RESULTS

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Factors that affect postoperative wound sepsis include the following:

1- Relation between the personal factors and development of postoperative wound sepsis :

a-Age :

The study showed that the percentage of wound sepsis increased with increased ages; the number of cases of the age group 10-30 years, was 8 (8%), the number of cases from 30-45years was, 20 (20%), the number of cases from 45-60 years was 37 (37%) and the number of cases > 60was 35 (35%) (table 1).

b- Sex :

The present study showed that the number of male patients (68) was higher than female patients (32) (table 1).

c-Smoking:

Out of 100 cases under the study the number of smokers was 19 (19%) while the number of non smokers was 81 (81%) (table 1).

Table (1): The distribution of wound sepsis according to age, sex and smoking status of the patients.

Age group	Number of cases	%
10 – 30 years	8	8%
30 – 45 years	20	20%
45-60 years	37	37%
> 60 years	35	35%
Sex	**Number of cases**	**%**
Male	68	68%
Female	32	32%
Smoking	**Number of cases**	**%**
Smokers	19	19%
Non smokers	81	81%
Total	100	100%

2- Medical factors:

a-Associated medical disorders :

The present study showed that total number of cases showing medical disorders was 42 (42%) and the cases of these medical disorders were as follows: D.M. 15 (15%), D.M. &hypertension 6 (6%), D.M. &obese, 7 (7%), hypertension 2 (2%), obesity 5 (5%), malignancy cases 6 (6%) and only one case was tuberculous (table 2).

Table (2): Incidence of associated medical disorders among cases of postoperative wound sepsis.

Medical disorders	Number of cases	%
D.M.	15	15%
D.M. &obese	7	7%
D.M. &hypertension	6	6%
obesity	5	5%
Hypertension	2	2%
Malignancy	6	6%
T.B.	1	1%
Total	42	42%

Diabetes mellitus (D.M). was the commonest medical disorder among the cases (15%)

b-Preoperative hospitalization period:

The study showed that the number of cases that have stayed preoperatively for more than 72 hours was 63 (63%) and the number of cases that stayed for less than 72 hours was 37 (37%) (table 3).

Table (3): Distribution of wound sepsis according to the preoperative period of hospitalization.

Preoperative hospitalization period	Number of cases	%
Less than 72 hours	37	37%
More than 72 hours	63	63%
Total	100	100%

3- Surgical factors:

a-Type of wound:

Out of 100cases of wound sepsis 13 (13%) were with clean wound, 27 (27%) had clean-contaminated wound, 41 (41%) had contaminated wound and lastly the number of cases with dirty wound was 19 (19%) (table 4).

b-Category and type of the operations:

The study showed that the number of cases of wound sepsis among patients who undergone moderate operations e.g. (appendectomy, herniectomy, cholycystectomy) was 59 (59%), the number of cases of major operations was 51 (51%) (table 4).

c-Use of drains:

It was found that out of 100cases of wound sepsis, 66 (66%) used drains and 34 (34%) of cases did not use drains. 42 (42%) used closed drains & 24 (24%) used opened drairs (table 4).

Table (4): Distribution of wound sepsis according to the type of wound, type of operations and usage of drains.

Type of wound	Number of pt	%
Clean	13	13%
Clean-contaminated	27	27%
Contaminated	41	41%
Dirty	19	19%
Category & type of operative	**Number of cases**	**%**
Moderate operations e.g. (appendectomy, herniectomy, cholycystectomy)	59	59%
Major operations e.g. (colorectal operations& explorations)	51	51%
Use of drains	**Number of cases**	**%**
Not used	34	34%
Use opened drains	42	42%
Use closed drains	24	24%
Total	100	100%

Distribution of cases among the different surgical departments was as follows, general surgery 60 cases (60%), orthopedic 16 cases (16%), urological 12 cases (12%) and gynecological & obstetric 12 cases (12%) (table 5).

Table (5): The distribution of wound sepsis cases among the different surgical departments.

Department	Number of cases	%
General surgery	60	60%
Orthopedic.	16	16%
Urological.	12	12%
Gynecological &obstetric	12	12%

The table showed that the highest incidence of wound sepsis cases was in the general surgery department (60%)

Microorganisms isolated from patient samples:

1- Microorganisms isolated from postoperative wound sepsis:

The study showed that among the isolated 100 cases of surgical wound sepsis, there were 75 single infections & 25 mixed infections. In general surgery department there were 43 (57.3%) single infections & 17 (68%) mixed infections, in orthopedic department there were 13 (17.3%) single infections & 3 (12%) mixed infections, in urological department there were 11 (14.7%) single infections & 4 (16%) mixed infections and in gynecological & obstetric department there were 8 (10.7) single infections & 4 (16%) mixed infections. The distribution of single or mixed infections among different department was not statistically significant (P>0.05) (table 6).

Table (6): Distribution of both, the single and mixed pathogens in the different surgical departments at Benha university hospital.

Department	Single infections		Mixed infections		Total
	No.	%	No.	%	
General surgery	43	57.3	17	68	60
Orthopedic	13	17.3	3	12	16
Urological	11	14.7	1	4	12
Gynecological & obstetric	8	10.7	4	16	12
Total	75		25		100

$X^2 = 2.91$ P = 0.4 (insignificant)

So the distribution of single or mixed infections among different departments was not statistically significant.

I -Types of isolated microorganisms from surgical wound sepsis

A-Gram positive cocci:

1-Staphylococci (27 strains):

-Microscopic examination after Gram staining showed Gram positive cocci arranged in clusters and small groups.

-On culturing on blood agar, the colonies appear opaque & circular, colonies of most strains 25 (92.5%) were surrounded by complete zone of hemolysis, on nutrient agar, colonies appear pigmented (orange, yellow & white) and on MacConkey's, the colonies appeared pink in color & small.

Biotyping of Staphylococci:

The present study showed that all *Staph.* strains 27 (100%) were catalase positive, 25 strains (92.5%) were coagulase positive, 25 strains (92.5%) were positive in gelatin liquefaction, 25 (92.5%) were mannite fermenters table (7).

Table (7): Biotyping of *Staphylococcal* strains.

Reaction	No. of positive strains (*Staph aureus*)	No. of negative strains
Catalase	27 Strains (100%)	0 (0%)
Coagulase	25 Strains (92.5%)	2 strains (7.5%)
Gelatin liquefaction	25 Strains (92.5%)	2 strains (7.5%)
Mannite fermentation	25 Strains (92.5%)	2 strains (7.5%)

2-*Streptococcus faecalis* (11 strains):

- Microscopic examination revealed gram positive short chains of non capsulated non spore forming cocci.
- On blood agar, the colonies were small & were not surrounded by any type of hemolysis except 2 strains only; which were surrounded by alpha hemolysis.
- On nutrient agar appeared as minute non pigmented colonies and on MacConkey's as very small pink colonies. All strains were catalase negative.

B-Gram negative bacilli:

1-E.coli (36 strains):

Microscopic examination of *E.coli* revealed Gram negative bacilli. On culturing on MacConkey's, colonies appeared smooth, glossy& pink.

Biotyping of E.coli:

The study showed that the biotyping of *E.coli* strains was as follows: All strains (36) fermented glucose, lactose, maltose, mannite and sucrose with production of acid & gas. All strains were iodole positive, Methyl red positive, and V.P., citrate, urea & H_2s negative.

2-Klebsiella(19 strains):

Microscopic examination of *Klebsiella* revealed Gram negative rods. Culturing on MacConkey's revealed large, mucoid, pink colonies which rapidly turn to yellow colonies and tend to fuse together.

Biotyping of Klebsiella:

The study showed that the biotyping of *Klebsiella* was as follows: All strains (19) fermented glucose, lactose, maltose, mannite and sucrose with production of acid and gas, all strains were indole, MR, H_2s negative, V.P., citrate, urea positive.

3-Pseudomonas (14 strains):

- On microscopic examination, Gram negative rods appeared. Culture on nutrient agar revealed blue pigment spreading on the agar.
- On MacConkey's, non lactose fermenting pale colonies were found. On blood agar, blue pigment appear & 5 strains out of 14, their colonies were surrounded by complete zone of hemolysis

Biotyping of pseudomonas:

Biotyping of pseudomonas strains in the present study was as follows: All strains (14) did not ferment any of the five sugars except 2 strains only that fermented glucose with production of acid only. All strains were indole, MR, V.P., H_{2s} negative, citrate & urea positive. All media appeared blue (due to pyocyanin pigment) and the organism formed thin film on the top of the tubes.

***4-Proteus* (10 strains):**

Microscopic examination revealed Gram negative bacilli. Culture on nutrient agar, swarming growth appeared & fishy small was characteristic. Culture on MacConkey's revealed non lactose fermenting and the swarming were inhibited.

Biotyping of proteus:

All strains (10) fermented glucose and 2 strains fermented glucose and Maltose with production of acid and gas. All strains were V.P. negative, indole, MR, citrate, urea and H_2s positive.

***5-Bacteroides* (9 strains):**

They were strictly anaerobes on culturing on blood agar selective for anaerobe, circular opaque colonies appeared, and 6 out of 9 strains were surrounded by complete zone of beta- hemolysis.

. Microscopic examination revealed Gram negative short, highly pelomorphic rods.

II-Distribution of microorganism encountered in post operative wound infection.

The most common organism encountered in surgical wound infection was *E.coli* which was isolated from 25 (33.3%) as single pathogen and 11 (21.6%) in mixed infections followed by *Staph. aureus* which was isolated from 18 (24%) cases as single pathogen& and 7 (14.6%) in a mixed form followed by *Klebsiella pneumoniae* which was isolated from 14 (16.7%) cases as a single pathogen & 5 (9.8) cases in a mixed form followed by *Strept. faecalis* which isolated from 2 (2.7%) cases as a single pathogen and 9 (17.6%) in a mixed form followed by proteus which is isolated from 6 (8%) cases as a single pathogen & 4 (7.8%) in a mixed form and lastly Bacteroides which isolated only in a mixed form, from 9 (17.6) cases (table 8).

Table (8): Types and incidence of microorganisms encountered in post operative wound infection, both in mixed or single infection.

Type of microorganisms	No. of strains in single infections		No. of strains in mixed infections		Total No. of strains	Incidence	X^2	P
	No.	%	No.	%				
E.coli	25	33.3	11	21.6	36	28.5%	2.06	0.15
Staph aureus.	18	24.0	7	14.6	25	21.4%	0.73	0.39
Klebsiella	14	16.7	5	9.8	19	15%	1.86	0.17
Pseudomonas	10	13.3	4	7.8	14	11%	0.93	0.3
Strept. faecalis	2	2.7	*9	17.6	11	7.9%	8.5	0.009
Proteus	6	8.0	4	7.8	10	8.7%	8.0	0.97
Bacteroides	-		*9	17.6	9	7%	14.25	<0.001
Total	27		51		126	100%		

* P significant

The distribution of microorganisms according to their prevalence in surgical wound infection and their occurrence in mixed or single infections was significant in *Strept. faecalis* and *Bacteroides* only their P value was significant ($P<0.05$).

III-Isolated organisms from the different surgical departments:

In general surgery department, *E.coli* was the most common isolated organism from wound sepsis cases, number of its cases was 15 (25%) (table 9).

In orthopedic department *Staph. aureus* was the most common, number of cases was 6 (37.5%) (table 9).

In urological department *E.coli* was the most common & number of cases was 4 (33.3%) (table 9).

In gynecological and obstetric department *E.coli* was the most common and number of its cases was 3 (25%) (table 9).

gynecological and obstetric departments & their percentages.

Isolated microorganisms in general surgery dep.	*Number& percentage of patients*	Isolated microorganisms in orthopedic dep.	*Number & percentage of patients*	Isolated microorganism s urological dep.	*Number & percentage of patients*	Isolated microorganisms in gynecological & obstetric dep.	*Number & percentage of patients*
E.coli	15 (25%)	*Staph. aureus*	6 (37.5%)	*E.coli*	4 (33.3%)	*E.coli*	3 (25%)
Staph. aureus	10 (16.7%)	*E.coli*	3 (18.75%)	*Proteus*	3 (35%)	*Klebsiella*	3 (25%)
Klebsiella	8 (13.3%)	*Klebsiella*	2 (12.5%)	*Pseudomonas*	2 (16.6%)	*CONS*	1 (8.3%)
Pseudomonas	5 (8.3%)	*Pseudomonas*	2 (12.5%)	*Klebsiella*	1 (8.3%)	*Pseudomonas*	1 (8.3%)
Proteus	3 (5%)	*Staph. aureus & E.coli*	1 (6.25%)	*CONS*	1 (8.3%)	*CONS& Bacteroid*	2 (16.6%)
Strept.feacalis	2 (3.3%)	*Staph. aureus & Strept. faecalis*	1 (6.25%)	*Proteus & Strept. faecalis*	1 (8.3%)	*Klebsiella & Bacteroid*	1 (8.3%)
E.coli & Strept.feacalis	3 (5%)	*Staph. aureus & Pseudomonas*	1 (6.25%)	Total	12 (100%)	*Klebsiella & Strept. faecalis*	1 (8.3%)
E. coli & Staph	2 (3.3%)	**Total**	16 (100%)			Total	12 (100%)
E. coli & Bacteroid	2 (3.3%)						
E.coli & Staph & Bacteroid	1 (1.6%)						
Staph & Bacteroid	2 (3.3%)						
Staph & Klebsiella	1 (1.6%)						
Klebsiella & Bacteroid	2 (3.3)						
Pseudomonas & proteus	2 (3.3)						
Pseudomonas & Bacteroid	1(1.7)						
Proteus & Strept. faecalis	1(1.7)						
Total	60(100%)						

Microorganism isolated from anterior nasal, throat & skin swabs from patients of postoperative wound sepsis.

Coagulase negative Staph. (CONS) was the commonest isolated organism from skin swabs (6 cases), coagulase positive Staph. (COPS) was the commonest isolated organism from nasal swabs (6 cases). *Nisseria* was the commonest isolated organism from throat swabs (10 cases) (table 10).

Table (10): Microorganism isolated from anterior nasal, throat & skin swabs of patients of post operative wound sepsis.

Type of organisms	Infected nasal swabs		Infected throat swabs		Infected skin swabs		X^2	P	
	No.	%	No.	%	No.	%			
Coagulase positive Staph .(COPS)	6	35.3	-	-	3	23.1	6.44	0.04	Sig.
Coagulase negative Staph. (CONS)	4	23.5	2	8.3	6	35.3	4.91	0.08	Ns
Strept. viridans	3	17.6	5	2.8	-	-	3.06	0.21	Ns
Strept. pyogenes	-		3	12.5	-	-	3.97	0.13	Ns
Klebsiella	2	11.7	-		-	-	4.52	0.1	Ns
Nisseria pharyngitides	2	11.7	10	41.7	-	-	10.04	0.006	Sig.
Diptheroid	-		4	16.7	3	23.1	4.0	0.13	Ns
E.coli	-	-	-	-	3	23.1	10.02	0.006	Sig.

P values of microorganisms isolated from anterior nasal, throat &skin swabs of cases of wound sepsis were significant for *COPS, Nisseria & E.coli*

The study showed the isolated microorganisms from nose, skin, throat of medical personnel, inanimate objects and environment of the operating room which was as follows.

Nasal, skin, throat swabs were obtained from surgeons, anesthetists, nurses and workers and the isolated microorganisms from these swabs were *COPS, CONS, Strept. viridans, Diptheroid* and *Nisseria* also swabs were taken from instruments, dressings, disinfectants, instrumental table and anesthetic table & all were sterile, specimens obtained from the air and wall dust yielded *CONS* and *Diptheroid plus Nisseria* respectively as shown in (table 11).

Table (11): Isolated microorganisms from nose, skin, throat of medical personal inanimate objects & environments in operating room.

Sample	Number of specimens	Infected specimens		Type of organisms
		No.	%	
A-Personnel				
Surgeons	6	4	66.7	CONS, Diptheroid, COPS
Anesthetists	6	3	50.0	
Nurses	6	3	50.0	Strept. viridans, Nisseria
Workers	6	4	4.7	
B-Inanimate objects				
Instruments	1	-	0.0	-
Dressings	1	-	0.0	-
Disinfectants	1	-	0.0	-
C- Environmental				
Air of the room	1	1	100	CONS
Wall dust	1	1	100	Diptheroid plus Nisseria
Instrumental table	1	-	0.0	
Anesthetic table	1	-	0.0	

P > 0.05 so it is not significant

Biochemical reactions of isolated organisms from nose, skin throat of patients & personnel inanimate objects was as follows: COPS strains liquefy gelatin & ferment mannite the CONS strains do not liquefy gelatin or ferment mannite & all of them were catalase positive, biochemical reactions of the isolated *E.coli* from skin swabs were identical to that of *E.coli* of the wound sepsis.

The present study show the microorganisms isolated from personnel, objects & environment in general surgery, orthopedic, urological and gynecological and obstetric departments which was as follows: the swabs of the instruments, dressings& disinfectants were sterile, swabs from personnel reveled *COPS, CONS, Strept. pyogenes, Diptheroid, Nisseria, E.coli* and *Strept. viridans*, air in the dressing room of general surgery department was found to contain *COPS.* and *Anthracoid*, that of the orthopedic department contained *CONS. & Nisseria*, that of the urological department contained *Diptheroid*, and lastly that of the gynecological & obstetric department contained *CONS* . Air of the patient rooms was found to contain COPS & *Micrococcus* in the general surgery, *Nisseria* in the gynecological & obstetric department and CONS in both the urological and orthopedic department, swabs from linen and blankets were found to contain *Diptheroid & Staph.* from the general surgery department & *Staph.* only in all other departments as shown in
(table 12).

Table (12): Organisms isolated from personnel, objects & environment in general surgery, orthopedic, urological & gynecologic and obstetric departmen

Samples	General surgery			Orthopedic			Urological			Gynecological & obstetric		
	No. of specimen	Infect specimen	Organisms	No. of specimen	Infect specimen	Organisms	No. of specimen	Infect specimen	Organisms	No. of specimen	Infect specimen	Organisms
1. Personnel			CONS, Strept viridans, E.coli, Strept. pyogenes, Diptheroid			CONS, COPS, Strept. viridans Nisseria			Strept. Viridans ,COPS Anthracoid Nisseria			Strept. viridans CONS Nisseria
Doctors	3	3		3	3		3	3		3	3	
Nurses	3	3		3	3		3	3		3	3	
Workers	3	3		3	3		3	3		3	3	
2. Inanimate objects												
Instruments	1	-	-	1	-	-	1	-	-	1	-	
Dressings	1	-	-	1	-	-	1	-	-	1	-	
Disinfectants	1	-	-	1	-	-	1	-	-	1	-	
3. Environment samples												
1-Dressing room air	1	1	COPS Anthracoid	1	1	CONS Nisseria	1	1	Diptheroid	1	1	CONS
2-Patient room air	1	1	COPS Micrococcus	1	1	COPS CONS	1	1	CONS	1	1	Nisseria
3-Linen & blankets	1	1	Diptheroid,	1	1	COPS	1	1	COPS	1	1	Diptheroid

Antibiotyping:

The antibiotics used in this study were as follows:

Penicillin (Pen), ampicillin (Amp), tetracycline (Tet), norfloxâcin (Nor), gentamycin (Gen), amikin (Ak), chloramphenicol (Chlor).

1-Antibiotyping of the isolated *E.coli* strains was shown in (table 13).

Table (13): Antibiotyping of the isolated E.coli strains (36) from wound sepsis

Number of strains	Percentage	Pattern of antibiotic sensitivity						
		Pen	Amp	Tet	Nor.	Gen	Ak	Chlor
13	36%	R	S	R	S	S	S	S
11	30.5%	R	R	R	S	S	S	S
4	11%	R	R	R	R	S	S	S
2	5.5%	R	R	R	R	R	R	S
2	5.5%	R	R	R	R	R	R	R

4-Antibiotyping of isolated *Staph.* strains from nasal, throat & skin swabs of patients & personnel was shown in (table 16).

Table (16): Antibiotyping of the isolated *Staph.* strains from nasal, skin& throat swabs from patients and personnel (40strains)

Number of strains	Percentage	Pattern of antibiotic sensitivity						
		Pen	Amp	Tet	Nor	Gent	Ak	Chlor
25	62.5%	S	S	R	S	S	S	S
11	27.5%	R	S	R	S	S	S	S
4	10%	R	R	R	S	S	S	S

5-Antibiotyping of the isolated *Klebsiella* strains was shown (table 17).

Table (17): Antibiotyping of the isolated *Klebsiella* strains.

Name been of strains	Percentage	Pattern of antibiotic sensitivity						
		Pen	Amp	Tet	Nor	Gent	Ak	Chlor
11	57.8%	R	R	R	R	S	R	S
4	21%	R	R	R	S	S	R	S
4	21%	R	R	R	S	S	S	S

6- Antibiotyping of the isolated *Klebsiella* from nasal swabs of the patients was shown in (table 18).

Table (18): Antibiotyping of the isolated *Klebsiella* from nasal swab of the patients (2 strains).

Number of strains	Percentage	Pattern of antibiotic sensitivity						
		Pen	Amp	Tet	Nor	Gent	Ak	Chlor
2	100%	R	R	R	S	S	R	S

7-Antibiotyping of *Pseudomonas* strains was shown in (table 19).

Table (19): Antibiotyping of *Pseudomonas* strains. (14)

Number of strains	Percentage	Pattern of antibiotic sensitivity						
		Pen	Amp	Tet	Nor	Gent	Ak	Chlor
12	85.7%	R	R	R	S	S	S	R
2	14%	R	R	R	S	S	S	R

8-Antibiotyping of *Strept. faecalis* was shown in (table 20).

Table (20): Antibiotyping of *Strept. faecalis* strains (11).

Number of strains	Percentage	Pattern of antibiotic sensitivity						
		Pen	Amp	Tet	Nor	Gent	Ak	Chlor
6	54.5%	S	S	R	S	R	R	R
5	45.4%	S	S	R	S	S	S	R

9-Antibiotyping of *Proteus* strains was shown in (table 21).

Table (21): Antibiotyping of Proteus strains. (10)

Number of strains	Percentage	Pattern of antibiotic sensitivity						
		Pen	Amp	Tet	Nor	Cent	Ak	Chlor
7	70%	R	R	R	S	S	S	R
3	30%	R	R	R	S	R	S	R

10-Antibiotyping of *Bacteroid* strains was shown (table22).

Table (22): Antibiotyping of Bacteroid strains. (9)

Name been of strains	Percentage	Pattern of antibiotic sensitivity						
		Pen	Neo	Tob	Kan	Bacit	Rif	Met
6	66.6%	R	R	R	R	R	R	S
2	22.2%	R	S	S	R	R	S	S
1	11.1%	R	R	R	S	R	R	S

Serotyping of *E.coli*:

1-Serotyping of E. coli strains isolated from wound sepsis was shown in the study as follows:

16 strains (44.4%) agglutinated with polyvalent 2 which included O44, O55, O125, O126, O146, and O166. 9 strains (25%) agglutinated with polyvalent 3 which included O18, O114, O142, O151, O157 and O158. 4 strains (11%) agglutinated with polyvalent 1 which included O1, O26, O86a, O111, O119, O127a and O128. 2 strains (5.5%) agglutinated with polyvalent 4 which included O6, O27, O78, O148, O159 and O168. 2strains (5.5%) agglutinated with polyvalent 8 which included O29, O143, O152and O164. 1 strain (2.75%) agglutinated with polyvalent 7 which included O28ac, O112ac, O124, O136 and O144 and lastly the remaining 2 strains (5.5 %) were Autoagglutinable (table 23)

Table (23): Serotyping of *E.coli* strains isolated from wound sepsis.

Number of strains	Percentage	Agglutinated with antiserum
16	44.4%	Agglutinated with polyvalent 2
9	25%	Agglutinated with polyvalent 3
4	11%	Agglutinated with polyvalent 1
2	5.5%	Agglutinated with polyvalent 8
2	5.5%	Agglutinated with polyvalent 4
1	2.75%	Agglutinated with polyvalent 7
2	5.5%	Autoagglutinable

Polyvalent 2 showed the highest percentage of agglutination with the isolated *E.coli* strains (44.4%) while polyvalent 7had the lowest percentage (5.5%)

2-Serotyping of *E.coli* strains isolated from skin swabs was shown in the study as follows :

3 strains (75%) agglutinated with polyvalent 2, 1 strain (25%) agglutinated with polyvalent 1 as shown in table (24)

Table (24): Serotyping of *E coli* isolated from skin swabs

Number of strains	Percentage	Agglutinate with antiserum
3	75%	Agglutinated with polyvalent 2
1	25%	Agglutinated with polyvalent 1

The cytotoxic effect of *E.coli* strains filtrate on Vero cell line.

The cytotoxic effect of *E.coli* strains filtrate on Vero monolayer cells were assayed in the study as follows:

20 strains (55.5%) had a verocytotoxic effect and 10 strains (44.4%) had no verocytotoxic effect. The cytotoxic affected cells appeared rounded and floated freely in the medium. The cytopathic effect began within 24 hours then became advanced with time, maximum effect were obtained after 72 hours (table 25)

0 means no response

1 means that less than 25% of cells are affected.

2 means that about 50% of cells are affected.

3 means that about 75% of cells are affected.

4 means that more than 90% of cells are affected.

(Konowalchuck et al., 1977)

Table (25): The cytopathic effect of *E.coli* strains filtrate on Vero cell line.

Strain no.	The cytopathic effect of 1/4 dilution of the filtrate		
	After 24 h	After 48 h	After 72 h
1	0	0	0
2	2	2	3
3	0	0	0
4	2	3	4
5	2	4	4
6	2	3	4
7	0	0	0
8	3	4	4
9	0	0	0
10	0	0	0
11	2	4	4
12	2	3	4
13	3	4	4
14	0	0	0
15	3	4	4
16	0	0	0
17	0	0	0
18	2	3	3
19	0	0	0
20	2	3	4
21	2	3	4
22	4	4	4
23	0	0	0
24	3	3	4
25	0	0	0
26	2	3	4
27	0	0	0
28	4	4	4
29	3	3	4
30	0	0	0
31	0	0	0
32	3	4	4
33	0	0	0
34	2	3	4
35	0	0	0
36	2	3	4