



## RESEARCH ARTICLE

### INCIDENCE AND RISK FACTORS OF NEONATAL SEPSIS

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#### ABSTRACT

**Objectives:** To identify the incidence and risk factors of neonatal sepsis in patients born in the General Hospital of Specialties Dr. Javier Buenfil Osorio, during the period from January 2013 to December 2015.

**Methods:** A cross-sectional, retrospective study, observational, descriptive; the record of 106 newborns diagnosed with sepsis were reviewed. We excluded 15 were included in the data collection, diagnosis of early and late neonatal sepsis, maternal age, number of gestation, prenatal care, premature birth, diagnosis of UTI diagnosis of chorioamnionitis, premature rupture of membrane (s RPM), sex product, invasive procedures, product weight and route of obtaining the product.

**Results:** Of the 1401 patients obtained alive, 191 obtained diagnosis of neonatal sepsis and an incidence of 6.49% of early neonatal sepsis was obtained. The main risk factor associated with early neonatal sepsis has been the way of obtaining caesarean with 52.74%, the low birth weight with 32.96% and multiparity an incidence of 34.06% and there were no significant differences between sexes as the man / femalerelationship was 1.02. However if a significant importance in the delivery / caesarean relationship was obtained 0.89. There was only one death recorded.

**Conclusions:** The main risk factors associated with early neonatal sepsis are obtained via caesarean section, low birth weight and multiparity, male sex was the most affected but with no significant differences, the IVU, PROM, maternal age less to 18 years and the lack of prenatal care they had similar incidence. Only one late neonatal sepsis and death was obtained. I do not chorioamnionitis data was obtained.

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## INTRODUCTION

Infectious disease remains very common in the neonatal period, with a high percentage of income to neonatal units and becoming one of the leading causes of morbidity - mortality in newborn. The diagnosis of neonatal sepsis is sometimes difficult to establish because of the lack of specificity of symptoms, creating an urgent need to establish an appropriate antibiotic treatment which is very valuable information provided by the laboratory of hematology and microbiology.

Because of the immunological immaturity and sudden exposure to an unknown extrauterine environment, conditioned by an increase in risk factors for neonatal sepsis, especially premature and low birth weight, they are very susceptible to severe systemic bacterial infections, considering also the maternal risk factors for developing this disease. The incidence of neonatal sepsis in developing countries has ranges between 0.5 and 10 cases per 1000 live births, also keeping fatality rates ranging between 15 and 50%. Because of the difficulty to accurately diagnose neonatal sepsis, in addition to the delay of clinical studies, it is important to know the risk factors for neonatal sepsis and discover what population is most at risk and make the diagnosis early.

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## Scientist Background

It is called neonatal sepsis to the clinical syndrome characterized by signs and symptoms of systemic infection, which is confirmed to be isolated in blood cultures, bacteria, fungi, viruses and manifested within the first 28 days of life, but now it tends to include sepsis diagnosed after this age, newborn very low birth weight (VLBW <1500 g).<sup>1</sup> According to the starting time it has been divided into early and late sepsis. They have been described as risk factors for early sepsis acquire low birth weight, male sex, preeclampsia, perinatal hypoxia, prolonged premature rupture of amniotic membranes mainly greater than 24 hours, urinary tract infection, maternal fever, chorioamnionitis and prematurity. Risk factors for nosocomial or hospital-acquired infections according to the Center for Disease Control and Prevention (CDC) definition is any infection happens after admission to the intensive care unit and that has not been contracted Transplacentally. Risk factors for hospital infection in this group include prematurity, low birth weight, aggressive techniques, permanent vascular catheters, parenteral nutrition with lipid emulsions, endotracheal tubes, ventricular shunts, changes in the skin or mucosal barriers, frequent use of broad-spectrum antibiotics and prolonged hospital stays.<sup>2, 6, 10, 11, 12, 13</sup> The way of obtaining product also proved to be a risk factor due to higher fetal exposure to maternal vaginal canal bacteria according to a study in 1548 patients, 310 pregnant patients had cultures vaginal and perianal positive of which 84.19% (261 patients) were for pregnancies between 35 and 37 weeks, 11.8% (37 patients) pregnancies less than 35 weeks and 3.9% (12 patients) those with more than 37 weeks. Resolution via delivery in patients with positive culture 72.8% (226) was vaginally and by caesarean section 26.2% -16% (51 patients)<sup>14</sup>.

The Apgar score less than 7 in 5 minutes proved to be a de facto risk related to neonatal sepsis, in a study conducted at the Hospital 1st octubre.<sup>3</sup> Maternal age and urinary tract infection also considered important risk factors due to risks associated with low birth weight, premature birth, poor nutrition, which determine elevation of 2-3 times in infant mortality, when compared with the groups most advanced maternal age, especially in ages near menarche.<sup>4, 8</sup> There are several factors that favor the invasion of bacteria, fungi and other pathogens in the newborn, such as the use of catheter onfaloclistis and venesection, endotracheal tubes, mechanical ventilation, parenteral nutrition and the use of antibiotics, among others. This promotes the colonization and infection in an immunologically immature and vulnerable host when it is premature, which favors nosocomial infections in the neonate and represents one of the major causes of morbidity and mortality during this period<sup>9</sup>. The two main sources of infection are the mother and the environment of the nursery. Infection is acquired from the transplacental mother at the time of delivery or in the postnatal period. The newborn becomes infected after birth from environmental sources, such as medical and nursing staff, ventilation equipment, contaminated cradle zone, venoclistis, etc.<sup>2, 13</sup>

Large cohort studies among newborns of very low birth weight (below 1500g) have described a hospital infection rates from 20 to 25%. These figures increase with lower gestational age and birth weight. The National Institute of Child Health and Human Development (NICHD) and Neonatal Research Network has published incidence rates of these infections of 43% for infants between 401 - 705g, 28% for those between

751 - 1000g, 15 % for those between 1001 - 1250g and 7% for those between 1251 - 1500g.<sup>12</sup> The World Health Organization (WHO) estimates that worldwide die almost 5 million newborns per year and 98% occur in developing countries. 30 to 40% of neonatal deaths are related to infections.<sup>3</sup> is also estimated that in the first 28 days of life, between 5 and 10 of 1 000 live births contract an infection and the incidence among patients in neonatal intensive care units (NICU) is 18 to 30%, only surpassed by burned-acquired infections.<sup>5</sup> In Venezuela, by the year 1997, the neonatal mortality rate was 45.46 per 100 live births, ranking among the leading causes SN with an incidence of 1-10 per 100 births alive.<sup>4</sup> The United States presents 1 to 8 in 10,000 live births and mortality varies from 10 to 40%, in Mexico Gram negative bacteria are the most common causative agents of systemic infection and reported 9 to 36 cases of sepsis per 100 discharges and mortality varies from 23 to 65%. In our country the neonatal Sepsis is a major cause of neonatal morbidity and mortality especially negatives.<sup>3</sup> caused by Gram Different studies have shown that up to 10% of children admitted to hospitals in our country will acquire a nosocomial infection (NI) during hospitalization. Pneumonia and nosocomial bacteremia have not only been identified as the first and second leading cause of nosocomial infection in children, but both cause a very high mortality.<sup>15</sup>

## MATERIAL AND METHODS

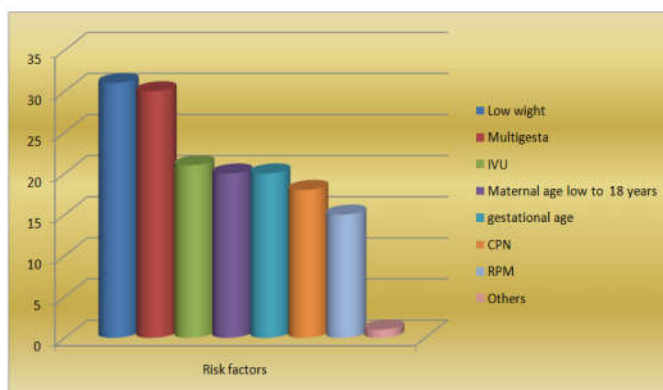
A cross, retrospective, observational and descriptive was made; in which 91 patients diagnosed with neonatal sepsis obtained in the General Hospital of Specialties included "Dr. Javier Buenfil Osorio" during 2013-2015. The sampling frame was 1401 newborns obtained alive during this period which were diagnosed 91 with neonatal sepsis clinic with Pharmacotherapy. En this study was excluded every newborn not obtained in the unit, with incomplete medical record A patient who has been transferred and has been voluntary discharge.

## RESULTS

In 1401 the total population of patients was observed that 91 patients were diagnosed with neonatal sepsis, so the incidence of the study in this population over the period 2013-2015 was 6.49% (Figure 1). The population that met the selection criteria was 91 live births diagnosed with sepsis, of both sexes. The incidence according to sex were 46 males (50.55%) and 45 females (49.45%) (Figure 2), and in relation to the way of obtaining it was observed that 48 individuals were obtained by cesarean section (52.74%) vaginally and 43 (47.26%) (Figure 3) route. It was found that from the sample 31 newborns had low birth weight (34.04%), 30 of them with multiparous mothers (32.96%), 21 (23.07%) had IVU during the period pre and perinatal, 20 were premature (21.97%). Mothers under 18 years were 20 (21.97%) 18 (19.78%) of them took prenatal care, 15 (16.48%) had no data RPM and chorioamnionitis were obtained (Figure 4). The male-female ratio was approximately 1: 1, which represents 50.55% male and 49.45% female of the total population. And the relationship in childbirth and caesarean section was 1: 1.1, which represents 47.26% obtained by 52.74% obtained births and caesarean. (Figure 5) Of the 91 patients in the study was conducted in 49 invasive procedures (53.84%) with only 1 (1.09%) late sepsis and death, it found that positive culture (coagulase-negative staphylococci), (Figure 6).

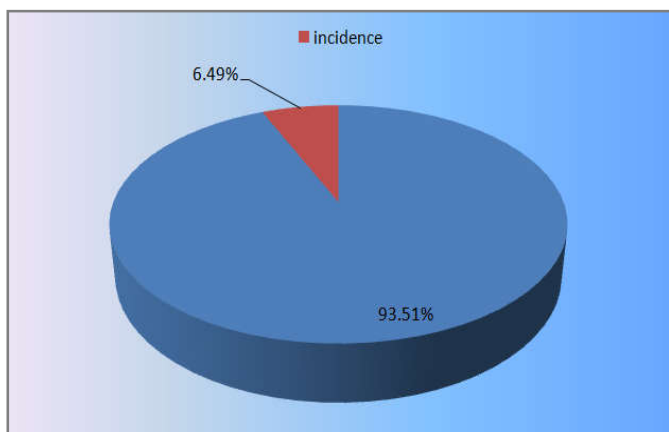
## DISCUSSION

We observed a higher incidence of neonatal sepsis in patients born with low birth weight and mothers multigesta. And although the majority of studies show childbirth as a major risk factor in this study are those obtained by Caesarean section without a significant difference and probably due to the higher obtaining this way, not with males. Urinary track infections had a significant prevalence unlike premature rupture of membranes (PROM). This may be due to early care and antisepsis.



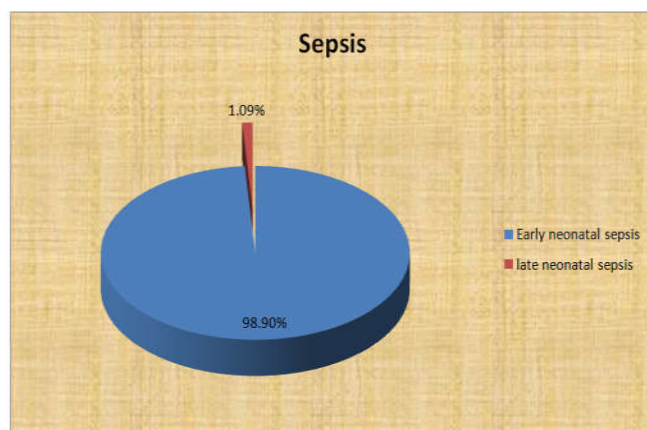
Source: "The General Hospital of Specialties Dr. Javier Buenfil Osorio 2013-2015".

Figure 4. Major risk factors related to sepsis



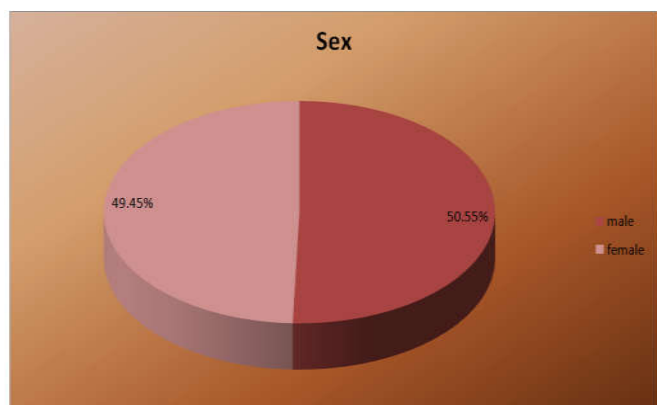
Source: "the General Hospital of Specialties Dr. Javier Buenfil Osorio 2013-2015".

Figure 1. Incidence of neonatal sepsis



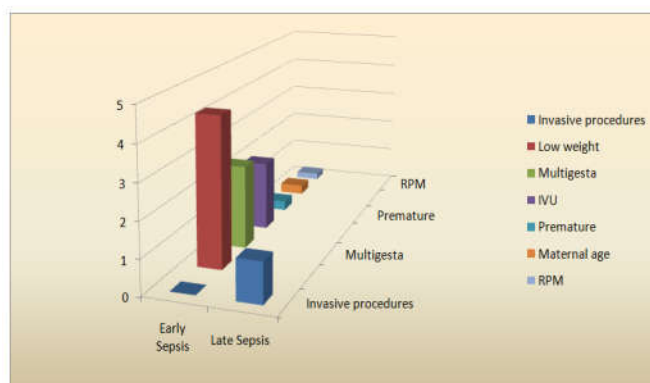
Fuente: "the General Hospital of Specialties Dr. Javier Buenfil Osorio 2013-2015".

Grafica 5. Relationship between early and late neonatal sepsis



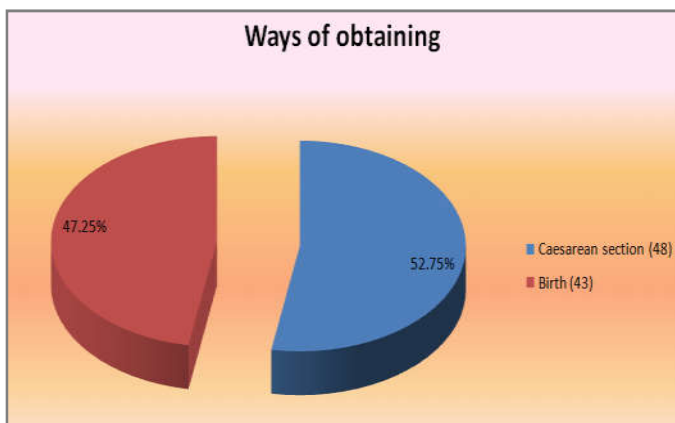
Source: " the General Hospital of Specialties Dr. Javier Buenfil Osorio 2013-2015".

Figure 2. Relationship between sexes



Fuente: "the General Hospital of Specialties Dr. Javier Buenfil Osorio 2013-2015".

Grafica 6. Relationship between risk factors for early and late neonatal sepsis



Source: "The General Hospital of Specialties Dr. Javier Buenfil Osorio 2013-2015".

Figure 3. Relationship between ways of obtaining

The overall incidence of neonatal sepsis early in the study population was 6.49%, which is higher than the worldwide incidence of from 5 to 10 per thousand live births 5. What is concluded that there is a significant increase in unit study and should be alerted about the main risk factors causing this pathology, and would merit further study and monitoring of the population at risk. The incidence of late neonatal sepsis in the population was 0.01 despite 53.84% of patients underwent invasive procedures, being the only death and the only positive culture, being the negative staphylococcus coagulase causative organism. According to the study groups, we found that low

birth weight was the most affected group. 34.06% corresponding one of the study population. It fails to detect that multiparity represents the second predisposing factor for early neonatal sepsis; surpassed only by the low birth weight; later following the IVU and order of incidence, maternal age under 18 years and premature with equal rates and ultimately premature rupture of membranes (RPM). Given that 18 (19.78%) of mothers of children studied patients had prenatal and products presented sepsis. It can be said that 73 of the mother who had no control, sepsis presented their products would be an incidence of 80.22%, taking into account that only prenatal care as a risk factor. This value would probably be overestimated because the vast majority of patients do not take prenatal control unit and the difficulty of obtaining this information. Still it considered a major risk factor.

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