

Meta-Analysis on Factors Influencing Early Onset Neonatal Sepsis

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Abstract

Neonatal sepsis is the main cause of morbidity and mortality of the neonate in the developing countries, and the delays in the diagnosis and treatment increase the incidence of the occurrence. The incidence of neonatal sepsis increasing from year to year despite the development in the medical field, where there are no accurate diagnostic test help in detecting and diagnosing the neonatal sepsis. This study concerns to review the factors influencing the early onset of neonatal sepsis in NICU department, there are two main factors influencing neonatal sepsis, first one maternal factor and the second neonatal factor.

Objective: The objective of this review is to determine the factors influencing the early onset of neonatal sepsis in NICU department.

Method: a meta-analysis study collecting data from available literature review to identify factors that influencing early onset neonatal sepsis.

Result: There are many factors related to the mother (maternal factors) and related to the neonate (neonatal factors) that increase the incidence of early onset of neonatal sepsis. Maternal factors such as premature rupture of membrane, prolonged rupture of membrane, chorioamnionitis, and infection during pregnancy...etc. Neonatal factors influencing neonatal sepsis such as the gender, the age, and birth weight, gestational age of the neonate and the Apgar score less than seven at 5 minutes.

Keyword: Sepsis, Neonatal sepsis, Early onset of neonatal sepsis, Chorioamnionitis.

Introduction

Neonatal sepsis is a systemic infection occurring in infants within 28 days of life in NICU department and it is a major cause of morbidity and mortality in new-borns [1]. According to Goldstein, Giroir and Randolph [2] neonatal sepsis was defined as systemic inflammatory response syndrome in the presence of or as a result of suspected or proven infection with or without accompanying bacteremia, documented by a positive blood culture in the first 28 days of life [3].

Neonatal sepsis is a serious problem for neonates who are admitted to the Neonatal Intensive Care Unit (NICU), as it is associated with increased in mortality, morbidity and prolonged length of hospital stay, there is no specific laboratory test has been shown to be very useful in improving our ability to predict who as a real bloodstream infection and therefore, who need to be treated with a full course of contributors [4]. Neonatal sepsis is classified into two major categories based on the time of onset: Early-Onset Neonatal Sepsis (EONS) and Late-Onset Neonatal Sepsis (LONS), EONS appears within the first seven days of life and most

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cases appear within 24 hours of birth, LONS occurs after 7 days of infant life and is mostly acquired after delivery [5,6]. Definition of EONS in the preterm infant as occurring in the first three days of life and it is as a result of vertical transmission of bacterial pathogens from mothers to infant before or during delivery [7].

Limited access to sufficient treatment for many of these infants cause 99 percent of the worlds every year the neonatal death about 4 million occur in the developing world, and the deaths rate caused by severe infections is 26 percent [8]. Although there are an improved survival and reduced complications in preterm infants related to the advances in neonatal care, sepsis still contributing factor to mortality and morbidity among Very-Low-Birth-Weight (VLBW < 1500 gram) infants in the NICUs [7].

A previous study in Jordan found that the 72.7 percent of preterm neonate were late preterm and experienced significantly higher hospitalization and morbidity than did term babies [9]. Factors that associated with preterm neonate in a tertiary hospital in Jordan including male gender, first birth and maternal age > 35 years, birth weight, gestational age and cesarean section delivery are risk factors that leading the neonate to be admitted to the NICU [10]. In another study was done in Jordan university hospital neonatal sepsis occurred more in premature, male neonate and low birth weight [11]. This study will concern in reviewing the factors influencing early onset neonatal sepsis.

Maternal factors

The acquisition of microorganisms in EONS from the mother that the infection transmitted by placenta or an ascending infection from the cervix may be caused by organisms that colonize the mother's genitourinary tract, the neonate acquires the microorganisms as it passes through the colonized birth canal at delivery [12]. The risk factors of EONS related to the mother are Chorioamnionitis, prolonged rupture of membrane > 18 hours and group B streptococcal (GBS) colonization, spontaneous onset of labor, multiple digital vaginal examinations, meconium-stained amniotic fluid and placement of internal fetal or uterine monitoring devices, chorioamnionitis causes the majority of prematurity, and premature neonates are at high risk for EONS [13,14].

The risk (assessment tool) factors for EONS are elevated maternal infectious parameters (temperature > 38 °C, C-reactive protein (CRP) > 20 mg/Litter, and leukocytosis), maternal fever, uterine tenderness, or foul odor of the amniotic fluid, fetal tachycardia [13]. Maternal serum IgG antibodies against specific capsular polysaccharides of GBS shown to be protective against infection with the relevant GBS strain in their infants, and the risk of GBS EONS has been increased to 1 percent when membranes are ruptured ≥ 18 hours prior to delivery [15], and the EONS risk of infants delivered to mothers with evidence of chorioamnionitis is estimated to be between 1 to 4 percent [15,16]. In utero inhalation or swallowing of infected amniotic fluid by the fetus may lead to intrapartum sepsis, that may partially

explain the high sepsis incidence in infants delivered of mothers with chorioamnionitis, alternatively, colonization of the skin and mucous membranes by pathogens involved in chorioamnionitis may cause infection shortly after birth when these barriers lose their integrity [15].

Neonatal factors

Very Low Birth-Weight (VLBW) infants are considered to have high incidence of mortality, with less than 1,000 gram infant birth weight, the incidences are estimated to be 26 per 1,000 live birth in premature infants and with a birth weight of between 1,000 and 1,500 gram 8 per 1,000 live births [17]. The risk factors of EONS related to the neonate are low gestational age (32-36 weeks of pregnancy; birth weight 1,500 gram) [13,14]. There is a strong relation between EONS and low gestational age with low birth weight [13]. Maternal infections represented by the intrapartum fever that are frequently transmitted to the baby in utero or during passage through the birth canal that usually causes early onset neonatal sepsis, APGAR score at 5 minutes less than seven had a strong predictive effect on the risk of neonatal sepsis [18].

Result

there are two independent factors influencing neonatal sepsis, first maternal factors, and the second neonatal factors. Maternal factors include: Chorioamnionitis, prolonged rupture of membrane >18 hours and group B streptococcal (GBS) colonization, premature rupture of membrane, spontaneous onset of labour, multiple digital vaginal examinations, meconium-stained amniotic fluid and placement of internal fetal or uterine monitoring devices. Neonatal factors: The risk factors of EONS related to the neonate are low gestational age (32-36 weeks of pregnancy) birth weight 1,500gram, Apgar score at 5 minutes less than seven, and male gender.

Conclusion

Neonatal sepsis still the major Cause of morbidity and mortality of the neonate in NICU department, and there is many factors influencing the early onset neonatal sepsis related to the mother such as PROM, prolonged ROM, Chorioamnionitis, and infection during pregnancy, and the neonate such as gender, age, birth weight and APGAR score less than seven at five minute, early detection and treatment enhance and decrease the incidence of neonatal sepsis.

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