

NEW TREATMENT APPROACHES TO PREVENT PREMATURE RUPTURE OF MEMBRANES IN PREGNANT WOMEN WITH VARICOSE DISEASE

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ABSTRACT

Aims: To investigate modern methods to prevent premature rupture of membranes by the use of chlorhexidine in pregnant women with varicose disease.

Methods: The data of 39 pregnant women with varicose disease, who delivered between 2014 and 2016 at Maternity Hospital No. 3, Zaporozhyye were analyzed using SPSS software. Patients were divided in 3 groups according to their medical history, complications during pregnancy, childbirth and postpartum period. The 1st group consisted of 13 pregnant women who did not receive prenatal vaginal douching with chlorhexidine; the 2nd group consisted of 13 patients with varicose disease, who received douching of birth canal with vaginal suppositories with chlorhexidine 1 time per day for 10 days before their delivery, but did not undergo a rehabilitation at the sanatorium; and the 3rd group had 13 pregnant women who received sanatorium rehabilitation at "Veliki lug" during the II. trimester of their pregnancy with the course of 1 chlorhexidine suppository per day for 10 days before delivery.

Results: In the 1st group, the percentage of premature death was 61.5%; anemia and significant ultrasound markers were present in 46.2%; the percentage for the presence of hematometra was 38.5%; premature rupture of membranes, anomalies of labor and polyhydramnios were 30.8%; chorioamnionitis 15.4%; and intrauterine infection of fetus was 7.7%. In the 2nd group, anemia was present in 35%, 23.1% showed anomalies of labor; premature rupture of membranes, ultrasound markers, premature death, and hematometra were present in 15.4%. Whereas in the 3rd group, anemia and anomalies of labor were present in 15.4%, premature rupture of the membranes and premature death were present in 7.7% of the patients.

Conclusion: With its broad antibacterial and antiviral effect, chlorhexidine in antiseptic form was found to be beneficial and it is found to promote the restoration of the vaginal microflora.

Keywords: Pregnancy, infection, membrane

INTRODUCTION

With the progress in modern obstetrics, the need for new approaches to problems concerning the protection of the fetus becomes evident. Preterm premature rupture of membranes (PROM) can be characterized as the rupture of the fetal membranes before the beginning of labor at any gestational age before 37th week (1-2). Complications such as PROM occur in nearly 8% percent of all term pregnancies (>37 weeks) and about 20% of these are prolonged by PROM, about 30% of these being preterm deliveries (3-5). Genital tract infections constitute an important risk factor for women of reproductive age (6). Intensive reproduction

of microorganisms in the vagina flora and cervix leads to an entry into the uterine cavity. Furthermore, the microorganisms are colonized in the basal layer of the decidua through which the microorganisms can pass into the blood vessels of the fetus and subsequently cause choriovasculitis or can reach the amniotic layer causing bacterial amnionitis. Moreover, microorganisms penetrating the amniotic fluid contribute to the inactivation of local antibacterial systems.

Currently, bacterial vaginosis is considered as the most common cause of PROM. Recent studies indicate the number of neonates with signs of bacterial intrauterine infection (IUI) as 20-55%. Gram-negative mic-

robacteria play an important role in the development of IUI's. PROM has been found to be associated with urogenital infections such as chlamydiosis, trichomoniasis, syphilis and gonorrhoea (6).

In neonates, PROM can increase the risk of intraventricular hemorrhage which can result in neurodevelopmental disability (cerebral palsy). PROM can lead to maternal infection, fetal deformation, low Apgar score, low birth weight, fetal infection, umbilical cord compression and prolapse, pulmonary hypoplasia, preterm delivery, and fetal demise (7). Pregnancies complicated by infections may constitute a difficulty in selection of the right antibacterial therapy due to its possible adverse effects on the developing fetus.

Risk factors for PROM include infections such as bacterial vaginosis, urinary tract infections, sexually transmitted diseases, PROM or preterm delivery in previous pregnancy, multiple gestations, bleeding episodes during the pregnancy, smoking during pregnancy, nutritional deficit, low socio-economic status, underweight, illicit drug use during pregnancy, polyhydramnios, invasive procedures such as amniocentesis, cervical insufficiency (7).

Chlorhexidine is an antiseptic which is active against bacteria (gram-positive and negative) and has no effect on clostridium spores (8). Chlorhexidine has a variety of usage, such as in surgical hand antisepsis, neonatal wiping, preoperative shower, vaginal wiping prior to delivery, cord care, dental and oral hygiene (9). Chlorhexidine is included under section 15.1, antiseptics by WHO Model Formulary 2009, 2011 (10, 11).

The Food and Drug Administration, in the early 1990's, granted clearance for 3 types of medical equipment that contain chlorhexidine: intravenous catheters, topical antimicrobial wound dressers, and antimicrobial surgical mesh implants.

The aim of this study was to investigate modern methods to prevent premature rupture of membranes by the use of chlorhexidine in pregnant women with varicose disease.

MATERIAL AND METHODS

This study was approved by Scientific Research Ethics Committee of Zaporozhye State Medical University. The data of 39 pregnant women with varicose disease,

who have been delivered between 2014 and 2016 at Maternity Hospital No. 3, Zaporozhye were analyzed and evaluated retrospectively. Patients were divided into 3 groups according to the anamnesis, complications during pregnancy, childbirth and the postpartum period. The 1st group consisted of 13 pregnant women who did not receive prenatal vaginal douching with chlorhexidine; the 2nd group had 13 patients with varicose disease, who received douching of birth canal with chlorhexidine vaginal suppositories once per day for 10 days prior to delivery, but did not receive a rehabilitation at the sanatorium; and the 3rd group had 13 pregnant women who received sanatorium rehabilitation at "Veliki lug" during the II. trimester of their pregnancy with a course of chlorhexidine suppository once a day over a 10-day period prior to delivery.

Examination of pregnant women with varicose veins included a bacterioscopic and bacteriological study of the vaginal mucosa, cervical canal, urethra, general clinical, biochemical analysis, ultrasound determining the biophysical profile of the fetus, dopplerometry of the utero-fetoplacental complex.

After data collection, all of the data was analyzed by using SPSS software. Numbers, percentages, and arithmetic mean were used as descriptive statistics for this study.

RESULTS

Patients' ages were divided based on their reproductive age, anamnesis, gestational period and complications during their pregnancy. In the 1st group, there were 3 (23%) patients whose age were in between 16-25 years, 5 (38.4%) patients in between 26-30 years, 5 (38.4%) patients in between 31-40 years. According to gestation, 1 (7.7%) patient was pregnant for 28 weeks, 3 (23.1%) patients were pregnant for 34-37 weeks, 9 (69.2%) patients were pregnant for 38-41 weeks. In the 2nd group, 6 (46, 2%) patients were in the age group between 20-30 years, 7 (53.8%) patients were between 31-42 years. In terms of gestation: 3 (23.1%) patients were between 33-37 weeks of gestation, 10 (76.9%) patients were in between 38-40 weeks. In the 3rd group, 2 (15.4%) patients were in the age group between 21-29 years, 8 (64.5%) patients were in between 30-35 years and 3 (23.1%) patients were in the age group between 36-41 years.

Considering the results for the bacteriological study of the mucosa prior and after the rehabilitation and medical treatment in the 2nd group of patients, the data presented in Table 1 was acquired.

Table 1: Results from the bacteriological study of the mucosa prior and after the rehabilitation and medical treatment in the 2nd group of patients.

Vaginal Microflora	Cell count before treatment	Cell count after treatment
Gardnerella vaginalis (CFU/ml)	10 ⁶	10 ²
Candida albicans (CFU/ml)	10 ⁵	10 ²
Escherichia coli (CFU/ml)	10 ⁷	10 ³
Staphylococcus epidermalis (CFU/ml)	10 ⁷	10 ²
Mobiluncus spp (CFU/ml)	10 ⁵	-
Klebsiella spp (CFU/ml)	10 ⁸	10 ³
Staphylococcus aureus (CFU/ml)	10 ⁶	10 ⁴

Almost 50% of the cases were associated with two or three microorganisms found in all groups. The data from the examination of the patients before sanitation are presented in Table 2.

Table 2: The data obtained from the examination of the patients before the sanitation and after the improvement in the local sanatorium "Veliki Lug".

Vaginal Microflora	Cell count before treatment	Cell count after treatment
Candida albicans (CFU/ml)	10 ⁶	-
Staphylococcus aureus (CFU/ml)	10 ⁵	10 ²
Staphylococcus epidermalis (CFU/ml)	10 ⁸	10 ³
Gardnerella vaginalis (CFU/ml)	10 ⁷	10 ³
Streptococcus hemolyticus (CFU/ml)	10 ⁶	10 ²
Escherichia coli (CFU/ml)	10 ⁶	10 ²

Analysis of pregnancy, childbirth and postpartum period in patients from all the three groups of the study are presented in Table 3.

DISCUSSION

Currently, rehabilitation for pregnant women with varicose disease is not a popular research topic. It is a known fact that application of external heat source shows a positive effect by causing a regression of chronic venous insufficiency. The truth behind this is the reduction of vascular spasm, activation of immune

Table 3: Analysis of the pregnancies, childbirth and postpartum period of patients.

Complications during pregnancy, childbirth and the postpartum period	1 st Group	2 nd group	3 rd group
PROM (%)	30.8	15.4	7.7
Grade 1-2 anemia (%)	46.2	35	15.4
Polyhydramnion (%)	30.8	-	-
Ultrasound markers of uterine infection (%)	46.2	15.4	-
The threat of premature birth (%)	61.5	15.4	7.7
Chorioamnionitis (%)	15.4	-	-
Anomalies of labor activity (%)	30.8	23.1	15.4
Hematometra (%)	38.5	15.4	-
Intrauterine infection (%)	7.7	-	-

responses, increase of the general tone and resistance of the organism (12-15).

Many researchers declared that douching of vagina and cervix with an active substance like chlorhexidine prevents peripartur infection of the mother and fetus by limiting bacterial growth (16). In addition, two studies using 0.25% chlorhexidine as a vaginal/neonatal disinfectant conducted in developing countries, including a hospital-based study in Malawi providing a second 1-month control period (16). After the therapy, there were compelling reductions in overall septic and newborn admissions, early neonatal mortality as a result of sepsis, as well as significant decrease in maternal hospital admissions (17).

A study conducted in Egypt with 4400 women showed that chlorhexidine treatment resulted in a decreased number of admissions at the neonatal and maternal hospital, with reduced newborn deaths due to infections as well as sepsis (18).

In 2006, Mullany LC et al. (19) stated that 4% chlorhexidine solution used during first 24 hours of delivery reduces the risk of umbilical cord infections.

The review of Lumbiganon et al. (20) indicated 3 studies with 3012 participants showing no benefits with chlorhexidine usage during labor in preventing neonatal and maternal infections (except HIV and streptococcal infections). However, they also stated that a well-designed randomized clinical trial is necessary for the prediction of an appropriate concentration and volume of chlorhexidine solution (20).

In the revised version conducted in 2014, Lumbiganon et al (21) included the same number of participants and assessed the efficacy and side effects of vaginal cleansing with chlorhexidine during labor, which revealed lowered neonatal and maternal infections excluding Guillain-Barré syndrome (GBS).

Christensen et al. (22) proposed a method for preventing GBS infection in term and preterm neonates using chlorhexidine as a vaginal disinfectant during labor in a study conducted between the years of 1983-1999.

Goldenberg et al. (16) conducted a systematic review in 2006, in which they identified the outcomes of each study where, chlorhexidine was used as vaginal irrigant, with or without washing the neonates. They found out that usage of chlorhexidine as vaginal or newborn disinfectant reduced bacterial count including transposal of GBS from mother to child excluding life-threatening maternal or neonatal infections (16).

A systemic review by Stade BC et al. (23) included five studies on 2190 infants both term and preterm, showed the reduction of group B streptococcal colonization with the usage of vaginal chlorhexidine excluding clinical infections. Therefore, the use of vaginal chlorhexidine is not supported by evidence (23).

Many studies have demonstrated that the usage of chlorhexidine as an antiseptic during surgeries as well for douching of the vagina (24, 25). However, none of them presented intensely on complications during the course of pregnancy like PROM.

The study conducted at “Veliki Lug” for the first time in Ukraine, concluded that the usage of sauna therapy with infrared thermos camera reduced chronic venous insufficiency in pregnant women with varicose disease (13). Thus, it averts the pharmacological burden usually acquired via the usage of traditional drug therapy.

In this study, the most substantial outcome of pregnancy, childbirth and postpartum period for the mother and the newborn were noted in the third group of women whose pregnancy preceded against the background of varicose disease with sanatorium rehabilitation as well as vaginal douching with antiseptic drug chlorhexidine. This study included the recovery stage of pregnant women with varicose disease at the local sanatorium ‘Veliki Lug’. In addition, the treatment of

choice for genital infections was chlorhexidine. Hence, it is inevitable that chlorhexidine meets all the requirements as an antiseptic, antibacterial and antiviral agent plays a crucial role in reducing maternal sepsis and newborn death rates.

Ethics Committee Approval: This study was approved by Scientific Researches Committee of Zaporozhye State Medical University.

Informed Consent: Written informed consent was obtained from the participants of this study.

Conflict of Interest: The authors declared no conflict of interest.

Author contributions: Concept: GNV. Design: GNV. Supervision: GNV, VT. Resources: GNV. Materials: GNV. Data collection and/or processing: GNV, VT, VV. Analysis and/or Interpretation: GNV, VT, VV. Literature Search: GNV, VT, VV. Writing Manuscript: VT, VV. Critical Review: GNV, VT, VV.

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