Candidemia in Neonatal Intensive Care Unit

Thesis

Submitted for partial fulfillment of Master Degree
in **Pediatrics**

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بسم الله الرحمن الرحيم

قَالُوا سُبْحَانكَ لاَ علِمَ لَنَا إلاّ مَا

عَلّمْتَنَا إنَّكَ أنتَ الْعَلِيمُ الْحَكِيمُ

صدق الله العظيم

سورة البقرة آية (٣٢)

Acknowledgement

First and foremost, I feel always indebted to **Allah**, the most kind and the most merciful.

I would like to express my sincere gratitude to **Prof. Mohammed Ashraf Abd-El Wahed,** Professor of Pediatrics, Faculty of Medicine – Ain Shams University, under his supervision, I had the honor to complete this work, I am deeply grateful to him for his professional advice, guidance and support.

I wish also to express my gratitude to **Dr. Samia Abdou Girgis,** Assistant Professor of Clinical Pathology, Faculty of Medicine – Ain Shams University, for her great efforts, kind advice, support and encouragement throughout the whole work.

I am also greatly indebted to **Dr. Soha Mohamed Khafagy,** Lecturer of Pediatrics, Faculty of Medicine – Ain Shams University, for her tremendous effort she has done, enthusiasm and help.

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Introduction

A review of positive blood cultures noted the relative increase in importance of fungal bloodstream infections (BSI) ***(Weinstein et al., ١٩٩٧).***

Candida is now reported to be the fourth most common blood stream pathogen in the United States ***(Pfaller et al., ١٩٩٨).***

Population-based studies in Europe ***(Cuenca-Estrella et al., ٢٠٠٥)*** and the United States ***(Wisplinghoff et al., ٢٠٠٤)*** demonstrate that approximately ٩٥٪ of candidaemia is caused by four species: Candida albicans, Candida glabrata, Candida parapsilosis and Candida tropicalis. Of these, C. albicans accounts for ٤٧–٦٠٪ of all blood stream isolates ***(Pfaller et al., ٢٠٠٧).*** There has also been a documented increase in the proportion of infections caused by other non-albicans species ***(Pfaller et al., ٢٠٠٤).***

Candida infections are an important cause of morbidity and mortality in the neonates ***(Friedman et al., ٢٠٠٠).*** It has been recognised that patients hospitalized in a neonatal intensive care unit (NICU) are at risk of developing late-onset sepsis from Candida spp ***(Saiman et al., ٢٠٠١).***

Candida infections have been studied extensively in neonates and was found that ٢١٪ of very low-birth weight (VLBW) infants developed late-onset infections ***(Stoll et al., ٢٠٠٢).*** Invasive candidiasis occurred in spite of fluconazole prophylaxis ***(Healy et al., ٢٠٠٥).***

Numerous risk factors for candidemia have been identified in NICU patients such as immature skin structure, prolonged use of antimicrobials, indwelling central venous catheters, hyperalimentation, mechanical ventilation, steroids or preexisting fungal colonization ***(Lopez-Sastre et al., ٢٠٠٣).***

Aim of the Work

The goals of our study are; to determine the Candida species prevalent in Neonatal ICU (NICU) of Pediatric Hospital Ain Shams university, their antifungal susceptibility pattern and the risk factors associated with acquisition of candidemia.

Neonatal Sepsis

Definition:

Neonatal sepsis is defined as a clinical syndrome characterized by systemic signs of infection and accompanied by bacteremia in the first month of life ***(Remington et al., ٢٠٠٥).*** As many as ٢٪ of the fetuses are infected in utero, and up to ١٠ % of the infants have infection in the ١st mo of life ***(Behrman et al., ٢٠٠٤).*** Neonatal infections are unique for several reasons:

١) Infectious agents may be transmitted from the mother to the fetus or newborn infant by diverse modes.

٢) Newborn infants are less capable of responding to infection because of one or more immunologic deficiencies.

٣) Coexisting conditions may complicate the diagnosis and management.

٤) The clinical manifestations of neonatal infection vary and include subclinical infection, mild to severe manifestations of local or systemic infection.

٥) Maternal infection is often undiagnosed during pregnancy because the mother was either asymptomatic or had non specific signs of infection.

٦) A wide variety of etiological agents infect the newborn including bacteria, viruses, fungi, protozoa and mycoplasma.

٧) With advance in neonatal care, increasingly immature, very low birth weights are surviving and remain for long time in NICU that puts them at high risk of infection.

(Behrman et al., ٢٠٠٤)

Perinatal risk factors:

Causes of infections in newborns can be divided into three main groups:

Intrauterine, intrapartum, and postnatal infections. All three groups include factors that increase the infant's risk of coming in contact with an organism that can cause an infection ***(Bellig, ٢٠٠٤).***

Intrauterine factors:** Those increase the risk before birth include the following: poor prenatal care, poor nutrition, recurrent abortions, and substance abuse. Intrauterine infections occur when pathogenic organisms cross the placenta into the fetal circulatory system. The organisms, such as cytomegalovirus (CMV), can reside in the amniotic fluid. Other organisms ascend from the vaginal track, infecting the membranes and causing them to rupture. This rupture of membranes can lead to infections of the respiratory and gastrointestinal tract of a newborn ***(Bellig, ٢٠٠٤).

Intrapartum factors:** those increase the infants chance of becoming infected during the birthing process include: prolonged rupture of membranes (>١٨ to ٢٤ hours), urinary tract infections, preterm labor, prolonged or difficult labor, maternal fever, colonization with Group B Streptococcus (GBS), and maternal infections. Most infections during the birthing process are related to the infant coming into unavoidable contact with an infected birth canal. The birth canal can host bacteria that an infant's immune system cannot defend against ***(Bellig, ٢٠٠٤).