Isolation and identification of bacteria causing nosocomial infections in Al-Shafaa General Hospital in Basrah

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Abstract

A study was conducted in Al-Shafaa General Hospital in Basrah, to detect the types of bacteria that could cause nosocomial infections and sensitivity of these bacteria to antibiotics. The study was done in a microbiology and immunology laboratories of the Pharmacy college in Basrah University on March 2005. A total of 75 swabs were collected randomly, 60 swabs from patients and 15 swabs from the operation theatre. Results indicated the absence of bacteria in the operation theatre and the presence of different types of bacteria in samples collected from patients. Their main types include: *Escherichia coli, Pseudomonas aeruginosa, Staphylococcus species, corynebacterium species, Serratia species, Entrobacter species* and other types were present insignificantly. Results of the antibiotic sensitivity tests revealed that most of these types of bacteria were sensitive to ampiclox (ampicillin and cloxacillin) and cephalexin antibiotics, some of them are resistant to other antibiotics.

Introduction

A hospital acquired or nosocomial infection is a disease that develops after the admission to the hospital, and is a consequence of treatment, not necessarily a surgical one, or work by hospital staff. Usually, a disease is considered nosocomial infection if it develops 72 hours after admission to the hospital. Nosocomial infections are an important cause of preventable morbidity and mortality; they also result in a significant socioeconomic cost. Surveillance of nosocomial infection is an essential part of the infection control programme (1). Pathogen frequency and resistance patterns may vary significantly from country to country and also in different hospitals within a country(2). Thus, regional surveillance programs are essential to guide empirical therapy and infection control measures additionally, surveillance programs may also be useful in the prevention and control of infections caused by resistant organisms (3-12).

This study was conducted in Al-Shafaa General Hospital in Basrah, for the detection of the types of bacteria present in the hospital area and the sensitivity of these bacteria to the antibiotics used.

Materials used
Culture media
Blood agar base. (Oxide) , MacConkey agar (Oxide) , Nutrient agar (Oxide)
Antibiotic medium no. 1 (Oxide), Brain heart infusion (Oxide), and Staphylococcus medium no. 1
Antibiotics used
Ampicillin 10mg (Oxide), Ampiclox 10mg (Oxide), Cephalexin 100mg (Oxide) Erythromycin15mg (Oxide), Tetracycline 30mg (Oxide) and Tobramycin 10mg (Oxide).

Method
Collection of samples
 1- Samples from 60 patients admitted to the surgery ward in Al-Shafaa General
   Hospital in Basrah were collected before surgery and three days after surgery
   from different parts of the patient body: hands, nose and the surgical site.
 2- Samples from different sites of operation theatre, instruments and furniture were
   collected.
Incubation and Culture
After collection of samples, swabs were put in sterilized Brain heart infusion, which is
a suitable media for bacterial growth until reaching the microbiological laboratory.
Swabs were incubated for four hours to activate bacteria. Samples were cultured on
different media mentioned above, to identify the types of bacteria. Dishes were
incubated for 48 hours at 37C°.Tests identification was done after incubation
according to that described by (13,14).
Sensitivity tests
After identification of bacteria, sensitivity test were made by a standardized single
disc method against different antibiotics mentioned above according to the method of
(15).

Results
    A total of 75 swabs were collected as follows:60 from the patients and 15 from the
operation theatre. Results indicated different types of bacteria in the samples
collected from the patients, include: *Escherichia coli, Pseudomonas aeruginosa,
Staphylococcus species, corynebacterium species, Serratia species, Entrobacter
species* and other types were present insignificantly (table 1). Samples collected
from the operation theatre showed the absence of bacteria.
     Results of the sensitivity tests revealed that most of these types of bacteria are
sensitive to ampiclox and cephalexin antibiotics, most of the types of bacteria were
resistant or partially sensitive to Ampicillin, Erythromycin and Tobramycine (table 2).

**Table 1: Prevalence of microorganisms in 60 samples taken from patients in a
surgical wards in Al-Shafaa General Hospital in Basrah.**

type of microorganism	Number of isolates	% of total number of isolates
Escherichia coli	15	25
Pseudomonas aeruginosa	13	21.67
Staphylococcus species	13	21.67
Corynebacterium species	7	11.67
Serratia species.	6	10
Enterobacter species	3	5
others	3	5

Table 2: Susceptibility of isolates from inpatients at Al-Shafaa General Hospital in Basrah (total number =60).

Species/antimicrobial	% sensitive	% partially sensitive	% resistant
***Escherichia coli*(n=15)**			
Ampicillin	33.3	0	66.67
Ampiclox	80	20	0
Cefalexine	80	20	0
Erythromycin	60	20	20
Tetracycline	60	26.67	13.33
Tobramycine	86.67	6.67	6.67
***Pseudomonas aeruginosa*(n=13)**			
Ampicillin	15.38	76.93	7.69
Ampiclox	23.07	53.86	23.07
Cefalexine	23.07	23.07	53.86
Erythromycin	0	23.07	76.9
Tetracycline	0	15.38	84.6
Tobramycine	15.38	61.55	23.07
***Staphylococcus species*(n=13)**			
Ampicillin	23.07	15.38	61.54
Ampiclox	76.92	15.38	7.69
Cefalexine	76.92	15.38	7.69
Erythromycin	23.07	7.69	60
Tetracycline	15.38	15.38	60
Tobramycine	15.38	23.07	61.54
***Corynebacterium species*(n=7)**			
Ampicillin	28.57	28.57	42.86
Ampiclox	71.42	14.29	14.29
Cefalexine	71.42	28.57	0
Erythromycin	57.14	14.29	28.57
Tetracycline	28.57	28.57	42.86
Tobramycine	71.42	14.29	14.29
***Serratia species* (n=6)**			
Ampicillin	33.33	16.66	50
Ampiclox	66.66	16.66	16.66
Cefalexine	1oo	0	0
Erythromycin	33.33	0	66.66
Tetracycline	50	16.66	33.33
Tobramycine	83.33	0	16.66
***Entrobacter species* (n=3)**			
Ampicillin	0	33.33	66.66
Ampiclox	33.33	0	66.66
Cefalexine	100	0	0
Erythromycin	0	0	66.66
Tetracycline	33.33	33.33	0
Tobramycine	66.66	0	33.33

Discussion

More advanced definitions sometimes require clinical and laboratory information which is not available in our hospitals on a regular basis. Microbiological evaluations have not only a benefit for the individual patient, but also allow evaluating the local epidemiologic situation. The methodology of the first UK National Prevalence Survey provided a better opportunity to analyze the prevalence of community acquired infections and antibiotic use (16). Our main objective was to recognize the problem of NIs in Al-Shafaa General Hospital in Basrah by using a simple survey approach. We do not think that information bias could significantly affect the outcome of the study because the hospital staffs were not fully aware of the aims of the study. Detection bias could be taken into account because certain essential laboratory investigations were not available.

Data on antibiotic use in the hospital concerned clearly indicated the lack of antibiotic prescribing policy. On the day of the study, most of hospitalized patients were receiving antimicrobial treatment. In surgical departments, the administered course of prophylactic antibiotics is sometimes prolonged for up to five days without clear clinical indications. Ampiclox and cefotaxime are the drugs of the first choice and given to the patients frequently, the explanation for the alarming rate of use is the availability of these antibiotics in hospital pharmacy and due to their broad spectrum of activity. Second and third generation cephalosporins are more expensive, and there are frequent financial restrictions. Other antibiotics that have been used extensively in treatment of various patients are Erythromycin and Tetracycline, probably because of their low cost and presumed good clinical efficacy. This study identified the presence of different types of bacteria in the surgery ward and the absence of them in the surgery room and also identified problems related to the excessive use of antibiotics. The future studies should focus on prevalence of nosocomial infections and on methods to control these infections. The implementation of monitoring programs is an important part of the prevention strategy against the progression of resistance.

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Escherichia coli, Pseudomonas aeruginosa, Staphylococcus :

species, Corynebacterium species, Serratia species, Enterobacter species

ampiclox : .

and cephalexin .

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