, Chlamydia, BV, and trichomonas were present in 10/122 (8.2%), 36/122 (29.5%), 3/122 (2.5%), and 15/122 (12.3%) of subjects, respectively (six subjects had more than one STD). Table 2 summarizes the statistical data for gonorrhea and/or Chlamydia in pregnant women with vaginal

N=122	N	# (%)	Positive STD (#)
Hispanic	75	61.5	26
Caucasian	45	36.9	17
Primiparous	32	26.2	12
Multiparous	90	73.8	42
Prenatal Care	55	45.1	29

(STD) Sexually Transmitted Diseases

\* Eight women had STDs without documented parity

**Table 1:** STD stratified by ethnicity, parity and prenatal care.

+ PCR	Prevalence	SN	SP	PPV	NPV	+LR	-LR	OR
Gonorrhea	0.32	0.32	0.98	0.15	0.89	18.9	0.69	27.5
Chlamydia	0.75	0.20	0.32	0.32	0.68	0.29	2.49	8.44
Gonorrhea and Chlamydia	0.32	0.62	0.81	0.33	0.67	3.28	0.47	7.05

(PCR) Polymerase Chain Reaction, (SN) Sensitivity, (SP) Specificity, (PPV) Positive Predictive Value, (NPV) Negative Predictive Value (+LR) Positive Likelihood Ratio, (-LR) Negative Likelihood Ratio, (OR) Odds Ratio

**Table 2:** Summary of the statistical data for gonorrhea and/or Chlamydia in pregnant women with vaginal bleeding.

bleeding compared to pregnant women without vaginal bleeding.

A majority of the subjects were indigent and non-compliant with follow up care.

Follow up exams for evaluation of pregnancy viability and for repeat STD testing would have been ideal.

## Limitations

Screening tests for HIV, syphilis, herpes and HPV were not obtained. The lack of patients follow up limits the evaluation of effectiveness of treatment.

## Discussion

There are but a few studies that have examined the prevalence of STD in pregnancy, but none that are specific to ED patients. To our knowledge this is the first ED study that reports the prevalence of sexually transmitted infections in the presence of vaginal bleeding during the first trimester of pregnancy.

Vaginal bleeding in early pregnancy accounts for nearly 2% of all ED visits nationwide, and the EP is the primary care giver for many women with vaginal bleeding and pregnancy, regardless if they have an obstetrician or not [3]. Several causes for first trimester vaginal bleeding include cervical cancer, ectopic pregnancy, molar pregnancy, miscarriage, and cervical infections [4]. One multicenter retrospective study showed up to 80% of pregnant women with cervicitis caused by gonorrhea or chlamydia are under treated in the ED; 20% of those are lost to follow up. It was also shown that of those unrecognized and untreated cervicitis patients, 34% presented with chief complaint of vaginal bleeding and were misdiagnosed with threatened abortion [5]. Many EP are under the misconception that accurate cultures cannot be acquired in the presence of vaginal bleeding. However this study demonstrates and supports previous studies that accurate PCR testing can be obtained in subjects with vaginal bleeding. Vaginal bleeding may be an incidental finding in pregnant women who also have a concomitant infection caused by gonorrhea or Chlamydia. However, the data in this study demonstrates that a pregnant woman who presents with vaginal bleeding is at increased risk for a cervical infection caused by gonorrhea or Chlamydia. This is clinically relevant because it supports and validates previous studies that indicate that cervical infections may be associated with vaginal bleeding within the first trimester of pregnancy, even though the rates of these infections are similar to those in non-pregnant women. [4,6].

It is well documented in the medical literature the adverse affects that STD have on pregnancy and the newborn. Early studies report data only on Chlamydia infections and pregnancy, some with age restrictions and others that included non-pregnant women and men [7,8]. To our knowledge this is the first study to evaluate and report the prevalence of Chlamydia and gonorrhea, as well as BV and trichomonas in first trimester women that presented to the ED with gynecological

complaints. This study demonstrates that pregnant women in their first trimester of pregnancy, regardless of age or parity, may be at risk for infections caused by Chlamydia, gonorrhea, BV and trichomonas.

In our study population, Chlamydia infections were most common, followed by trichomonas. This differs from the CDC statistics that pregnant women are most commonly infected with BV, and infections with Chlamydia and gonorrhea are less common [1]. The CDC advises clinicians to counsel patients regarding the potential risks and benefits of STD treatment and the option of therapy deferral in asymptomatic pregnant women until after 37 weeks' gestation. However, all symptomatic women should be considered for treatment regardless of pregnancy stage. First line recommended treatment for Chlamydia and Gonorrhea during pregnancy is the same as for non-pregnant women, Azithromycin and Rocephin, respectively [1].

BV can increase a woman's susceptibility to other STD and therefore treatment is recommended for all pregnant women with symptoms [1]. Although BV is associated with adverse pregnancy outcomes, including premature rupture of membranes, preterm labor, preterm birth, intra-amniotic infection, and postpartum endometritis, the only established benefit of therapy for BV in pregnant women is the reduction of symptoms and signs of vaginal infection. Additional potential benefits include reducing the risk for infectious complications associated with BV during pregnancy and reducing the risk for other STD or HIV [1,2]. The 2010 CDC reports that treatment of trichomonas might relieve symptoms of vaginal discharge in pregnant women and may prevent preterm labor, respiratory or genital infection of the newborn and further sexual transmission. The CDC guidelines recommend metronidazole orally for treatment of both BV and trichomonas, although some trials have reported risk of low birth weight and prematurity with treatment. [1]. Therefore, the EP should discuss alternative options as well as the risks and benefits of treating BV or trichomonas with the patient.

## Conclusion

This study has demonstrated a high prevalence of a STD (gonorrhea, Chlamydia, bacterial vaginosis, and trichomoniasis) during the first trimester of pregnancy and the clinical relevance of first trimester bleeding. The authors recommend EP should routinely test for STDs during the evaluation of all women with first trimester vaginal bleeding.

By providing early diagnosis and treatment, the EP may be able to prevent many of the consequences caused by cervical infections in pregnant women such as relief of symptoms, premature labor and other devastating fetal complications either in-utero or at birth

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