BIOSCIENCES BIOTECHNOLOGY RESEARCH ASIA, June 2016. Vol. **13**(2), 845-857

Prevelance of Bacteria and *Candida* Oral Colonization Infections Among Dialyzed Patients

Mohammed S. Alhussaini

Department of Clinical Laboratory Sciences, College of Applied Medical Sciences, Shaqra University, Saudi Arabia.

http://dx.doi.org/10.13005/bbra/2106

(Received: 20 April 2016; accepted: 08 June 2016)

The prospective study aimed to investigate the incidence of bacteria and *Candida* infections among dialyzed patients admitted to Saudi Arabian Medical Center (Riyadh City, KSA). A total of 55 of microbial isolates were recovered from 56 different cases by taken oral swab from dialyzed patients. Positive clinical specimens were cultured and identified using standard aerobic microbiological techniques. The conventional *Candida* identification was used for the identification of the isolated strains. Antimicrobial susceptibility testing of the bacteria and *Candida* isolates was determined. The results of this study revealed that 33 (60%) of isolates were Gram negative and Gram positive bacteria representing *Enterobacter cloacae* was the most predominant organisms (21.21%). Out of the 56 studied cases, 22 (40%) were positive for 4 species of the genus *Candida* isolates. Antimicrobial susceptibility results showed that amikacin, gentamicin, ofloxacin, pfloxacin ciprofloxacin, and imipenem were the more antimicrobial agents effective against the Gram negative isolates. While Gram positive bacterial isolates were sensitive to all antimicrobial agents except gentamicin, clindamycin and metronidazol. Antifungal sensitivity of *Candida* isolates revealed that *C.albicans* and *C.tropicalis* were found to be highly susceptible to azoles whereas isolates of *Candida* species exhibited decreased susceptibility to amphotericin B.

Key words: Nosocomial infection , Oral colonization and Dialyzed patients.

Patients with renal failure are susceptible to infection. In the predialysis era, 60% of patients with chronic renal failure requiring hospitalization were infected and 39% died from infectious causes. It was assumed that the debility caused by the uremic state increased the risk of infection, and the reversal of uremia would reduce the risk of infection[1]. Unfortunately, the prescription of chronic hemodialysis to reduce the uremic state did not reduce the problem of infection; it only changed the paradigm. Dialysis superimposes new problems onto patients already suffering relentless deterioration from underlying multi-system disease and poor wound healing. Diabetes mellitus is the responsible cause for one-half of end stage renal disease (ESRD) cases, followed by hypertension, and chronic glomerulonephritis. Heart disease is present in 40% of the patients and 15% suffer from peripheral vascular disease. In addition to infection risk associated with frailty and disability are problems associated with the intravascular connection, white blood cell and complement dysfunction from contact with dialysis membranes, and exposure to bacteria and pyrogens from contaminated dialysis solutions or inadequately cleaned dialysis machines[2].

Staphylococcus aureus*, coagulase negative staphylococci (CONS), *P. aeruginosa

E. coli, *Klebsiella* and *Enterobacter* were the most frequent isolates . From infections of the hemodialysis vascular access device (HVAD), *S. aureus* and *CONS* were the most commonly isolated bacteria. Unexpectedly, Gram-negative bacteria were commonly isolated from the initial sputum cultures of patients with community-onset

* To whom all correspondence should be addressed.
Mob.: =966-569506939;
E-mail: malhussaini@su.edu.sa

pneumonia. Fifty-five percent (55 %) of 113 patient episodes with positive sputum cultures grew gram-negative bacteria, including 23 isolates of *P. aeruginosa*. Although outpatient hemodialysis facilities are free-standing and separate from the hospital, the cohorting of patients into large room(s) with multiple dialysis stations, the pervasive and widespread use of antibiotics, and frequency with which patients are in/out of the hospital all contribute to a resident microbiological flora historically associated with nosocomial infections. Infections in these patients are more accurately classified as Health Care Associated (HCA) rather than community acquired[3].

Opportunistic fungal infections are becoming more frequent complication in hospitalized patients especially during hemodialysis, cancer therapy, after organ transplantation and in AIDS infections[4]. Parenteral nutrition, broad-spectrum antibacterial agents and prolonged neutropenia with neutrophile count less than 0.5x 10(9) / L longer than 7 days, are the most important risk factors for the development of systemic yeast-fungal infections in hospitalized patients[5,6]. Furthermore, using of invasive monitoring devices, indwelling catheter and other mechanical devices are likely to be important contributing factors[7,8].

The yeast fungal infections in hospitalized patients are often severe, rapidly progressive and difficult to diagnose or treat[9]. The opportunistic pathogens like *Candida* are responsible for a major cause of morbidity and mortality in the chronically debilitated and immunocompromised patients[10]. *Candida albicons* is consistently the most frequently isolated causative agent of *Candida* infection in human[11,12]. Other species of *Candida* have been recovered from cases of infection with increasing frequency. These include *Candida glabrata, C. parapsilosis, C. tropicalis, C. krusei, C. guilliermondii* and *C. kefyr*[5,13,14]. Also among the organisms recognized and causing devastating opportunistic mycosis in children and adults with solid tumors and renal failure are *Trichosporon, Rhodotorula* and *Cryptococcus neoformans*[15].

Candida species have become important nosocomial pathogens in immunocompromised patients and are responsible for considerable morbidity and mortality, especially in preterm infants[16,17]. Colonization with *Candida* has been identified as the major risk factor and a necessary first step in development of candidemia, providing a reservoir of the potentially invading *Candida* strains[18,19]. This study aimed to analyze patterns of bacteria and *Candida* colonization in dialyzed patients admitted to Saudi Arabian Medical Center, Riyadh City, KSA as well as the susceptibility pattern of bacteria and *Candida* isolates to different antimicrobial drugs.

MATERIALS AND METHODS

a-Cases

This prospective study was carried out on 56 patients presented by patients with renal failure admitted to Saudi Arabian Medical Center, Riyadh City, KSA, during the period from May , 2015 to September, 2015, their age ranged from 40-75 years (57.2±5.1), 35 patients are males, and 21 patients are females. Written consent from all patients submitted in the study was taken full history taking to all patients.

Detection and isolation of samples

Premoistened (with sterile normal saline) cotton-tipped swabs were used to obtain samples from the oral cavity. Oral swabs were taken from all patients and inoculated in a transport media (thioglycolate broth) for about 2-4 hours, to be inoculated on nutrient agar, blood agar, MacConkey's agar, cooked meat media and sabouraud dextrose agar (Himedia laboratories, Mumbai, India) with 50mg chloramphenicol/liter and 50mg gentamicin/liter (pH 5.5) and incubated under aerobic conditions. After incubation for 24-48 hours at 37° C for bacteria and incubation for 48 hours at 24° C for fungi, they were examined . The developed colonies were generally counted, sub cultured and identified.

Examination of the bacterial growth

Identification of bacterial isolates

Representative colonies were identified systemically for: Colonial morphology and the effect of organisms on different culture media e.g., alpha or beta haemolysis on blood agar, rose pink (lactose fermenting) colonies, or pale yellow (non lactose fermenting) colonies on MacConkey's agar, swarming on nutrient agar plate and Sabouraud's dextrose agar plates (for suspected Candida sp.) , and Gram stained film for growing microorganisms

were done Gram positive and Gram negative isolates were identified microscopically and biochemically according to Koneman *et al*[20] and Hawkey[21,22] and identified to species level by using the MicroScan WalkAway diagnostic microbiology system—an evaluation[23].

The MicroScan WalkAway Method is an automated bacterial identification and susceptibility testing system that has only recently been marketed in Australasia. We evaluated the performance of the instrument using MicroScan Rapid fluorescent panels to determine the identity and antibiotic susceptibilities of 100 Gram negative and 100 Gram positive organisms representing both common clinical isolates and selected organisms of interest. MicroScan results were compared with those obtained by conventional biochemical identification, and antibiotic susceptibility testing using agar dilution following the National Committee on Clinical Laboratory Standards guidelines. MicroScan and reference identifications were in agreement for 93% of Gram negative organisms. MicroScan results were available within 2 hrs. Additional tests were required to confirm the identity of 9 isolates but on only 2 occasions would a definitive identification been delayed beyond 24 hrs. Very major or major discrepancies were seen in 2% and minor discrepancies in 8% of Gram negative susceptibility tests. Susceptibility results were available within 7 hrs but could not be obtained for 13 slow growing organisms. With Gram positive organisms MicroScan agreed with the reference identification of 87% of isolates cultured on horse and 90% of those cultured on sheep blood agar. Discrepancies that occurred in the identification of some streptococci made us question the suitability of MicroScan as the sole means of identifying these organisms. All identifications were available within 24 hrs and the requirement for additional tests was minimal. Susceptibility results closely matched those obtained by agar dilution with < 1% major and 7% and 9% minor discrepancies occurring with sheep and horse blood respectively.

Examination of the Mycological growth

Identification of the isolated *Candida* strains

The obtained *Candida* isolates were identified according to Ladder[24], Ahearn[25,26] and Burnett *et al*[27]. The conventional yeast identification methods based on morphology, sporulation and fermentation characteristics as well as the assimilation of a wide range of carbon and nitrogen sources were used. The isolates were tested to grow on media without different vitamins (Thiamine, pantothenate, myo-inositole, Pyridoxine, Niacin, para aminobenzoic acid. The pathogenic potentialities of the yeast isolates were studied by testing protcolytic, lipolytic and haemolytic activity[28]. Also the species were determined by the germ tube test and the KJ3006 HiCanclicla Identification Kit (Himedia laboratories, Mumbai, India) according to manufacturer's instructions.

Confirmatory tests

Tween 80 oxgal-caffic acid (TOC) agar plates were streaked with a 48 hrs-old yeast colony, covered with a sterile cover slip, incubated at 37°C for 3 hrs and observed for germ tube production. TOC agar plates were incubated at 28°C for 2-3 days in the dark to promote the production of chlamydospores, hyphae and pseudohyphae. Ascospore formation and urea hydrolysis were also tested for the isolated strains to confirm the identification.

Antimicrobial Susceptibility Testing

The in vitro antimicrobial susceptibility of the bacteria and *Candida* isolated was determined by using the disk diffusion method. Susceptibility testing of bacterial isolates was performed for amoxacillin - Clavulinic acid **{**augmentin (Aug 30 µg)}, oxacillin (Oxa 5 µg), cefotaxime (Cef 30 µg), ampicillin (Amp 10 µg), amikacin (Ami 15 µg), gentamicin (G 120 µg) , ofloxacin (Ofx 5µg), pfloxacin (Pfx 5µg), ciprofloxacin (Cip 5µg), imipenem (Im 30 µg), clindamycin (Cl 10 µg) and metronidazole (Met 10 µg), while susceptibility testing for *Candidal* isolates was performed for amphotericin B, ketoconazole, itraconazole, fluconazole (Hi media laboratories, Mumbai, India).

RESULTS

In this study, total of 55 clinical microbial isolates were recovered from 56 cases hospitalized at Saudi Arabian Medical Center from May, 2015 to September, 2015. Single microbial isolate was recovered from 21 case (37.5%) , and two microbial isolates were recovered from 13 case (23.21%), while 3 cases (5.35%) were found to be carrying more than two microbial isolates and19 case (33.93

Table 1. Incidence of clinical isolates recovered from colonized and infected dialysis zed cases admitted to Saudi Arabian Medical Center

Total No. of dialysis zed cases	Cases				Isolates	
	Case revealed single isolate No.	Case revealed two isolates No.	Case revealed three isolates No.	Case revealed no isolate No.	Total No.	%*
56	21	13	3	19	55	100

*percentage was correlated to total number of isolates

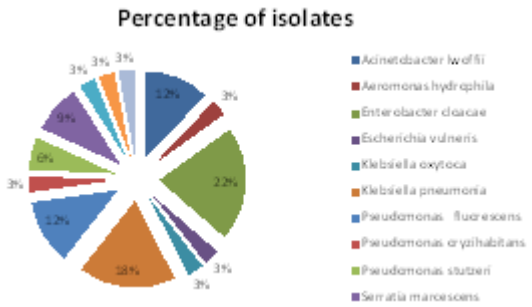

Fig. 1. Frequencies of Gram positive and Gram negative isolated from infected dialyzed cases admitted in Saudi Arabian Medical Center.

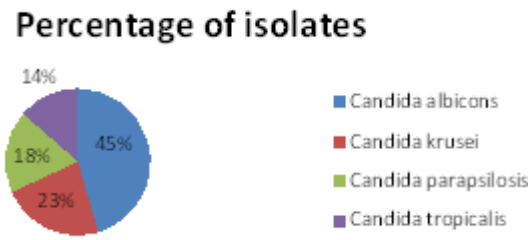

Fig. 2. Frequencies of *Candida* isolated from infected dialyzed cases admitted o Saudi Arabian Medical Center

%) with non microbial isolates as described in Table 1 and Table 2.

This prospective study revealed that 54.55% (30/55) of isolates were Gram negative 5.45% (3/55) were Gram positive and 40 % (22/55) were *Candida* species as described in Table 3.

The results of this study revealed that Gram negative bacterial isolates were *Acinetobacter lwoffii*, *Aeromonas hydrophila*, *Enterobacter cloacae*, *Escherichia vulneris*, *Klebsiella oxytoca*, *Klebsiella pneumonia*, *Pseudomonas fluorescens*, *Pseudomonas oryzihabitans*, *Pseudomonas stutzeri* and *Serratia marcescens* with following frequencies 12.12% (4/33) , 03.03%(1/33) ,21.21% (7/33), 03.03%(1/33), 03.03%(1/33), 18.18% (6/33), 12.12% (4/33) , 03.03%(1/33) , 06.06%(2/33) and 09.09% (3/33) respectively, where Gram positive bacterial isolates were *Enterococcus faecium*, *Staphylococcus auricularis* and *Streptococcus bovis* with the following frequencies 03.03% (1/33), 03.03% (1/33) and 03.03% (1/33) respectively as described in Table 4 and Fig 1.

Identification and physiological characterization of the isolated *Candida* strains

In the present study the *Candida* isolates identified as 4 species of *Candida*, *Candida albicans*, *C. krusei* , *C. parapsiolosis* and *C.tropicalis*. The results of assimilation tests revealed that none of the isolates were capable of growing on melibiose, lactose, erthritol, methanol as carbon source and creatinine as nitrogen source. The results of fermentation tests showed negative results in all isolates of *C. tropicalis*, while the different species of *Candida* were able to ferment a narrow range of sugars. The results of assimilation of vitamin showed that *C. tropicalis* unable to grow on medium without thiamine (Table 5).

Germ tube test, Ascospore formation , urease test and Chlamydospore formation along with assimilation and fermentation results confirmed the identification of the isolated yeast strains (Table 6).

Pathogenic potentialities of the isolated *Candida* strains

The pathogenic potentialities were tested for the isolated *Candida* strains and the results showed that the strains were able to grow at 37°C, which indicates their ability to grow at body temperature of patients. Also they could hydrolyze casein and fats that indicates their ability to

Table 2. Frequencies and incidence of microbial isolates recovered from colonized and infected dialysis zed cases admitted to Saudi Arabian Medical Center

Case No.	Bacterial isolates			Fungal isolates
	Gram positive	Lactose ferm.	Gram negative Non L. ferm.	*Candida*
1	*St. bovis*			
2		*K. oxytoca* E. cloacae		*C. albicans*
4			*P. stutzeri*	*C. krusei*
5		*E. cloacae* E. vulneris		
6				*C. albicans*
7		*K. pneumoniae*		*C. parapsilosis*
8				*C. albicans*
10			*S. marcescens*	
11				*C. albicans*
13				*C. tropicalis*
14	*E. faecium*	*K. pneumonia* E. cloacae		
16				*C. albicans*
18		*E. cloacae*		
19			*A. lwoffii*	
20				*C. albicans*
21			*P. fluorescens*	*C. parapsilosis*
23		*P. oryzihabitans*		
24		*E. cloacae*		
25		*K. pneumoniae*		*C. krusei*
26				*C. albicans*
27				*C. albicans*
29		*K. pneumoniae*	*A. lwoffii*	*C. krusei*
30		*A. hydrophila*	*P. fluorescens*	
31	*S. auricularis*		*S. marcescens*	
33			*A. lwoffii* P. fluorescens	
34				*C. parapsilosis*
37			*A. lwoffii*	
38		*E. cloacae*	*P. stutzeri*	
42				*C. tropicalis* C. parapsilosis
45				*C. krusei*
46			*S. marcescens*	
47		*K. pneumoniae*		*C. tropicalis*
50			*P. fluorescens*	
51				*C. albicans*
52				*C. albicans*
53		*K. pneumoniae*		*C. krusei*
56		*E. cloacae*		

produce proteolytic and lipolytic enzymes which as described in Table 7.

The results obtained showed that hospitalized patients were infected with 4 species of *Candida*. *C. albicans* was the most prevalent species followed by *C. krusei*, *C. parapsilosis* and finally *C.tropicalis* with following frequencies 45.45% (10/22), 22.73% (5/22), 18.18% (4/22) and 13.64% (3/22) as described in Table 8.

In this study the results showed that the Gram negative bacterial isolates were found to be highly susceptible to amikacin, gentamicin, ofloxacin, pfloxacin, ciprofloxacin, imipenem, whereas intermediate to amoxacillin - clavulinic acid, cefotaxime, ampicillin, and highly resistance to oxacillin, clindamycin and metronidazole, as showed in Table 9.

The present study showed that, the isolated Gram positive bacteria were sensitive to all antimicrobial agents except gentamicin, metronidazole and clindamycin as described in Table 10.

Table 3. Prevalence of Bacterial and Fungal isolates recovered from colonized and infected dialysis zed cases admitted to Saudi Arabian Medical Center

Total No. of dialysis zed cases		Bacterial isolates			Fungal isolates	Total No. of isolates	
		Gram positive	Gram negative		*Candida*		
No.	%	No.	No. of L.F.	No. of Non L.F.	No.	No.	%
56	100	3	17	13	22	55	100

Table 4. Frequencies of Gram positive and Gram negative isolated from infected dialyzed cases admitted to Saudi Arabian Medical Center

S. No.	Microorganisms	No. of isolates	Percentage of isolates
	Gram negative bacteria	30	90.90
1	*Acinetobacter lwoffii*	4	12.12
2	*Aeromonas hydrophila*	1	03.03
3	*Enterobacter cloacae*	7	21.21
4	*Escherichia vulneris*	1	03.03
5	*Klebsiella oxytoca*	1	03.03
6	*Klebsiella pneumonia*	6	18.18
7	*Pseudomonas fluorescens*	4	12.12
8	*Pseudomonas oryzihabitans*	1	03.03
9	*Pseudomonas stutzeri*	2	06.06
10	*Serratia marcescens*	3	09.09
	Gram positive bacteria	3	09.09
1	*Enterococcus faecium*	1	03.03
2	*Staphylococcus auricularis*	1	03.03
3	*Streptococcus bovis*	1	03.03
	Total	33	60.00

Table 5. Physiological characteristics of *Candida* strains isolated from dialysis zed cases admitted to Saudi Arabian Medical Center

Physiological characteristics	*C.albicans*	*C.krusei*	*C.parapsilosis*	*C.tropicalis*
Assimilation				
D - glucose	+	+	+	+
D - galactose	+	+	+	-
L - sorbose	+	+	+	+
D - Glucose amine	-	+	-	-
D - Ribose	+	-	+	+
D - Xylose	+	-	+	-
L - Arabinose	+	+	-	-
D - Arabinose	+	-	-	-
L - Rhamnose	-	-	-	+
Sucrose	+	+	+	+
Maltose	+	+	+	+
Irehalose	+	+	+	+
Cellobiose	+	+	-	-
Salicin	+	+	-	+
Arbutine	+	+	-	+
Melibiose	-	-	-	-
Lactose	-	-	-	-
Raffinose	-	-	-	+
Inulin	-	-	-	+
Starch	+	+	-	-
Glycerol	+	+	+	-
Erythritol	-	-	-	-
Ribitol	+	+	+	-
Xylitol	+	-	-	-
L - Arabinitol	+	-	-	+
D - mannitol	+	+	+	-
D - Dulcitol	-	-	-	-
Myo - inositol	+	-	-	-
Succinate	+	+	+	+
Citrate	+	+	+	+
Methanol	-	-	-	-
Ethanol	+	+	+	-
Nitrate	+	-	-	+
Nitrite	+	-	-	+
Erthylamine	+	+	+	+
L - lysin	-	+	+	-
Creatine	+	-	-	-
Creatinine	-	-	-	-
Cadaverine	+	+	+	+
without thiamine	+	+	+	-
without pantothenate	+	+	+	+
without myo - inositol	+	+	+	+
without pyridoxine	+	+	+	+
without Niacin	+	+	+	+
without para amion-benzoic acid	+	+	+	+
Fermentation				
D - glucose				
D - galactose	+	+	+	-
Maltosc	-	+	+	-
Sucrose	-	-	-	-

Trehalose	+	-	+	-
Melibiose	-	+	-	-
Lactose	-	-	-	-
Cellobiose	-	-	-	-
Raffinose	-	+	-	-
Inulin	-	-	-	-
Starch	-	-	-	-
D – Xylose	+	-	-	-

Confirmatory tests for identification of yeast strains

Antifungal sensitivity of the dialyzed cases *Candida* isolates *C.albicans* and *C.tropicalis* were found to be highly susceptible to azoles, especially to itraconazole in contrast to *C.krusei* and *C.parapsilosis* which were totally resistant and intermediate to azoles. dialyzed cases isolates of *Candida* species exhibited decreased susceptibility to amphotericin B where only 40% of *C.albicans*, none of *C.krusei*, 25% of *C.parapsilosis* and 33% of *C.tropicalis* isolates were sensitive to amphotericin B (Table 11). As regards the *Candida* species isolates *C.tropicalis* was sensitive to the azoles.

DISCUSSION

Bacterial infections represent a common and important health problem for patients with end-

Table 6. Confirmatory tests for identification of *Candida* strains isolated from dialysis zed cases admitted to Saudi Arabian Medical Center

Yeast strain	Urease test	Ascospore Formation	Germ tube test	Chlamydospore formation
C. albicons	-	-	+	+
C. krusei	-	-	-	-
C. parapsilosis	-	-	-	-
C.tropicalis	+	-	-	+

Table 7. Pathogenic potentialities of the isolated *Candida* strains

Candida strain	Casein hydrolysis	produce proteolytic enzyme	Produce lipolytic enzyme	Growth at 37°C
C. albicons	+	+	+	+
C. krusei	+	+	+	+
C. parapsilosis	+	+	+	+
C.tropicalis	+	+	+	+

Frequencies of Candida isolated from clinical specimens

Table 8. Frequencies of *Candida* isolated from infected dialyzed cases admitted to Saudi Arabian Medical Center

S. No.	Microorganisms	No. of isolates	Percentage of isolates
1	*Candida albicons*	10	45.45
2	*Candida krusei*	5	22.73
3	*Candida parapsilosis*	4	18.18
4	*Candida tropicalis*	3	13.64
	Total	22	100.00

Table 9. Antibiotic susceptibility pattern of Gram negative bacteria

Antibiotics *Microorganisms*	Aug	Oxa	Cef	Amp	Ami	G.	Ofx	Pfx	Cip	Im	Cl	Met
Acin. lwoffii	70%	R	75%	50%	85%	90%	80%	85%	90%	95%	R	R
Aero.hydrophila	60%	R	70%	50%	90%	85%	90%	85%	90%	85%	35%	R
Ent. cloacae	60%	25%	75%	45%	95%	95%	85%	80%	85%	85%	R	R
E. vulneris	65%	R	70%	40%	90%	85%	80%	90%	95%	90%	R	R
Kl. oxytoca	70%	R	75%	5o%	80%	85%	85%	90%	85%	85%	R	R
Kl. pneumonia	60%	R	75%	50%	85%	80%	95%	85%	90%	80%	R	R
Ps. Fluorescens	65	R	60%	R	85%	80%	85%	80%	80%	85%	R	R
Ps. Oryzihabitan	70%	R	70%	40%	90%	85%	90%	85%	85%	90%	25%	R
Ps. stutzeri	60%	R	65%	45%	80%	80%	95%	90%	90%	80%	40%	R
Ser. marcescens	75%	30%	75%	50%	80%	85%	90%	80%	85%	85%	R	R

Table 10. Antibiotic susceptibility pattern of Gram positive bacteria.

Antibiotic	*Enterococcus faecium*	*Staphylococcus auriculari*	*Streptococcus bovis*
Augmentin	S	S	S
Oxacillin	S	S	S
Cefotaxime	S	S	S
Ampicillin	S	S	S
Amikacin	S	S	S
Gentamicin	R	R	R
Levofloxacin	S	S	S
Ofloxacin	S	S	S
Pfloxacin	S	S	S
Imipenem	S	S	S
Ciprofloxacin	S	S	S
Clindamycin	R	R	R
Metronidazole	R	R	R

Table 11. Antifungal sensitivity of *Candida* species isolated from infected dialyzed cases admitted to Saudi Arabian Medical Center

Candida sp.	Fluconazole			Itraconazole			Ketoconazole			Amphotericin B		
No. & %	S	I	R	S	I	R	S	I	R	S	I	R
C. albicans ; 10	8 (80)	2 (20)	-	10 (100)	-		9 (90)	1 (10)		4 (40)	6 (60)	-
C.krusei ; 5	-	-	5 (100)	-	5 (100)		-	5 (100)			5 (100)	-
C.parapsilosis ; 4	-	-	4 (100)	- (100)	4		-	4 (100)		1 (25)	3 (75)	-
C.tropicalis ; 3	3	-	-	3	-	-	2	1		1		2 (67)
-	(100)			(100)			(67)	(33)		(33)		

stage renal disease (ESRD) who undergo maintenance hemodialysis (HD), and this patient illustrates the challenges inherent to this problem. Considerable gains have been made in deciphering the pathogenesis of bacterial infections in this high-risk population[29]. Infection is an important cause of morbidity and mortality among patients with ESRD. According to the United States Renal Data System (USRDS) registry, infection is the second leading cause of death in patients with ESRD (the first is cardiovascular disease), and septicemia accounts for more than 75% of these infectious deaths[29]. Indeed, among ESRD patients undergoing dialysis, the total death rate is 176/ 1000 patient-years, and septicemia and pulmonary infections combined account for close to 26/1000 patient-years[1]. Annual death rates due to pneumonia and sepsis are markedly higher in dialysis patients compared with the general population; in the 65- to 74-year-old category, the magnitude of difference is on the order of 10- and 100-fold, respectively[30,31]. Whereas the presence of diabetes mellitus confers an additional risk for sepsis-related deaths, this comorbid condition appears to exert little influence on pneumonia-related deaths[30,31].

Dialyzed patients are susceptible to infection. In addition to that dialysis superimposes new problems onto patients already suffering relentless deterioration from underlying multi-system disease and poor wound healing. Diabetes mellitus is the responsible cause for one-half of (ESRD) cases, followed by hypertension, and chronic glomerulonephritis. Heart disease is present in 40% of the patients and 15% suffer from peripheral vascular disease. In addition to infection risk associated with frailty and disability are problems associated with the intravascular connection, white blood cell and complement dysfunction from contact with dialysis membranes, and exposure to bacteria and pyrogens from contaminated dialysis solutions or inadequately cleaned dialysis machines[2].

In this study, total of 55 clinical microbial isolates were recovered from 56 cases hospitalized at Saudi Arabian Medical Center. Single microbial isolate was recovered from (37.5%) , and two microbial isolates were recovered from (23.21%), while 3 cases (5.35%) were found to be carrying more than two microbial isolates from total isolate, also study revealed that 54.55% of isolates were Gram negative , 5.45% were Gram positive and 40 % were *Candeda* species. The results of the present study revealed that Gram negative bacterial isolates were ***Acinetobacter lwoffii***, ***Aeromonas hydrophila***, ***Enterobacter cloacae***, ***Escherichia vulneris***, *Klebsiella oxytoca*, ***Klebsiella pneumonia***, ***Pseudomonas fluorescens, Pseudomonas oryzihabitans***, ***Pseudomonas stutzeri*** and ***Serratia marcescens*** with following frequencies 12.12%, 03.03% ,21.21% , 03.03%, 03.03%, 18.18% , 12.12% , 03.03%, 06.06% and 09.09% respectively , where Gram positive bacterial isolates were ***Enterococcus faecium***, ***Staphylococcus*** *auricularis* and *Streptococcus bovis* with the following frequencies 03.03%, 03.03% and 03.03% respectively. This in agreement with Steven,2010 reported that *S.aureus, coagulase negative staphylococci (CONS), P.aeruginosa, E.coli, Klebsiella,* and *Enterobacter* were the most frequent isolates from dialyzed patients. As well as from infections of the hemodialysis vascular access device (HVAD), *S. aureus* and CONS were the most commonly isolated bacteria. Unexpectedly, Gram-negative bacteria were commonly isolated from the initial sputum cultures of patients with community-onset pneumonia. Fifty-five percent (55 %) of 113 patient episodes with positive sputum cultures grew gram-negative bacteria, including 23 isolates of *P. aeruginosa*. Also, the present studies come in line with the study of Mackowiak[32] where thirty-five percent of the primary isolates were aerobic Gram-negative rods. This is of interest because Gram-negative bacilli comprise a small percentage of the normal flora of the skin and respiratory tracts of healthy individuals. Historically, colonization and infection with these organisms have been associated with the hospital setting, bedridden patients, indwelling Foley catheters, or patients requiring mechanical ventilation[33-35]. Though patients with ESRD are ambulatory and live at home, they share the 3 characteristics that support the presence of organisms associated with nosocomial infections: antibiotic use[36] clustering in a common environment (hemodialysis units), and the presence of indwelling medical devices[37].

Over the past decade there has been a significant increasein the number of reports of systemic and mucosal infections caused by yeast-

fungi among hospitalized patients[38,39]. Newer technologies and therapies such as bone marrow or solid- organ transplants and chemotherapeutic agents, have become common at many radical centers, resulting in many immunocompromised individuals[40], Also, care in hospitals units and the use of invasive monitoring devices, parenteral nutrition, broad-spectrum antimicrobial agents, iatrogenic immunosuppression required for organ transplantation has been associated with a variable rate of fungal infection[41]. All these factors resulted in proliferation of a severely ill, immunocompromised, hospitalized patient population. These patients are highly susceptible to nosocomial infections caused by yeast-fungi. The origin of these infecting strains is the hospital staffer environment[42].

The clinical significance of different species of yeast-fungi recovered from clinical specimens of hospitalized patients is difficult to evaluate, since it is considered to be part of the normal flora of human and is almost impossible to avoid its exposure[43]. The simultaneous recovery of the same species of the yeast-fungi from body sites, including sputum, urine, and blood are a good indicator of disseminated infection and the subsequent development of fungemia.

Candida albicans is considered the most important agent of opportunistic fungal infection in humans and numerous reports dealing with the increase in the incidence, diagnosis and virulence of candidiasis have published[44,45]. *Candida*, *Rhodotorula* and *Trichspcron* species have been emerged as important nosocomial pathogens[14, 46-50].

In the present study, The *Candida* isolates identified as 4 species of *Candida, Candida albicans, C. krusei* , *C. parapsiolosis* and *C.tropicalis*. Out of the 56 studied cases, 22 (40%) were positive for 4 species of the genus *Candida* isolates representing 10 (45.45%) *C. albicons* was the most prevalent species, followed by 5 (22.72%) *C. krusei,* 4 (18.18%) *C. parapsilosis* and 3 (13.63%) *C. tropicalis*. The same results were obtained in previous studies[51]. Weems[48] and Winston *et al*[49] reported that *Candida albicans*, *C. krusei* are widely proliferated in patients receiving prophylactic fluconazole therapy in some medical centers and *C. parapsilosis* is widely accompanied with nosocomial peritonitis,

CONCLUSION

From the present study we might conclude that: Oral infections are one of the most frequent medical complications affecting dialyzed patients. Conclusively, attention must be payed to the profoundly increase in bacteria and *Candida* infections among hospitalized patients. The source of infection must be determined in order to control and prevent the infection of human by yeast fungi. As well as amikacin, gentamicin, ofloxacin, pfloxacin ciprofloxacin,, and imipenem were the more antimicrobial agents effective against the Gram negative isolates. While Gram positive bacterial isolates were sensitive to all antimicrobial agents except gentamicin, clindamycin and metronidazol, as well as Antifungal sensitivity of Candida isolates revealed that *C.albicans* and *C.tropicalis* were found to be highly susceptible to azoles, especially to itraconazole in contrast to *C.krusei* and *C.parapsilosis* which were totally resistant and intermediate to azoles. Whereas isolates of *Candida* species exhibited decreased susceptibility to amphotericin B.

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