Prevalence of Group B Streptococcal Colonization in pregnancy at Ain Shams University Maternity Hospital, Obstetrics Outpatient Clinic with Comparison between Ampicillin and Clindamycin in treatment; RCT

Thesis

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By

Mustafa Mohammed Abbas

M.B.B.Ch, 2012 - Ain Shams University

Resident of Obstetrics and Gynecology- Ain Shams University

Under supervision of

Prof. Ihab Hassan Abd Al Fattah

Professor of Obstetrics and Gynecology

Ain Shams University

Prof. Magdy Hassan Kolaib

Professor of Obstetrics and Gynecology

Ain Shams University

Dr. Walid El-Basuony Mohammed

Lecturer of Obstetrics and Gynecology

Ain Shams University

Faculty of Medicine

Ain Shams University

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Mustafa Mohammed Abbas

Contents

List of Abbreviations

ACOG	:	The American College of Obstetricians and Gynecologists
BMI	:	Body Mass Index
C5a	:	Complement factor 5a
CAMP	:	The Christie, Atkins, and Munch-Peterson test
CDC	:	Centers for Disease Control and Prevention
CI	:	Confidence Interval
CNS	:	Central nervous system
CPS	:	Capsular-like polysaccharide antigen
CS	:	Cesarean Section
CSF	:	Cerebrospinal Fluid
CspA	:	A Cell-Surface-Associated Protien
DM	:	Diabetes Mellitus
EDTA	:	Ethylenediaminetetraacetic acid
ELISA	:	Enzyme linked immunosorbent
EOGBSD	:	Early-onset GBS disease
GA	:	Gestational Age
GBS	:	Group B of Streptococci

List of Abbreviations (Cont.)

HIV	:	The human immunodeficiency virus
HvgA	:	Hypervirulent GBS adhesion
iagA	:	The invasion associated gene
IAP	:	Intrapartum antibiotic prophylaxis
ICU	:	Intensive Care Unit
IgG	:	Immunoglobulin G
IgM	:	Immunoglobulin M
III-TT	:	Type III CPS coupled to tetanus toxoid
IQR	:	Interquartile range
Kg	:	Kilogram
LMP	:	Last Menstrual Period
MMWR	:	Morbidity and Mortality Weekly Report
NICU	:	Neonatal Intensive Care Unit
NVD	:	Normal Vaginal Delivery
OR	:	Odd Ratio
PCR	:	Polymerase chain reaction
PMN	:	Polymorphonuclear
PPHN	:	Persistent pulmonary hypertension of the newborn

List of Abbreviations (Cont.)

PPROM	:	Preterm Premature Rupture Of Membranes
PROM	:	Premature Rupture Of Membranes
PTL	:	Preterm Labor
SE	:	Standard Error
Sip	:	Surface immunogenic protein
SPSS	:	Software package used for statistical analysis
Srr-1	:	Serine-rich protein
TCA	:	Tricyclic Antidepressant
USA	:	United State of America
WBC	:	total white blood cell count

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Abstract

The colonization by some of the microorganisms in pregnant women is a significant risk factor of development of congenital infection in newborns what could increase the risk of infants' morbidity and mortality. The group B of Streptococci (GBS) is the family of commensal germs, which resides in lower part of intestinal and urogenital tract in up to 40% of women all over the world and 3.3-25.8% in Polish population of pregnant women. The relatively high incidence of GBS carriers among pregnant women is the major problem in eradication of bacteria. Group B of Streptococci includes Streptococcus agalactiae as the most important species. The maternal colonization of GBS shows no clinical signs but could constitute a significant factor of intrauterine infection. Bacteria colonize up to 50% of newborns from GBS-positive mothers.

Numerous studies report the prevalence of GBS colonization in pregnant women living in high-income regions. Approximately 10-30% of pregnant women are colonized with GBS in industrialized countries.

GBS disease is caused mainly by serotypes I, II and III. Serotype III is the most prevalent serotype in asymptomatic carriers. The gastrointestinal tract is the human reservoir of GBS. Women may carry GBS temporary, intermittent or persistent. The lower gastrointestinal tract and vagina are often colonized with GBS.

GBS can cause significant morbidity in pregnant women. Manifestations of symptomatic maternal infection include chorioamnionitis, endometritis, cystitis, pyelonephritis and febrile GBS bacteraemia. Caesarian delivery appears to be a prominent risk factor for postpartum endomyometritis.

The first approach involved universal screening for GBS colonization of all pregnant women between 35 and 37 wk gestation using vaginal and rectal cultures to detect GBS colonization. Properly obtained and processed antenatal cultures correctly identified most women colonized at the time of labour. Intrapartum antibiotics are administered to all those with a positive GBS culture regardless of risk factors. The risk-based approach involved administration of antibiotics based solely on the presence of antenatal or intrapartum risk factors.

Several clinical trials have demonstrated that use of intravenous antibiotics during the intrapartum period is highly effective at preventing early-onset neonatal GBS infections. Use of intrapartum prophylaxis has also been shown to be cost-effective in the United States.

This prospective cross sectional clinical trial study was held in Obstetrics outpatient clinic, Ain Shams University Maternity Hospital to Measure the prevalence of GBS colonization and Compare between the efficacy of Ampicillin and Clindamycin on the treatment in ladies with viable pregnancy (after 35 weeks' gestation).

Keywords : USA : United State of America; WBC : total white blood cell coun

Introduction

The colonization by some of the microorganisms in pregnant women is a significant risk factor of development of congenital infection in newborns what could increase the risk of infants' morbidity and mortality. The group B of Streptococci (GBS) is the family of commensal germs, which resides in lower part of intestinal and urogenital tract in up to 40% of women all over the world and 3.3-25.8% in Polish population of pregnant women. The relatively high incidence of GBS carriers among pregnant women is the major problem in eradication of bacteria. Group B of Streptococci includes Streptococcus agalactiae as the most important species. The maternal colonization of GBS shows no clinical signs but could constitute a significant factor of intrauterine infection. Bacteria colonize up to 50% of newborns from GBS-positive mothers.***(Skoff et al., 2010)***

Streptococcus agalactiae -often referred to as group B streptococcus (GBS)- is a Gram-positive bacterium that has been identified as a human pathogen since the early 1900s. GBS is of particular medical importance during pregnancy and the postpartum period since it may lead to invasive disease in both mother and newborn. Maternal

colonization with GBS in the genitourinary and gastrointestinal tract, leading to intrapartum transmission, is a primary risk factor for early neonatal morbidity and mortality. (***Verani et al., 2010***)

Numerous studies report the prevalence of GBS colonization in pregnant women living in high-income regions. Approximately 10-30% of pregnant women are colonized with GBS in industrialized countries. Because of the considerably varying colonization rates reported in individual studies, standard specimen and culture conditions were published by the Centers for Disease Control and Prevention to enhance GBS detection and improve the comparability of individual studies. Classification of GBS is based on ten different capsular polysaccharides and a clear predominance of several serotypes has been shown with respect to the prevalence and the virulence in industrialized countries. (***Kunze et al., 2011***)

GBS colonization can be transient, chronic, or intermittent and is usually asymptomatic. Persson et al found that GBS screening during the 37th week of gestation was 85% predictive of GBS colonization during labor. ***(Persson et al., 1987)***

Maternal group B Streptococcus (GBS) colonization is a major risk factor for neonatal early-onset GBS disease. In the 1970s, GBS was identified as the leading infectious cause of neonatal morbidity and mortality in the United States, with a mortality rate of up to 50 %. ***(Schrag et al., 2002)***

Most early onset neonatal GBS disease causes sepsis and pneumonia and, less commonly, meningitis, osteomyelitis, and septic arthritis. In the 1980s intrapartum antibiotics demonstrated an effective means to prevent neonatal disease in GBS-colonized mothers.The incidence of early onset disease decreased by 65% during the 1990s. ***(Schrag et al., 2000)***

The introduction of prenatal screening for GBS colonization in pregnant women and intrapartum antibiotic prophylaxis in 1996 reduced the incidence of early-onset disease by 80 % to 0.28 cases per 1,000 live births in the United States. ***(Sastre et al., 2005)***

Therefore, many national guidelines in high-income countries recommend universal GBS screening for all pregnant women between 35 and 37 weeks of gestation and intrapartum antibiotic prophylaxis in the case of GBS colonization. Oral penicillin is the antibiotic of choice

based on its high activity against GBS and its comparably narrow antimicrobial spectrum. Erythromycin and clindamycin are suggested as alternatives, particularly in the case of suspected allergy to penicillin. Unfortunately, current evidence suggests that intrapartum antibiotic prophylaxis does not reduce the incidence of late-onset disease.***(Capan et al., 2012)***

The mortality rate of infants with early onset GBS disease decreased from 10% in the 1970s to 4% in the 2000s secondary to improved neonatal treatment. Despite these improvements, neonatal GBS remains the leading infectious cause of neonatal mortality. Nevertheless, surviving neonates often recover with long-term neurological sequelae. ***(Verani et al., 2010)***

Neonatal invasive GBS disease in Africa is sporadically reported with incidences up to 3 per 1,000 live births (corresponding to the preintrapartum antibiotic prophylaxis area of the high-income regions) and high case fatality rates. ***(Madhi et al., 2003)***

First reports on GBS serotype distribution indicate the predominance of several serotypes, largely overlapping with the predominant serotypes from industrialized countries. ***(Madzivhandila et al., 2011)***

Still, for most parts of Africa, knowledge on current GBS epidemiology is still lacking including Egypt to the best of our knowledge.

In addition, GBS disease burden in Africa is likely to be underestimated since cases occurring outside the healthcare facilities are not reported, infrastructure for microbial diagnosis is not available and antibiotics are used prior to the microbiological specimen collection.***(Sigauque et al., 2009)***

GBS tests are performed by using a swab test. Swabs are ideally taken from the lower vagina and rectum at 35-37 weeks of pregnancy. They can be taken by healthcare professionals, or by the mother, following simple instructions. ***(Benitz et al., 1999)***

Several published studies have demonstrated the usefulness of culture-based and PCR-based methods for detecting GBS. ***(Block et al., 2008)***

The Centers for Disease Control and Prevention (CDC) and the American College of Obstetricians and Gynecologists (ACOG) recommend chemoprophylaxis in patients with unknown GBS colonization status if they develop temperature in labor of greater than 100.4°F

(38°C), the gestational age is less than 37 weeks in labor, or they have rupture membranes greater than 18 hours. GBS bacteriuria in the current pregnancy or a history of delivering an infant with early onset GBS disease are also indications for chemoprophylaxis that negate the need for GBS screening. ***(Schuchat et al., 1994)***

GBS is susceptible to penicillin, amoxicillin, cefazolin, cefotaxime, vancomycin and linezolid. Penicillin is commonly used for intrapartum chemoprophylaxis because of the susceptibility of GBS to the beta-lactam antibiotics. If the women are allergic to penicillin, clindamycin or erythromycin can be used although a resistance rate of 16.7% and 11% respectively was found. ***(Decoster et al., 2005)***

A study from Egypt Shabayek SA et al. which screened 150 pregnant women in their gestational age between 35 to 40 weeks noted a carriage rate of 25% and that the isolated group B streptococci showed 100% sensitivity to penicillin, ampicillin and vancomycin. ***(Shabayek et al., 2009)***

Another very recent report from Egypt by same authors has studied the antimicrobial susceptibility profile of 100 isolates of colonizing group B streptococci and