Candida Colonization in Newborn in Neonatal Intensive Care Unit at Ain Shams University Hospitals

Thesis

Submitted for partial fulfillment of Master Degree in Basic Medical science

(Medical Microbiology and Immunology)

By

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List of Abbreviations

ABCD	:	Amphotericin B colloidal dispersion
AIDS	:	acquired immuno deficiency syndrome
CDC	:	Center for Disease Control
CNS	:	central nervous system
CSF	:	Cerebro spinal fluid
ELBW	:	extreme low birth weight
FIP	:	focal intestinal perforation
GIT	:	*Gastro intestinal tract*
HCWs	:	health care workers
HIV	:	human immunodeficiency virus
ICU	:	intensive care unit
LamB	:	liposomal amphotericin B
LONS	:	Late onset neonatal sepsis
NEC	:	necrotizing enterocolitis
NICU	:	Neonatal intensive care unit
PICU	:	Premature intensive care unit
ROP	:	retinopathy of prematurity
UTI	:	Urinary tract infection
VLBW	:	very low birth weight
VLONS	:	Very Late onset neonatal sepsis

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Acknowledgement

*First of all, to **Allah** the most merciful for guiding me through and giving me the strength to complete this work the way it is.*

I wish to express my sincere gratitude and appreciation to Prof. Amany Tharwat Abd EL-Rahman *Professor of Microbiology and Immunology, Faculty of Medicine-Ain Shams University, for giving me the privilege of working under his supervision, eminent guidance, continuous encouragement and valuable criticism and instructions. No words can express my respect to his thoughtfulness and overwhelming guidance.*

My deepest thanks and most sincere gratitude go to Prof Dr. Nayera Ismail Attia, *Professor of Pediatrics in Institute of Postgraduate Childhood Studies and NICU of Obstetrics and Gynaecology Department Ain Shams University for his close supervision, generous guidance, enlightening suggestions and creative ideas. I must admit that I consider myself fortunate to work under his supervision.*

I am deeply indebted to Dr. Rasha Ahmed Reda Nasr *Ass. Prof. of Microbiology and Immunology, Faculty of Medicine - Ain Shams University for his valuable corrections, worthy criticism and great cooperation throughout the whole work step by step. I would like to have the opportunity to thank him for everything he has done for me.*

Finally, I would like to convey my Gratitude to my Patients and Their families *and to every person who helped me while performing this work.*

✍ Fatma Mohammed

استبيان لمعرفة مدي تطبيق برنامج مكافحة العدوى داخل الوحدة

م	البيـــــــــان	لا	نعم	ملاحظات
١	تتوفر بالوحدة وثيقة مكتوبة بسياسات واجراءات مكافحة العدوي للآتى: الغسيل- طرق تنظيف الوحدة- طرق التعقـيم- نظـام التهوية- المعمل/ ومعلنة.			
٢	توجد بالوحدة لجنة للتحكم فى العدوى/ تجتمـع بشـكل دوري/ وتسجل محاضرها.			
٣	يوجد توصيف وظيفي لمسئول مكافحة العدوي/ ومعلن.			
٤	توجد خطة وجدول لتدريب العاملين بالوحدة/ ومعلن.			
٥	توفر استمارات خاصة للابلاغ عن الامراض المعدية.			
٦	يتم تقييم معدلات العدوى بالوحدة دوريا.			
٧	توجد سجلات للمزارع المأخوذة من اماكن مختلفة مـن الوحدة.			
٨	يتم تسجيل نتيجة المزارع المرسلة.			

Check list

Specimen no.:

Name : **Sex:** **Age:**

Profession : **duration:**

Hand washing	**Yes**	**No**
Adequate hand facilities to need.		
Hand wash skins hand free, dedicated to hand washing.		
Antimicrobial soap available for invasive procedures.		
Plain soap available for routine procedures.		
Hands are washed between patient contacts.		
Hand are washed each time gloves are removed.		
Barrier equipment.		
Readily available when needed.		
Disposed off corretly.		
Clean ones located away from sinks & other splash areas.		
Gloves are worn for contact with any patient.		
Long sleeved gowns are available when needed.		
Antibiotic intake: - With doctor prescription. - Without doctor prescription: - Full course:		
Infection control training: - Before. - After. - Before and After.		

Introduction

Candida species have become common causes of nosocomial invasive infections in neonatal intensive care units (NICUs) ***(Roilides et al., ٢٠٠٣ and Heljic et al., ٢٠٠٥).*** They are the third most frequent causal agent of late-onset sepsis in preterm neonates ***(Stoll et al., ٢٠٠٢ and Chapman, ٢٠٠٧)*** with crude mortality rate of ٣٠٪ to ٧٥٪ ***(Karlowicz et al., ٢٠٠٢ and Makhoul et al. ٢٠٠٢).*** *Candida* species also account for ٩ to ١٣ % of all blood stream isolates in NICUs ***(Agarwal et al., ٢٠٠٤).***

In the past decade colonization and infection with *Candida* species has risen dramatically and high rates of carriage in neonates, especially preterms, has been reported by many workers ***(Sharp et al., ١٩٩٢ and Singh et al., ١٩٩٩).*** This has been attributed to the advancement in medical field, life support systems, relative immunodeficiencies, extensive use of broad spectrum antibiotics, high prevalence of hand carriage of *Candida* in health care workers, ability of Candida to survive on environmental surfaces and colonization of maternal vagina ***(Pfaller ١٩٩٥, Seeling, ١٩٩٦, and Mendiratta et al., ٢٠٠٦).***

Colonization with *Candida* has been identified as the major risk factor and the first step in development of candidaemia ***(Heljic et al., ٢٠٠٥ and Mendiratta et al., ٢٠٠٦).*** The NICU babies become colonized very early. About ١٠% of these babies get colonized in the first week of life and up to ٦٤٪ babies get colonized by ٤ weeks of hospital stay. The gastrointestinal tract is the first to become colonized though multiple sites as oral cavity and skin may be involved ***(Rao and Ali ٢٠٠٥, and Mendiratta et al., ٢٠٠٦).*** Candida colonization has been greatly associated with prematurity, longer duration of rupture of membranes, administration of steroids and antibiotics and vaginal colonization of mothers ***(Saiman et al, ٢٠٠١ and Mendiratta et al., ٢٠٠٦).***

Broad-spectrum antibiotic therapy was found to promote fungal growth in neonates with prior colonization ***(Charles et al., ٢٠٠٥).*** Increased risk for systemic candidiasis was also found to be associated with parenteral nutrition, the presence of a central venous catheter and prolonged ICU stay ***(Saiman et al., ٢٠٠٠ and Manzoni et al., ٢٠٠٦).***

Although Candida albicans has been the most frequently isolated species in colonized or infected neonates,

non-*C.albicans* species particularly *C. parapsilosis* and *C. tropicalis* have emerged as important predominant fungal pathogens in many neonatal ICUs ***(Huang et al., ٢٠٠٠, Roilides et al., ٢٠٠٣, Rao and Ali, ٢٠٠٥, and Chapman, ٢٠٠٧).*** This could be because of selection of lesser susceptible non-albicans species due to frequent use of fluconazole ***(Agarwal et al., ٢٠٠٤).***

Aim of the Study

This work aims to study the Candida colonization on and after admission to NICU and progression to infection and to determine the risk factors and the possible source of colonization. This study also aims to identify the isolated Candida species and determine their susceptibility to different antifungal drugs.

Candida

Genus Candida

The heterogeneous genus candida belongs to the family candidaceae within the ascomycetes. The genus contains approximately ٢٠٠ species. This number is not immutable. Technological advances that affect apparent taxonomic relationships will continually result in reassignments of present species and discovery of new species. These advances may also lead to the designation of new genera ***(Mahieu et al., ٢٠١٠).***

Candida species are ubiquitous yeasts, being found on many plants and as normal flora of the alimentary tract of mammals and mucocutaneous membranes of humans ***(Calderone, ٢٠٠٢).*** Essentially all areas of the gastrointestinal tract of humans can harbor Candida. The most commonly