

# The study of Antibiotics Resistance for Isolates isolated of Postoperative Wound Infections in some Hospitals Baghdad City

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## Abstract

This research aims to examine the bacteria causing infection at the surgical site and their susceptibility antibiotics. The Surgical site infection samples were taken from sixty eight patients suffering with infections after various operations with the ages included in the study were between (15-64) years old for both sexes. the results of the current study showed, during the mentioned time period for collecting samples, that out of a total of 194 surgeries, about 68 were Postoperative Wound Infections, with both types of bacteria, representing a percentage of 35.05. the showed diagnostic methods many types of bacteria causing the infection, as the results showed 75 bacterial isolates individually or a mixture of isolates, where the positive isolates for Gram stain represented 31 bacterial isolates, while the negative isolates represented For Gram 44 stain, bacterial isolates showed the types of Gram-positive bacteria cells and their numbers, which included bacteria *Staphylococcus aureus* (MAAS) n=17 , *Staph aureus* (MRSA) n=10 , Coagulase negative staphylococci n=3 and *Streptopyogenes* n=1 , While the types of Gram-negative bacteria cells and their numbers, which included bacteria *E.coli* n=23 , *Klebsellia* species n=9 , *Pseudomonas aeruginosa* n=9 and *Acinetobacterbaumanii* n=3. the

showed of sensitivity The antibiotics Meropenem and Vancomycin more than effective on isolated positive bacteria while the Impenem antibiotic the effective antibiotic on isolated negative bacteria.

**Key words:** surgical site infection, hospital acquired infections, antibiotics resistance

## Introduction

Surgical site infection (SSI) is defined as an infection that occurs within one month after surgery and affects either the incision or the deeper tissues at the site of the operation. The infection can occur as a superficial or deep infection, or as an infection involving different organs or areas of the body. Postoperative SSI is among the most common problems with the surgical site of patients undergoing surgical procedures. (1, 2) mendeley: {"formattedCitation": "(Sattar et al., 2019). There are different ways through which pathogenic bacteria can reach the wound area, including direct contact, air dispersion, and self-contamination. At the same time, there is insufficient evidence to determine the most common way for pathological bacteria to enter the wound, as well as cases of direct contact, failure to wash hands well for

health care personnel, and lack of good sterilization during the pre- and post-operative stages are among the most important factors for wound contamination(3,4). Inflammation of can play a large role in protecting the host eventually and it begins to heal. In addition, if the initial infection is extensive, the infection may develop as organisms previously inhabiting the skin and gut area may invade tissues. In addition, such environmental conditions may allow other secondary assailants to cause infection and may be either other pathogenic bacteria or their released toxins causing further disruption of the local protective environment.(5,6).The aim of this research is to investigate the types of pathogenic bacteria that cause SSI and the patterns of sensitivity to some known antibiotics

**Materials and Methods**

This study have collection about 68 samples from patients suffering from wound infection after surgery.Wound swaps were collected from 68 patients who suffering from wound infection after surgical operation with The ages included in the study were between (15-64) years old for both sexes. The period of collection of pathological samples extended from15/10/2021 to 15/1/2022.Smear from infectious area was taken by sterilized cotton swab, and then samples had been inoculated on the culture media (MacConkey, chocolate and Blood agar) and incubated aerobically at 37°C for 24 hrs.After the positive culture appeared, then a sensitivity test of these isolates towards several types of antibiotics was carried out using the Kirby Power method. The data under study were analyzed statistically by ANOVA (7).

**Results and Discussion**

The results of the current study showed, during the mentioned time period for collecting samples that out of a total of 194 surgeries, about 68 were Postoperative Wound Infections, with both types of bacteria, representing a percentage of 35.05, as shown in Table 1.

Table 1: lists of No. Surgeries and Postoperative Wound Infections

No. of surgeries	No. of Postoperative Wound Infections	Percentage%
194	68	35.05

The laboratory diagnostics, which included microscopic, biochemical and culture diagnostics, also showed the diagnosis by the Vitek 2 device for 68 Postoperative Wound Infections to determine the type of bacteria causing the infection, as the results showed 75 bacterial isolates individually or a mixture of isolates, where the positive isolates for Gram stain represented 31 bacterial isolates, while the negative isolates represented For Gram 44 stain, bacterial isolates, as shown in Table 2,While Table 3 showed the types of Gram-positive bacteria cells and their numbers, which included bacteria *Staph aureus* (MAAS) n=17, *Staph aureus* (MRSA) n=10 ,staphylococci of Coagulase negative n=3 and *Streptopyogenes* n=1

Table 2: lists of No. of pathogenic bacteria G+ andG-

Type of pathogenic bacteria	No .
pathogenic bacteria G+	31
pathogenic bacteria G-	44
Total number of isolates	75

Table 3: Types and number of Gram-positive bacteria

Types of pathogenic bacteria G+	No.of isolates
Staph aureus (MAAS)	17
Staph aureus (MRSA)	10
staphylococci of coagulase negative	3
Streptopyogenes	1
Total	31

While Table 4 showed the Types of pathogenic bacteria G- and their numbers,

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which included bacteria *E.colin*=23, *Klebsellia species* n=9, *Pseudomonas aeruginosan*=9 and *Acinetobacter baumaniin*=3

Table 4: Types and number of Gram-negative bacteria

Types of pathogenic bacteria G-	No. of isolates
E.coli	23
Klebsellia	9
P. aeruginosa	9
A. baumaniin	3
Total	44

Table 5 shows the prevalence and distribution of Gram-positive and Gram-negative bacteria for sites Postoperative Wound Infections (Superficial SSI and Deep organ ortissues SSI) ,Where *Escherichia coli* represented the most Gram-negative bacteria that contaminated wounds after surgeries, while *Staphylococcus aureus* was the most Gram-positive bacteria that caused infection of wounds after surgeries.

Table 5: SSI class of pathogenic bacteria prevalence

Bacterial isolates	Superficial SSI	Deep organ or tissues SSI	total
Staphau-reus(MAAS)	4	3	7
Staphyau-reus(MRSA)	5	2	7
staphylococci of Coagulase negative	3	0	3
Streptopyo-genes	1	0	1
E.coli	16	8	24
Klebsellia species	9	5	14
Pseudomona-saeruginosa	11	7	18

Acinetobacter-baumanii	1	0	1
Total	50	25	75

To study the effect of antibiotics on positive bacteria isolated from infections after surgical operations, it was noted that the two antibiotics Meropenem and Vancomycin. One of the most effective antibiotics on isolated positive bacteria, where all bacterial isolates were sensitive to it, as shown in Table No. 6

Table 6: A pattern of antibiotic sensitivity of pathogenic bacteria G+

Antibiotic's name	Sensitive	resistant	intermediate
Vancomycin	29 (93.55%)	0	2 (6.45%)
Co-amoxycylav	15 (48.39%)	16 (51.61%)	0
Ceftriaxone	20 (64.52%)	11 (35.48%)	0
Neomycin	22 (70.97%)	9 (29.03%)	0
Meropenem	31(100%)	0	0

To study the effect of antibiotics on positive bacteria isolated from infections after surgical operations, it was noted that the all antibiotics that effective antibiotics on isolated negative bacteria, where all bacterial isolates were sensitive to it, as shown in Table 7

Table 7: A pattern of antibiotic sensitivity of pathogenic bacteria G-

Antibiotic's name	Sensitive	resistant	intermediate
Meropenem	40 (90.91%)	0	4(9.09%)
Impenem	42 (95.45%)	0	2(4.55%)
Amikacin	40 (90.91%)	0	4(9.09%)

Ceftriaxone	40 (90.91%)	4 (9.09%)	0
Amikacin	39 (88.63%)	2 (4.55%)	3 (6.82%)

## DISCUSSION

Despite the use of the best sterilization methods in surgical procedures and the use of effective antibiotics, The (SSI) still occur in all countries.(8)The process of using antibiotics is considered one of the most important methods of prevention and treatment of infectious infections resulting from pathological bacteria, and that SSI patients can be infected with various types of bacteria, whether they are Gram-positive or Gram-negative bacteria, and that the process of selecting effective and effective antibiotics is very important to eliminate Those germs (9)

In this study, it was found that about 68 people out of a total of 194 had Postoperative Wound Infections, with a percentage of 35.05% This percentage is consistent with many local and international studies.The 68 contaminated samples after surgical operations included cultures positive for either a single bacteria growth or multiple bacteria growth.It included about 75 bacterial isolates, 31 of which were Gram-positive pathogenic bacteria and 44 Gramnegative pathogenic bacteria. (10)Where the most important isolates isolated from contaminated wounds were Staphylococcus bacteria of both types *Staphy. aureus* (MAAS) and *Staph. aureus* (MRSA)

As for the negative for the gram stain, the dominant were *E. coli*, *Klebsellia species* and *P. aeruginosa* (11,12)

In this study, it was found that all Gram-positive isolates were 93.55% ,100% sensitive to the antibiotics Vancomycin and Meropenem respectively While the isolates were sensitive to another antibiotics Co-amoxyclav, Ceftriaxone and Neomycin (48.39%), (64.52%), (70.97%) respectively. While the Gram-negative

isolates were sensitive to the used antibiotics in different proportions, all gram negative isolates were sensitive to words

Meropenem, Amikacin and Ceftriaxone with percentage (90.91%), As for the antibiotic Impenem, she was very sensitive to it and in its ratio(95.45% )The lowest percentage was the antibiotic Amikacin with ratio (88.63%)

## Conclusion

The pathogenic bacteria that were identified from the infection site belonged to different types, and the most common bacteria were Staphylococcus aureus (MAAS) and Escherichia coli. The results of this study confirmed that the isolated pathogenic bacteria, whether they were Gram-positive or Gram-negative, had good resistance against the antibiotics under study, and that the antibiotics belonging to the group of carbamins were the most effective against the isolated bacteria.

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**Ethical Clearance:** This study is ethically approved by the Institutional ethical

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