Evaluation of the Chromogenic medium ChromID CPS for Isolation & Identification of Urinary Tract Pathogens

Thesis

Submitted for partial fulfillment of M.Sc. Degree in Basic Medical Science (Medical Microbiology & Immunology)

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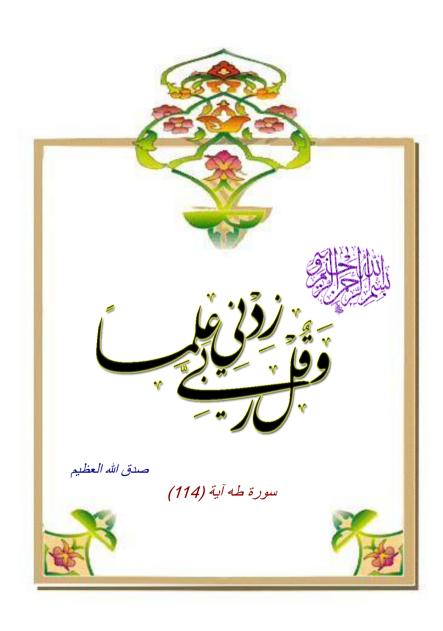
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List of Abbreviations

Afa : Afimbrial adhesions

AMP : Antimicrobial peptides

ASB : Asymptomatic bacteriuria

BA : Blood agar

CAUTI : Catheter-associated urinary tract infection

CDC : Centers for Disease Control

CFU : Colony Forming Unit

CLED : Cystine lactose electrolyte-deficient

CNF1 : Cytotoxic necrotizing factor 1

DsDNA : Double-stranded DNA

ED : Emergency departments

GBS : Group B Streptococcus agalacticae

HBD2 : Human betadefinsins 2

HIV : Human immunodeficiency virus

IDSA : Infectious Disease Society of America

KESC : Klebsiella, Enterobacter, Serratia a

Citrobacter

KTRs : Kidney transplantation recipients

LE : Leukocyte esterase

MAC : MacConkey agar media

MSU : Mid-stream sample of urine

List of Abbreviations (Cont.)

SCIs : Spinal cord injuries

THP : Tamm-Horsfall protein

UPEC : Uropathogenic *E.coli*

UTIs : Urinary tract infections

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Introduction

Urinary tract infections (UTI) are considered one the most common bacterial infections. They affect up to 1 million individuals annually. There are limited data on t true impact of UTIs in the developing world. In USA, U7 are responsible for 7 million physician visits and more th 100,000 hospital admissions annually (*Renuart et al.*, 2013

The total annual direct and indirect cost due to UTIs the US alone is estimated to be greater than US\$ 1.6 billi (*Talan et al.*, 2004). Globally, they cause not only significant amount of morbidity, but also a significat financial burden (*Habte et al.*, 2009).

Rapid identification of the infecting organism provid useful information to the clinician for appropriate antibio choice prior to organism susceptibilities being available a can alert infection control teams to potential outbrea (Merlino et al., 1996).

Most urinary tract infections are caused by grainegative bacteria like *Escherichia coli*, *Klebsiella sp. Proteus mirabilis*, *Pseudomonas aeruginosa*, *Acinetobaci spp.*, and *Serratia spp*, and gram-positive bacteria such

Enterococcus spp and Staphylococcus spp (Grude et a 2001).

In recent years, a range of chromogenic media has be made commercially available for the improved isolation a identification of urinary tract pathogens (*Scarparo et a 2002*). These media detect key microbial enzymes diagnostic markers for pathogens through the use "chromogenic" substrates incorporated into a solid-aga based matrix (*Van et al., 2011*).

In contrast to conventional culture media, chromoger media allow direct colony color-based identification of t pathogen from the primary culture (*Kumar et al., 2010*). To not only minimizes the need for further identification tends to the state of the results to the clinician to facilitate early initiation of antibiotic thera (*Lakshmi et al., 2004*).

In addition, routine use of chromogenic media carri the potential for cost savings in the clinical microbiolo laboratory since they could potentially save the time a expense of performing assimilation panels and oth fermentative or biochemical tests (*Horvath et al.*, 2003).

Furthermore, the diagnosis of urinary tract infectio contributes significantly to the daily workload in microbiology laboratory; hence any innovation that tends reduce the workload is always welcome when a high-qual standard is still maintained (*Hengestler et al.*, 1997).

Aim of the work

To compare between the use of chromID CPS agar a the conventional culture and identification methods as reference to conclude the best way for rapid diagnosis of t most frequent urinary tract pathogens reducing the burden biochemical characterization, allowing the clinician commence an initial course of antibiotics.

Review of Literature

Urinary Tract Infections

Urinary Tract Infection (UTI) is one of the mocommon infections which affect humans, cause significal distress to individuals, and is associated with high healthcal and social costs. If UTI is not treated by primary health call providers, it can cause serious potential consequences, su as pyelonephritis and bacteremia. In addition, it is believ that UTIs have become increasingly resistant to first-liantibiotic therapy (*Tehrani et al., 2014*).

for more than

100,000

hospi

admissions annually, (Foxman et al., 2002). They al account for at least 40% of all hospital-acquired infectio and are, in the majority of cases, catheter-associate Bacteriuria develops in up to 25% of patients who require urinary catheter for > 7 days, with a daily risk of 5%. It h been estimated that an episode of healthcare-associat (nosocomial) bacteriuria adds significantly to the direct confidence of acute-care hospitalization. In addition, the pathogens a fully exposed to the nosocomial environment, includi

UTIs

account

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selective pressure by antibiotic or antiseptic substance

Nosocomial UTIs therefore comprise perhaps the large