Microorganisms Isolated From Foot Ulcers Infection Of Diabetic Iraqi Patients.

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Summary:

Background: - *Diabetic foot infections may be classified as superficial or deep. Bacteria are liable to enter any cut or ulcer causing infection. Defect in treatment of infected deep diabetic foot may result in oesteomyelitis, limb loss, and even death.*

Methods: - *Microorganisms were isolated and identified from both superficial & deep foot ulcers infection of (60) diabetic patients.*

Results: - *The present results showed that high incidence (30.8%) of Escherichia coli (E-coli) was isolated from dry - superficial foot ulcers followed respectively by Staphylococcus epidermidis (S. epidermidis). 3.1 % and 15.4% of Proteus mirabilis (P. mirabilis), equal Percentages for Klebsiellae Pneumoniae (K. pneumoniae), Klebsiellae ozaenae (K. ozaenae), Citrobacter freundii (C. freundii) and Pseudomonas aeruginosa (Ps. aeruginosa which were 7.7 %. the most common microorganisms isolated from wet - superficial foot ulcers were 14.3% of S. aurous and S. epidermidis, followed by equal by Percentages of E-coli, Enterobacter cloacae (E cloacae) k. pneumoniae, C. freundii; which were 9.5 % also equal Percentages for K. ozaenae, P. mirabilis, Morganella morganii (M. morganii) providencia rettgri (P. rettgri), Enterobacter. aerogenes (E. aerogenes), Acinetobacter baumanii (A. baumanii) & Ps. aeruginosa (4.8%) were isolated The present findings demonstrated that the microorganisms isolated from different depth of deep ulcer were 18.4% of Ps. aeruginosa, followed by equal Percentages (12.2%) of E-coli & P. mirabilis. Then 10.2% of k. Pneumoniae and equal Percentages 8.2% for both S. aureus& S. epidermidis, similar Percentages4.1 for Klebsiellae terrigina (K. terrigina) & providencia stuartii (p. stuartii). the other species from different other genera represent one (2.1 %) isolate only.*

Conclusions:- *The infected superficial ulcers from diabetic patients demonstrates high incidence of Ecoli followed by S. epidermidis, Proteus and Klebsiella. While the most common microorganisms isolated from wet-superficial foot ulcers were S. aureus, S. epidermidis, E.coli, Enterobacter, Klebsiella, Proteus, Providencia, Morganella, Citrobeacter, Acinetobacter & pseudomonas. The microorganisms isolated from different depth of deep ulcers were pseudomonas, E.coli, Proteus, Klebsiella, S. aureus, S. epidermidis, S.capitis, Streptococcus viridans, Shigella, Serretia, Acinetobacter.*

Keyword: - *microorganisms foot ulcers diabetics*

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Introduction:

Diabetic foot ulcers

The diabetic foot can be defined as a condition that includes infection, ulceration and destruction of deep tissues associated with neurological abnormalities and peripheral vascular disease in the lower limbs (Apelqvist, 2001).

There are three main factors that lead to ulceration and necrosis in the diabetic foot, namely ischemia, neuropathy, and infection (septic), (Jackson and Vinik, 1979).

Foot infections may be classified as superficial or deep. Superficial infections are non - limb threatening, do not manifest signs of toxicity and blood glucose level are not usually affected.

Deep foot infections are divided into three types, namely dorsal foot phlegmon, deep planter space infections, and infected foot ulcer. Any of these deep foot infections May results in oesteomyelities limb loss, sepsis and even death (James 2000).

A superficial microbiological colonization of foot ulcer is virtually universal. A culture of fluid from a lesion, aspiration from deep tissue, or biopsy specimens in cases of deep infection provides more reliable data (Apelqvist 2001)

A superficial infection and most non - limb threatening Infection with ischemia or necrosis is usually polymicrobial due to Gram - positive cocci, strict anaerobes, and Gram negative bacilli (Apelqvist, 2001).

Patients and methods

The present study consisted of sixty, diabetic foot patients (31 female, 29male) of different ages, weights and marital status. The patients age was ranged between 20-90 years.

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The study population included , patient who attended medical city teaching hospital & al-jemhouri hospital in Al-sadir city.

The samples were collected from all patients though the period of October 2002 till jully 2003. The patients were asked if they were on antibiotic treatment. Specimens taken from ulcer were collected after removal of necrotic tissue overlying the base of ulcer. Bits of tissue were obtained from underlying tissue by using asharp scalpel or pus was obtained by swab (Louie etal, 1976). The microorganisms were isolated and identified according to the microbiological method (Bailey & Scotts, 1990)

Results:

The results of this study were obtained from sixty patients with diabetic foot ulcers 25 (41.6%) with superficial ulcers & 35 (58.3%) with deep ulcers. The age range of those patients was between 20 - 90 years, there were (48%) males and (52%) females.

The main depth of superficial ulcers was 0.74+ 0.7 cm, ranged between 0.5-2.5 cm. While for deep diabetic foot ulcers was 2.2-0.5 cm, which range from 2.0-3.0cm.

Table (1), shows the microorganisms isolated from swab's culture of superficial diabetic foot ulcers patients.

It was indicated from the above table that the most common microorganisms isolated from dry ulcer was E.coli (30.8%) followed by S.epidermidis (23.1%), and P.mirabilis (15.4%).

Equal percentages were obtained for each of K.penumoniae, K.ozaenae, C.freundii, and Psaeruginosai which were (7.7%).

Also the same table shows the most common microorganisms isolated from wet ulcers, which were S.aureus & S.epidermidis(14.3%),followed by E.coli, K.pneumoniae, C.freundii & E.cloacae, which were (9.5%) for each . Equal percentages were obtained for each K-ozaenae, P.mirabilis, M.morganii, P.rettgri, E.aerogenes, and A.baumanii & Ps.aeruginosa, which were (4.8%).

Table (1), the frequencies and percentages of microorganisms
isolated from su erficial diabetic foot ulcer.

No. of patient ulcers	Type of ulcers	Microorganisms isolated	No. of isolates	% of isolates	More frequent isolates
10	Dry	E-coli	4	30.8	E-coli
		s. epidermidis	3	23.1	s. epidermidis
		P. mirabilis	2	15A	
		k. Pneumoniae	1		
		k.Ozaenae	I		
		C. freundii	1	7.7	
		Ps. aeruginosa	1		
	Total		13		
15	wet	S. aureus	3	14.3	S. aureus
		s. epidermidis	3		s. epidermidis
		E.cloacae	2	9.5	
		E.coli	2		
		k. Pneumoniae	2		
		C. freundii	2		
		k.Ozaenae	I		
		P. mirabilis	I		
		M. morganii			
		P. rettgri	1		
		E. aerogenes	1		
		A.baumanii	1		
		Ps. aeruginosa	1		
	Total		21		
25	Total		34		Total

Table (2), the frequencies and percentages of microorganisms lated from dee diabetic foot ulcer.

Depth of Ulcers/cm	Microorganisms isolated	No. of isolate:	%of isolates	More frequent isolates
2.0	Ps. aeruginosa	9	25.0	Ps. aeruginosa
	S. epidermidis	4	11.1	s. epidermidis
	S. aureus	3	8 3	
	E-coli	3		
	P. mirabilis	3		
	k. Pneumoniae	3		
	k.terrgina	2		
	peptostreptococcus	1	5.6	
	S.lentus	1	2.7	
	S.hominis	1		
	k. Ozaenae	l		
	E cloacae	1		
	P.stuartii	1		
	Shigella spp	l		
	S.plyanthica	l		
	Ps.fluo/putida	1		
	Total	36	73.3	
2.5-2.6	E-coli	2	18.2	E-coli
	k. Pneumoniae	2		k. Pneumoniae
	P. mirabilis	2		P. mirabilis
	S. aureus	1	9.1	
	S.capitis s.viridans A.baumanii Ps. aeruainosa			
	Total	11	22.4	
3.0	E-coli	1	50.0	
	P. mirabilis	I		
	Total	2	4.1	

Total number of isolates (49) Table (2), demonstrates the microorganisms isolated from swabs culture of deep diabetic foot ulcers patients.

All the deep diabetic foot ulcers swabs show a positive culture results. The incidence of Ps. aeruginosa were 9 isolates (18.4%) of the total (49) isolated from different depth ulcers and was the most frequent common microorganisms isolated Escherichia coli & proteus mirabilis were the second common frequent isolates they were 6 isolates (12.2%), followed by 5 isolate (10.2%) of K.pneumoniae, and equal percentages for S.aureus & S.epidermidis, which were 4 isolates (8.2%), and K.terrgina which were 2 isolates (4.1%).

The other species from different other genera represent one (2.1%) isolate only Out of (35 positive cu ture spec mens, only 17 cases (48.6%) revealed mixed bacterial growth culture results.

Discussion

The economic social and personal costs of foot infections in diabetic patients are considerable. The increased susceptibility to foot infection was attributed to several fectors (Gibbons & Eplipoubs, 1984); among these factors are immune dysfunction, neuropathy and vascular insufficiency. The microorganism most frequently isolated in the present study from dry ulcer was E.coli. Followed by S.epidermidis & facultative anaerobic Gram-negative bacilli. The present findings are in disagreement with result reported by Louie et al, 1976 and Sapico et al, 1984. Also it
is inconsistent with that studied by wheat et al, 1984 and lipsky et al, 1990. The most frequent

common microorganisms isolated from wet ulcers were S.aureus and S.epidermidis, followed by facultative anaerobic Gram-negative bacilli, also these results disagree with which was reported by Sapico et al, 1980 and 1984. But still agreed with that studied by wheat et al, 1986 and lipsky et al, 1990; Bengamin et al, 1990; whom they did isolate Gram-positive cocci which was the most common, then Gram-negative facultative anaerobic bacteria. The most common frequent microorganisms isolated from deep ulcers in present work were Ps-aeruginosa, followed by Gram-negative enteric bacilli, followed by Grampositive cocci (S.aureus & S.epidermidis) and anaerobic streptococci, these are in disagreement with the results which were reported by Sapico et al, 1976 & 1984; also with that studied by wheat et al, 1980; lipsky et al 1990 & Bengamin et al, 1990. Also it is inconsistent with that reported by Ge.Y. Et al, 2002.

Among the Gram- negative enteric bacilli, E.coli & P.mirabitis were the most frequently isolated. In the present study of the total isolate of Gram-Positive anaerobic cocci, pepto-streptococcus species was the most frequent and only one of unidentified to species level of anaerobic cocci was isolated. This result is in agreement with which was reported by Sapico et al, 1976 & 1984; also with that studied by bengamin et al, 1990 & Ge.Y et al, 2002.

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