



STUDY OF BACTERIAL CONTAMINATION IN AL-SHATTRA TEACHING HOSPITAL

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Abstract

This study carried out in Al-Shattra general hospital in Al-Shattra city and included taking of (48) forty eight samples from different parts of hospital building and health care workers (physicians and assistants) and these samples transported to college of education of girls laboratory by using of culture media. After that culturing of these samples on different culture media and made of different biochemical tests for identification and differentiation of different bacterial spp. Which can cause nosocomial infections. The results showed detection of (13) thirteen different bacterial types and *E. coli* was predominant at 27.2% the *Klebsiella pneumoniae* and *Staphylococcus saprophyticus* at 22.5% followed by *Staphylococcus aureus* 20% and the remaining ratio represent other pathogenic bacteria as *Pseudomonas aeruginosa* and others.

Key words : Bacterial contamination, *Pseudomonas aeruginosa*, *Staphylococcus aureus*

Introduction

Bacterial contamination in hospitals in general is higher in repeated using tools and instruments with different highly pathogenic bacterial strains also from well-known strains as normal flora. The members of Enterobacteriaceae and *Staphylococcus aureus* have the great chance in such places specially those resist to anti biotic as hospital environment (tools and instruments, building parts in general) also, health care workers from the physicians to cleaning worker and chicken workers all those be susceptible to be colonized by different microbial, fungal and yeast strains (Horan *et al.*, 1992). Direct contact with admitted patients or with hospital building in general, tools and instruments has great chance to transport this microbial contaminants which usually lead to high morbidity and mortality to the patients. In American united states there are about 2 million of persons annually acquired nosocomial infection from whom 90000 die. Nosocomial infection is the fifth cause of death in VIP hospitals and in hospitals of developing world countries there are on any evidences or statics due to many causes from which policy some times. In general distribution of nosocomial infection may be estimated in highly economic entrance with 7.6% and in mid economic entrance with 10.1%. from other observations that the

bacteria can survive for different times on the surfaces as clothes (gun), stethoscope, sticky tape, computers, key board, electrical key for elevator, mobiles and different inspection tools as blood pressure toll and etc. dangerous of transmission directly proportionate with time of survival of these strains on the surfaces which depend on geographical and environmental conditions as temperature, moisture, organic matter, ability of biofilm formation and methods of sterilization (Tikhomirov, 1987; Ducel *et al.*, 2002). G+ and G- bacteria known with staying for months on the dead surfaces in hospitals and as well-known that the nosocomial infections as MRSA, *Pseudomonas aeruginosa*, VRE and *Acinetobacter baumannii* more stable in hospital environment, while in case of some of well-known pathogens as *Streptococcus pneumoniae*, *Streptococcus pyogenes* and *Haemophilus influenzae* inactivated quickly after dispelling from the patients and have little chance for survival on surfaces. The main cause for such studies is due to its transport directly to the medical staff of hospital in general and to the admitted patients and visitors specifically, as we known this infection lead to increasing of emotional stress for patients and families which may lead to high not restfully and decrease in quality of patient life therefore, there are 5–10 % of patients had nosocomial

infections after admission which consider as dangerous problems through their presence here due to closed relationship with diseases that affected them as GUTI, lower respiratory tract infections, blood diseases, wounds contamination and burns contamination, the infection rate to be high in highly overcrowded places in hospitals as intensive care units which represent 20% from the hole of hospital and this infection be high in aged people, immunosuppressed patients, patients after surgical operations, patients having chronic diseases and persons who have not recovered from different diseases (Ponce, 1991; Wenzel, 1995).

Materials and Methods

This study carried out in Al-Shattra general hospital in Al-Shattra city and included taking of (48) forty eight samples from different parts of hospital building and health care workers (physicians and assistants) and these samples transported to college of education of girls laboratory by using of culture media. After that culturing of these samples on different culture media and made of different biochemical tests for identification and differentiation of different bacterial spp. Which can cause nosocomial infections

Results and Discussion

Emergency of antibiotic resistant bacteria consider as dangerous problem with important impacts responsible for controlling on the nosocomial infection, more of descriptive studies from this aspect found that the members of G- Enterobacteriaceae strength occupy the first rank in the list of bacterial contaminants specially antibiotic resistant members, so that several studies found that the bacterial contamination by mobile phones exactly equal to bacterial contamination in other hospital parts including tools, instruments, computers building structures despite of geographical distribution of these microbes in different parts of the world. In this simplified screening study found many of dangerous bacterial types which may be act as dangerous killers colonized odd different parts of hospital which are enough to infect health care workers added to admitted patients and visitors and as observed in the above results that the *E. coli* represent the most prevalent bacterial type in nosocomial infection at 27.5% from the collected samples followed by *K. pneumoniae* and *S. saprophyticus* at 22.5% then *S. aureus* at 20% and the remaining distributed on the other species which are dangerous too as *P. aeruginosa* which lead to actually death. The previous studies found that the *E. coli*, *S. aureus* and *P. aeruginosa* resist 3-6 months at dry blood or cotton and approximately four weeks on other surfaces; other study to tested of patients carts

taken from surgical intensive care unit and general surgical operation room found 90% from patients carts taken from surgical intensive care unit and 72.1% from surgical operation room contaminated with coagulase – ve Staph., multi drug resistant *Acenitobacter baumannii*, *K. pneumoniae* and *Stenotrophomonas maltophilia*. With taking the mind those isolated bacteria similar to those isolated from patients admitted to hospitals specially antibiotic resistant character and this good indicator to bacterial contaminants transmission between hospital environment and admitted patients and health care workers in general and this study agreed with other study on patients existed in intensive care unit in which their respiration depend on artificial respiration instrument found the carbenim resistant *K. pneumoniae*, cefotaxin resistant *S. aureus*. In case of *P. aeruginosa* in this study it agreed with study in health care workers – neonatal intensive care unit that found 6% of employers hands have or carry the resistant *P. aeruginosa* represented by 10 of 165 of employers especially those with a false nails and nail polish, also three of children, then after one year passed on this study applied in same hospital and unit found there were 49 infected children, so that, this study summarized by that the infection with this resistant type of *P. aeruginosa* came from internal environment and its workers in general, the role of this type of bacteria as pathogenic factors to children specially neonates from 1960 studies explained several places habitat with this type of infection as respiratory and gastrointestinal tracts, so that, this type of infection consider as predominant and dangerous in life of children. In Iraq – Nineveh at Al-J amhori Teaching Hospital in case of admitted patients for one year only results showed isolation of 21 bacterial types of G- bacteria at 86.7% from which *E. coli* at 45%, *P. aeruginosa* at 31.86%, Enterobacter at 22.42%, *K. pneumoniae* at 10.62%, *Proteus mirabilis* at 8.26%, *A. baumannii* at 7.08% *Serratia spp.* at 4.72% and *Raoultella* at 2.36% and other species of bacteria in few numbers and this study summarized its results by presence of closed relationship between microbial contamination in hospital and admitted patients. So that, nosocomial infection consider more serious problem that affect admitted patients in the hospital especially those in the intensive care units about 20% and the septicemia is the main cause of death. so that, following of precautions of disease control centers must be done firstly that act by two methods which are prevent the contact between patients themselves and prevent any contact between patients and outer environment, also, health care workers by contaminated hands so that rigid following on cleaning of hands firstly to reduce infection transmission (but this step remain very

Table 1: Explain diagnosed bacterial species (Nosocomial infections).

No.	Bacteria	Blood agar	Mac.	Man.	Urea	Oxid	C.cit	Cat	Coag	Indol	T.S.I	No.	OP	BA
1	<i>E. coli</i>	1-4 mm colonies, mucoid, hemolytic	+	+	-	-	-			+	A/Agas			
2	<i>Staph. saprophyticus</i>	White yellow colonies, non-haemolytic	+				+	-			R			
3	<i>Staph. aureus</i>	1-2 mm yellow-cream, beta-haemolytic		+				+	+			+		
4	<i>Klebsiella pneumoniae</i>	Large grey-white, mucoid	+		+	-	+			-	A/Agas			
5	<i>Citrobacter spp.</i>	+	+	+	-	+			-	A/AH2S			
6	<i>Klebsiella oxytoca</i>	Large grey-white, mucoid	+		+	-	+			+	A/Agas			
7	<i>Staph. epidermidis</i>	White colonies, non-haemolytic		-		-		-	-			+		
8	<i>Enterobacter cloacae</i>	Large colony, non-mucoid	+	+	-	-	+			-	A/AGas			
9	<i>Salmonella typhi</i>	2-3 mm, grey-white, non-mucoid	+	+	-	-	-			-	K/Agas			
10	<i>Pseudomonas aeruginosa</i> colony, haemolysis	Large flat, spreading	-	+		+				-	A/AGas, H2S			
11	<i>Proteus vulgaris</i>	Swarming on blood agar	-	-	+	-	+			+	K/AH2S			
12	<i>S. pyogenes</i>	Beta haemolysis, 0.5–1 mm						-					R	+
13	<i>Proteus mirabilis</i>	Swarming	-	-	+	-	+	-		-	A/AGas, H2S			

difficult to be applied) and cleaning of tools according to manufactured company instructions as part of reduction of nosocomial infection. Antibiotic sensitivity testing by using of differential once as Optchin proved that not presence of *Streptococcus pneumoniae* isolates at the level of this study only, Bacitracin proved presence of *S. viridans* and *S. pyogenes*; from other observations in this study was present of much of anti-biotic resistant strains of *Staphylococcus aureus* to Oxacillin, Novobiocin and Meropenem as observed growth of some strains inside the inhibiting zone to these antibiotics. much using of anti-biotic do not lead only to emergency of resistant strains to the same anti-biotic but this problem extend to including of other list of antibiotics from the same family or group, this misusing of drugs consider as costly status because its lead to conversion of microbial population inside the hospital to resistant strains and this result in admitted patients become having to these strains and those patients consider as source of infection to outer population and this may lead to elevation of mortality ratio specially within patients affected by other diseases disturbed their immune systems or kidney filer patients

or other body organs, misusing of drugs at level of personality or individuals inside the health institutions lead to resistant problem, in spite of developing in scientific researches in discovery of modern generations of antibiotics but the controversy remain continuously as a result of emergency of newly resistant strains, this state lead to putting of new strategies to delay or reduce development of bacterial resistance, anti-biotic resistance problem not a new status and the evidence of that the united states in 2016 present this condition as adversity and declaration that this status consider as bluster forever on the healthy status of human and sustained food production and furtherance as said by the general secretary of united states Ban-Kemone and this occur after record of report from the American united states to woman patient suffered from Carpenim resistant *Enterobacter* and *K. pneumoniae* as appear they are resist all known 26 antibiotic in the world including the last biological weapon Colcin. finally the observation of microbial contamination in all hospital parts with different species of resistant bacteria consider as huge danger problem specially on the health of admitted patients, health care workers,

physicians and visitors and this stop all the necessary applications to save of patient life as surgery or other medical interactions and this consider as intimidation to the humanitarian unless interference of scientific researches to solve this problem (Haley *et al.*, 1985; Coello *et al.*, 1993; Plowman, 2000).

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