



Secondary Bacterial Infection Accompanying Some Skin Diseases

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ABSTRACT

The study included collecting 25 different samples from patients suffering from vitiligo, eczema and psoriasis at the period from 14/10/2012 till 10/12/2012 at the Dermatology Department of Al Faluga General Hospital.

The bacterial isolates were diagnosed depending on visual and microscopic examinations. The distinction of types and the confirmation of the pre-diagnosis depended on differential chemo-biological examinations. Consequently, 70.15% of 47 bacterial isolates were diagnosed as being positive to Gram staining. They included 4 types of bacteria which were *Staphylococcus aureus* where 29.9 % of 20 isolates were positive, 20.9% of the 14 isolates of *Staphylococcus epidermidis*, 16.41% of 11 isolates of *Streptococcus pneumoniae* and 2.98% of the 2 isolates of *Streptococcus pyogenes* were positive. 29.85% of the 20 isolates of bacteria, which also included 4 types were diagnosed as being negative to Gram staining.

13.4% of the 9 isolates of the first type, which was *Escherichia coli* were diagnosed as being negative, 7.46% of the 5 isolates of *Pseudomonas aeruginosa*, 5.97% of the 4 isolates of *Proteus mirabilis* and 2.98% of the 2 isolates of *Klebsiella oxytoca* were also diagnosed as being negative.

The sensitivity of the isolates to antibiotics was tested by 7 antibiotics. The results showed that the resistance rates of bacteria to antibiotics were diverse, and so were their sensitivity rates. Some bacteria were very resistant to Amoxicillin and some were mildly sensitive to Amikacin and some were very sensitive to Ciprofloxacin.

Key Words: Bacterial, skin, diseases

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INTRODUCTION

Skin is the external cover of the human body. It consists of different layers which are the corium and the tissues. It is one the most important organs of the body because it interacts with the environment. It is the first defense line against external factors, for example the skin plays a major role in protecting the body from the causes of diseases. [1]. It has become clear that we must consider the bacteria which lives in the human body. The healthy skin layer prevents the attack of micro-organisms causing diseases. But, there are some skin diseases which cause itching to the skin, and so they cause scarification to the skin. Thus, paving the way for the access of micro-organisms to the skin, causing diseases such as vitiligo, eczema and psoriasis

[2].

Material and Method

35 samples were collected for that study in the period from 14/10/2012 till 10/12/2012 at the Dermatology Clinics at Al Faluga General Hospital from the hands, legs and faces of the patients suffering from vitiligo, eczema and psoriasis. The samples were directly transplanted upon the agricultural media, MacConkey agar and Blood agar. Then, the samples were exposed to a temperature of 37°C for 18-24 hours, and the characteristics and forms of the underdeveloped colony became clear. After pre-diagnosis, the samples are to be re-transplanted upon a selective media which is Mannitol salt agar in order to distinguish between the staphylococci, *staph. aureus* and *staph epidermidis*. The

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color of the first one would be golden yellow when exposed to the medium as result of its fermentation to mannitol sugar. The bacteria were diagnosed depending on its agricultural and microscopic characteristics and chemo-biological tests [3].

The sensitivity of the isolates to a number of commonly used antibiotics in medicine, which were used as ready-made tablets. Then, the results were determined by measuring the inhibition diameters around the antibiotic tablets and comparing them to the standard rates [3].

Statistical analysis was performed to compare between details by using the statistical program SPSS as it would make referring to information easier, reviewing them and to make the required comparisons.

RESULTS AND DISCUSSION

The total samples were 35 samples. They were distributed

between 60% of the 21 samples of the patients infected with vitiligo. They were 11.4% in 4 males and 48% in 17 females. Concerning, the cause of that disease and its relation to heredity, 18 samples had no relation to heredity, but they were affected by other external factors and the other 3 samples were due to a hereditary cause.

Concerning the patients infected with psoriasis, there were 7 samples having a percentage of 20%. 3 males were infected by 8.6% and 4 females were infected by 11.4%. All the samples were due to external factors.

Concerning the patients infected with eczema, there were 7 samples having a percentage of 20% and all of them were females, and they were unrelated to heredity and the ages of the patients suffering from the three diseases. There ages ranged between 2 and 31 years old or more, as in tables (1, 2, 3 and 4).

Table (1) Distribution of samples and their percentages according to the age groups

Percentage	Eczema	Percentage	Psoriasis	Percentage	Vitiligo	Percentage
5.7	2	2.9	1	11.4	4	10 years old or less
5.7	2	2.9	1	31.4	11	11-20 years old
2.9	1	5.7	2	8.6	3	21-30 years old
5.7	2	8.6	3	8.6	3	31 years old or more
20	7	20	7	60	21	Total

Table (2) Distribution of samples and their percentages according to the age groups

Percentage	Eczema	Percentage	Psoriasis	Percentage	Vitiligo	Sex
--	--	8.6	3	11.4	4	Males
20	7	11.4	4	48.6	17	Females
20	7	20	7	60	21	Total

Table (3) Relation between skin diseases and heredity

Percentage	Eczema	Percentage	Psoriasis	Percentage	Vitiligo	Heredity
20	7	20	7	51.4	18	None
--	--	--	--	8.6	3	Found
20	7	20	7	60	21	Total

Table (4) Distribution of samples and their percentages according to the infection duration

Percentage	Eczema	Percentage	Psoriasis	Percentage	Vitiligo	Infection Duration
17.1	6	17.1	6	42.9	15	10 years old or less
2.9	1	--	--	17.1	6	11-20 years old
--	--	2.9	1	--	--	21-30 years old
--	--	--	--	--	--	31 years old
20	7	20	7	60	21	Total

The bacterial isolates were diagnosed depending on visual and microscopic examinations, as the apparent characteristics of the underdeveloped colonies were studied upon the mediums, Mannitol salt agar, MacConkey agar and Blood agar.

The Staph. aureus appeared to be grey at the Blood agar medium, while they were golden yellow at the Mannitol salt agar as a result of their fermentation to mannitol sugar. The staph. epidermidis were white because they did not ferment the mannitol sugar. Microscopic examination of the isolates showed that they were Gram staining positive isolates and they gathered as clusters [4]. The colonies of

Strept. pyogenes appeared to be grey white at the opaque or semi-transparent Blood agar medium. The colonies were surrounded by beta hemolytic haemolysins which are smooth, dry and shiny. They appeared to be as spherical cocci in the form of chains or individual cells. Concerning, the Staph. pneumonia, their apparent characteristics were similar to Strept. pyogenes, but their colonies were surrounded by alpha hemolysis hemolysins.

Their colonies may be moister or mucous because in some groups, the cells form the bacteria. The cells appear to be diplococcal in the microscopic examination, they are oval, elongated and may be individual [5].

The isolated Gram staining negative bacteria were diagnosed depending on visual and microscopic pre-examinations. The form, constituency and color of the colonies depended on their ability to ferment lactose at the MacConkey agar medium. The colonies of E.coli bacteria appeared to be pink due to its fermentation of lactose. They were dry, medium and arched. The P. aeruginosa bacteria were pale at the MacConkey agar medium due to its inability to ferment lactose. They are characterized by the production of blue green pyocyanin dye, and smell of fermented grapes at their growth. Their color tends to be black green at the Blood agar [6]. All the Gram staining negative bacteria appeared to have a bacillary form [7]. Differential bio-chemical examinations were used to

distinguish types and to confirm pre-diagnosis. Chemo-biological examinations were also performed [8]. 80% of the 28 samples were positive to bacterial culture. They included 70.15% of the 47 isolates of Staph .aureus, where 29.9% of the 20 isolates were positive. 16.41% of the 14 isolates of Staph .epidermidis were positive, and 2.98% of the 2 isolates of Strept. pyogenes were positive. 29.85% of the 20 isolates were negative to Gram staining. They included 4 types, the first being E.coli bacteria, 13.43% of 9 isolates were negative, 7.4% of the 5 isolates of P. aeruginosa bacteria. The study of the researcher [9] that P. aeruginosa causes skin infections such as rash. 5.97% of 4 isolates of Pr. mirabilis were negative, as shown in table (5) and in figures (1, 2, 3)

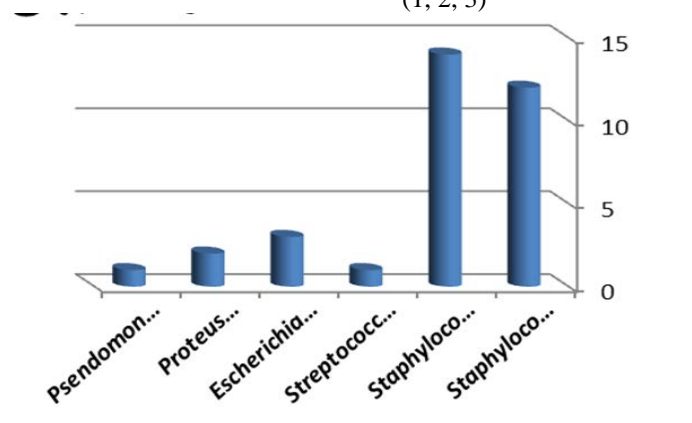


Figure (1) Percentages of bacterial isolates of vitiligo.

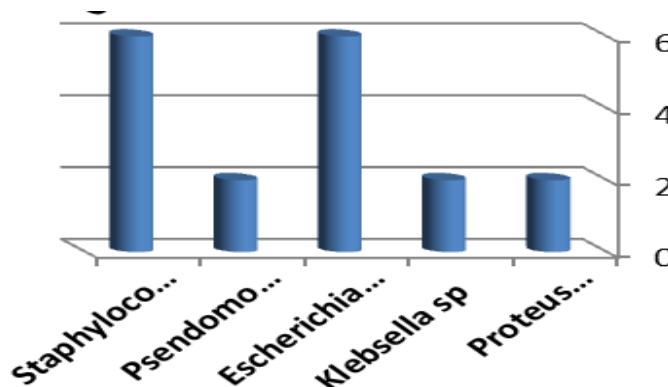


Figure (2) Percentages of bacterial isolates of psoriasis.

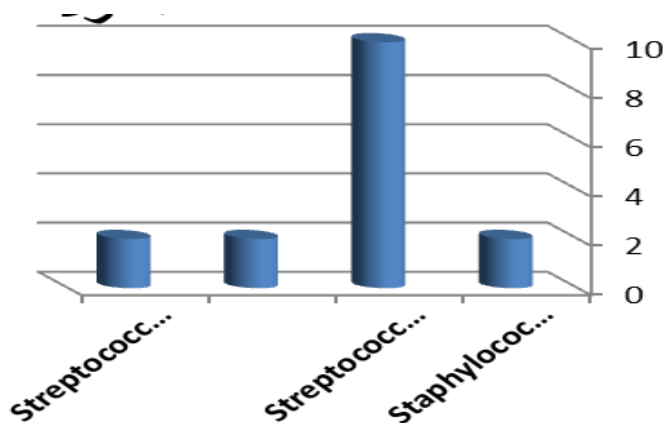


Figure (3) Percentages of bacterial isolates of eczema.

Table (5) Number of bacterial isolates of every disease.

Eczema		Psoriasis		Vitiligo	
Isolates	Bacteria Type	Isolates	Bacteria Type	Isolates	Bacteria Type
+2	<i>Staphylococcus aureus</i>	-2	<i>Proteus mirabilis</i>	+12	<i>Staphylococcus aureus</i>
+10	<i>Streptococcus pneumonia</i>	-2	<i>Klebsiella oxytoca</i>	+14	<i>Staphylococcus epidermidis</i>
+2	<i>Streptococcus aeruginosa</i>	-6	<i>Escherichia coli</i>	+1	<i>Streptococcus pneumonia</i>
+2	<i>Streptococcus pyogenes</i>	-2	<i>Pseudomonas aeruginosa</i>	-3	<i>Escherichia coli</i>
		+6	<i>Staphylococcus aureus</i>	-2	<i>Proteus mirabilis</i>
				-1	<i>Pseudomonas aeruginosa</i>

Its percentage was 20.5%. This result was near to our study and similar to what was found (Brook, 2001). The greatest percentage of bacteria found in the skin was that of *Staph. aureus*. The least percentage was that of three types of bacteria, which were *Streptococcus faecalis* by 2% and *Pseudomonas aeruginosa* by 2%. We found that *Staph. aureus* was the bacteria which infected most of the patients. 29.9% of 20 isolates were isolated.

The *Strept. pyogenes* and *K. oxytoca* infected the least number of patients, as 2.98% of the 2 isolates were isolated. A sample of the patients' infected with vitiligo, eczema and psoriasis as shown in table (6).

Table (6) shows the percentages of isolated bacteria types

Bacteria Type	Number	Percentage
<i>Staphylococcus aureus</i>	20	29.9
<i>Staphylococcus epidermidis</i>	14	20.9
<i>Streptococcus pneumonia</i>	11	16.41
<i>Streptococcus Pyogenes</i>	2	2.98
<i>Escherichia coli</i>	9	13.4
<i>Pseudomonas aeruginosa</i>	5	7.46
<i>Proteus mirabilis</i>	4	5.97
<i>Klebsiella oxytoca</i>	2	2.98
Total	67	100

The examination was performed upon 8 isolates of the

isolated bacteria as they are considered the cause of skin infection and the environment surrounding it.

The sensitivity of these isolates was tested by 7 antibiotics and they included the following antibiotics:

Ciprofloxacin, Kanamycin, Nitrofurantoin, Erthyromycin, Amoxicillin, Amikacin and Streptomycin. Different antibiotics were added according to the type of isolated bacteria. The isolate was determined to be either sensitive or resistant to antibiotics by measuring the inhibition area by using NCCLs [10].

The golden staphylococci, *Staph. aureus* showed great resistance to Nitrofurantoin, Erthyromycin and Amoxicillin antibiotics, and were very sensitive to Streptomycin, Ciprofloxacin, Kanamycin and Amikacin antibiotics as shown as figure (4).

The antibiotic which had the greatest effect on isolated bacteria was Ciprofloxacin. It is one of the broad spectrum antibiotics as it effects the positive and negative germs to Gram straining as it inhibits the effectiveness of the Dnase enzyme in germs.

The researcher [11] stated that the Ciprofloxacin antibiotic is one of the antibiotics which made a greater effect on *Staph. aureus*. This result also coincides with what Al Zubaidy [12] found as golden staphylococci are very sensitive to Ciprofloxacin, but they were also very sensitive to Nitrofurantoin.

The resistance of bacteria to antibiotics are a result of random use of antibiotics which led to resistant types or the appearance of hereditary evolutions [12].

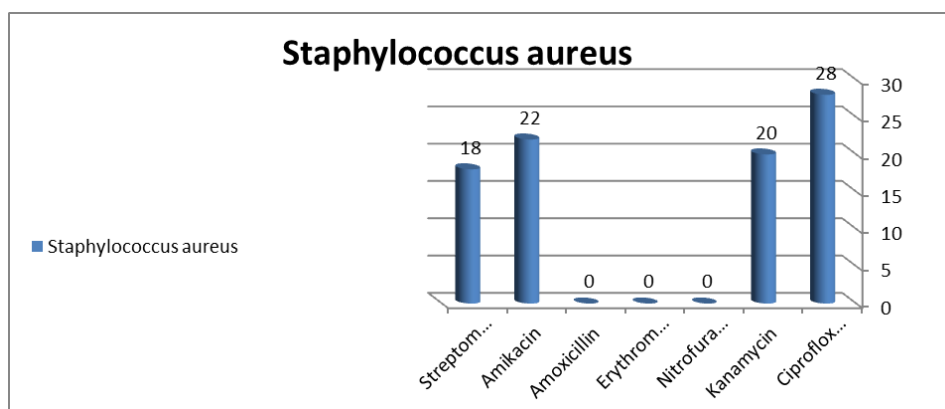


Figure (4) Percentage of the sensitivity and resistant rate of *Staphylococcus aureus* types to antibiotics

The white staphylococci, *Staph.epidermidis* showed great resistance to Amoxicillin, Kanamycin, Erythromycin, Nitrofurantoin and Ciprofloxacin antibiotics. They were moderately sensitive to Amikacin and Streptomycin antibiotics as shown in figure (5).

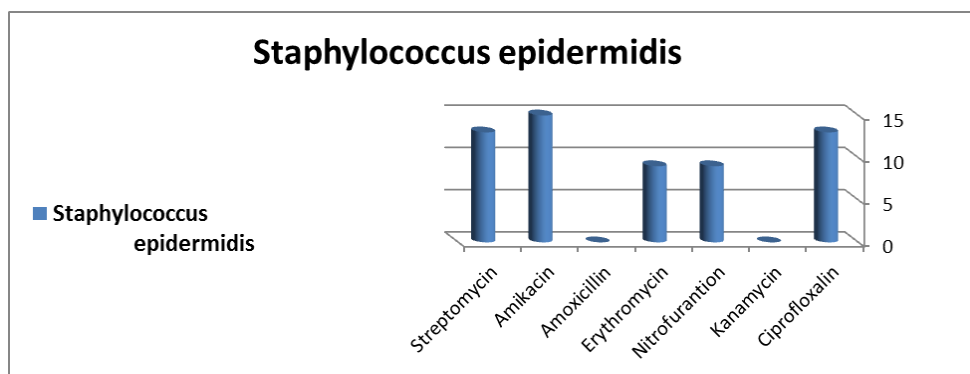


Figure (5) Percentage of the sensitivity and resistant rate of *Staph.epidermidis* to antibiotics.

The result concerning Amikacin antibiotic was contradictive to what Saurina et al. [14] found, as the bacteria was very sensitive to that antibiotic. The result was coincident to what was found for Erythromycin and Amoxicillin antibiotics as the bacteria was resistant to them.

The *Proteus mirabilis* bacteria showed great resistance to Amoxicillin, Nitrofurantoin and Streptomycin antibiotics, while they were very sensitive to Kanamycin, Erythromycin, Ciprofloxacin and Amikacin as shown in Figure (6).

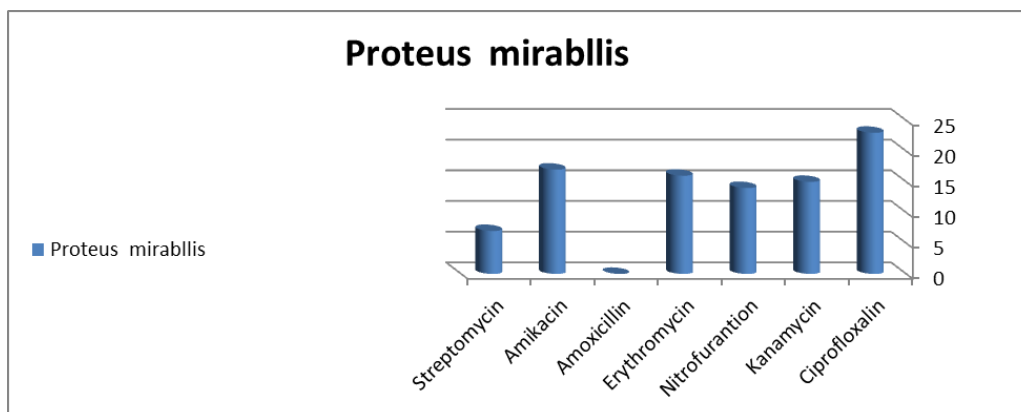


Figure (6) Percentage of the sensitivity and resistant rate of *Proteus mirabilis* types to antibiotics.

The *Strept. pyogenes* showed great resistance to Amoxicillin, Erythromycin and Amikacin antibiotics, while they were moderately sensitive to Nitrofurantoin

and Streptomycin antibiotics. They were very sensitive to Ciprofloxacin and Kanamycin as shown in figure (7).

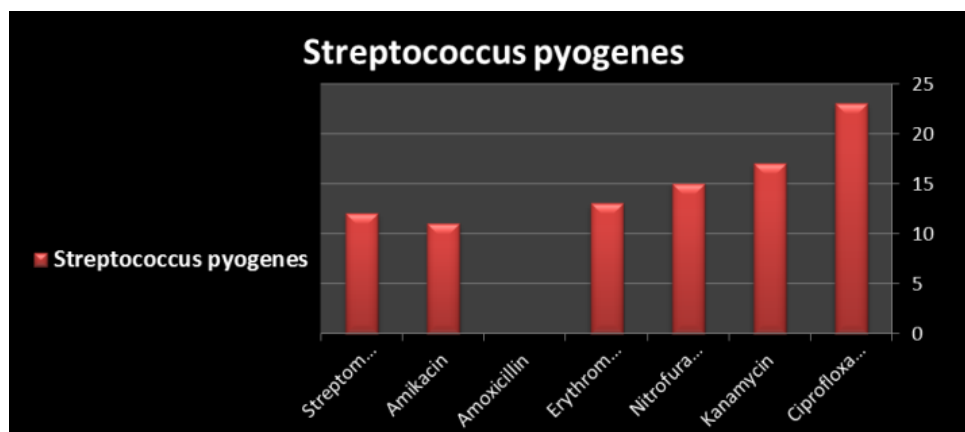


Figure (7) Percentage of the sensitivity and resistant rate of *Streptococcus pyogenes* types to antibiotics

The *Strept. pneumoniae* showed great resistance to Amoxicillin antibiotic, while they were moderately sensitive to Nitrofurantoin and Erythromycin antibiotics. They were very sensitive to Ciprofloxacin, Amikacin, Kanamycin and Streptomycin antibiotics as shown in Figure (8).

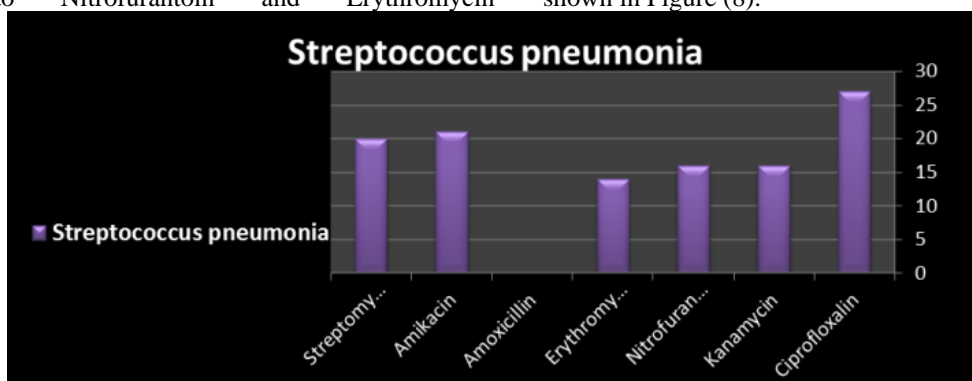


Figure (8) Percentage of the sensitivity and resistant rate of *Streptococcus pneumoniae* types to antibiotics.

The *P. aeruginosa* showed great resistance to Amoxicillin, Erythromycin and Amikacin antibiotics and moderately sensitive to Kanamycin and Nitrofurantoin antibiotics. They were very sensitive to Ciprofloxacin antibiotic as shown in figure (9).



Figure (9) Percentage of the sensitivity and resistant rate of *Ps. aeruginosa* types to antibiotics.

The *E. coli* showed great resistance to Amoxicillin, Erythromycin and Nitrofurantoin antibiotics, while they were moderately sensitive to Kanamycin and Streptomycin antibiotics and very sensitive to Ciprofloxacin and Amikacin antibiotics as shown in figure (10).

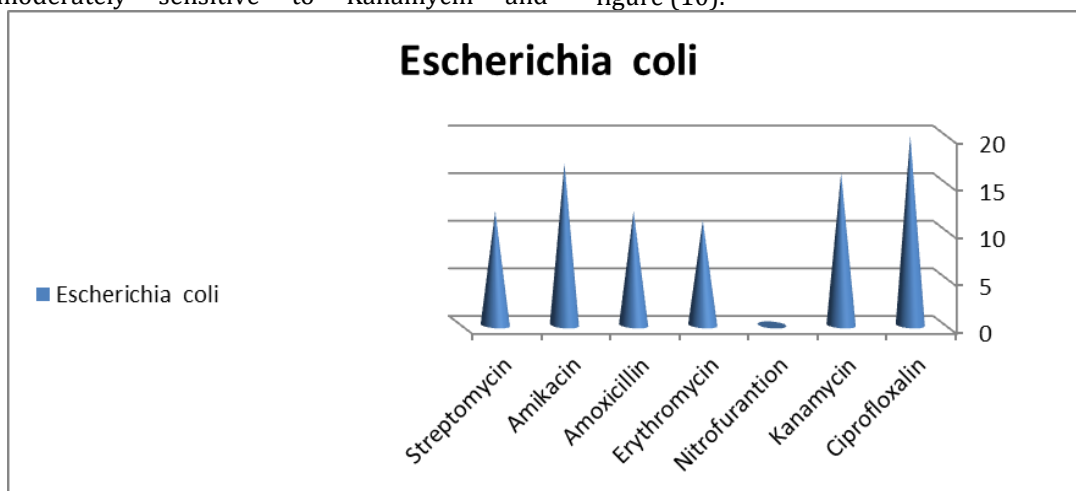


Figure (10) Percentage of the sensitivity and resistant rate of *Escherichia coli* types to antibiotics.

K. oxytoca showed great resistance to Amoxicillin, Erythromycin, Nitrofurantoin and Kanamycin, while they were moderately sensitive to Streptomycin and very sensitive to Amikacin and Ciprofloxacin antibiotics as shown in figure (11).

We notice that Ciprofloxacin is the one of the antibiotics which have the greatest effects on isolated bacteria. It is one of the broad spectrum antibiotics as it effects the positive and negative germs to Gram staining as it

inhibits the effectiveness of the Dnase enzyme in germs. The resistance of bacteria to antibiotics are a result of random use of antibiotics which led to resistant types or the appearance of hereditary evolutions [12].

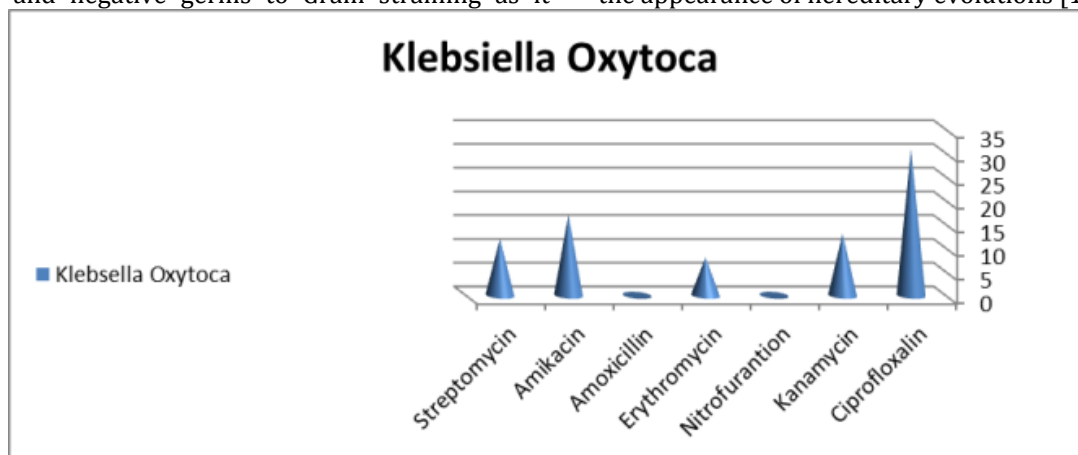


Figure (11) Percentage of the sensitivity and resistant rate of *Klebsiella oxytoca*.

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