

## Study about the Relationship of Some Aerobic Anaerobic Bacteria of Acne and Its Resistance to Some Topical Treatment

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**Abstract:** Acne vulgaris is a common chronic skin disease involving blockage and/ or inflammation of pilosebaceous unit ( hair follicle ) and their accompanying sebaceous glands) . Acne develops as results of an interplay of the following four factors one of them the presence and activity of commensal bacteria Propionibacterium acnes . **Methods:**( 438) samples were collected from ( 312) infected patients with acnes from both sexes ( 132 males ) and ( 180 female ) for the period from January 2015 to February 2016 where the comedone samples were( 116 ) and pustules samples (322) samples . Samples were distributed in different agricultural medium where identified their depending upon appearance characteristics and biochemistry tests .( 10 ) Topical Treatment were used in the experiment and all results were analyzed by using variance analysis (ANOVA) . Moral valued at level 0(  $P < 0.05$  ) . **Results :** Clinical results showed that repetition of infections at females was more than the male . Domination of ( P. acnes ) bacteria in comedone while domination of ( S. epidermidis ) bacteria in pustules . it was noticed that the topical treatment ( Benoxide ) was the most effective in killing all micro-organism under consideration comparing with other topical treatments. **Conclusion:** The study revealed that Quercus Robur L. has fatal effectiveness at rate of (100%) to all positive and negative isolates to gram stain comparing with other plant extracts . We recommend using new medical herbs not used before for the treatment of acne which must have fatal effect upon bacteria ( Antibacterial Activity ) .

**Key words:** Acne vulgaris , topical treatment, clinical findings , Bacteriological findings .

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### I. Introduction

Acne vulgaris is a common chronic skin disease involving blockage and /or inflammation of pilosebaceous unit (hair follicle and their accompanying sebaceous gland) . Acne can present as Non-inflammatory inflammatory lesions or a mixture of both .Affecting mostly the face , but also the back and chest (1).Acne develops as result of an interplay of the following four factors :-

1. Follicular epidermal hyper-proliferation with subsequent plugging of the follicle .
2. Excess sebum production .
3. The presence and activity of the commensal bacteria propion bacterium acnes and,
4. Inflammation (3).

#### Management :

Treatment of acne vulgaris should be directed towards the known pathogenic factors including follicular , hyper-proliferation ,Excess sebum production acnes and inflammation .The most appropriate treatment is based on grade and severity of the acne .The following medications are used in treatment of propion bacterium acnes vulgar :-

1. Retinoid – like agents ( isotretinoin ) .
2. Antibiotic.
3. Acne products ( azelaic acid ) .
4. Herbal therapy (4).

### II Methodology and Materials:

#### Collection of the Samples

(438) samples were collected from (312) patients suffer from acne from both sex( 132 male ,180 female) for a period from January 2015 till February 2016 with different ages around ( 15-35 years) in which samples preparation were from ( 116) sample taken by sterilized comedone extractor after rubbing the face skin three times with spirit ( 70% ) .While the number of the pustules was ( 322) samples were taken by pustules tingling by sterilized disposable lancet after rubbing the face skin twice or three times with spirit ( 70% ) with cotton swab .Both samples were put in small glass bottles with screw heads (capped bottles) called (

pigot tube ) filled with Thioglycolate, then transfer the samples by cooled containers to the laboratory .**Sample Implant** :Comedones samples were implanted after breaking them by sterilized glass balls ( glass beads ) were put inside glass bottle by vortex mixture upon blood agar and MacConkey agar ( separation medium ) by using planning through sterilized standard implanting transport( loopful ) .While the pustules samples were implanted directly from transfer medium upon enriched medium of blood and MacConkey agar . This process carried out in case of aerobic implant .In case of anaerobic , both samples were implanted ( comedone and pustules ) on the` ( Thioglycolate) were put already in well capped glass bottles ( screw capped bottles ) after adding ( 1% ) ( Tween 80 ) in order to motivate the bacteria ( *P. acnes* ) . The bottles will be hugged for the period of ( 5-7 days ) . Then transfer ( loopful) from implanted to blood agar which was put in anaerobic refreshment (anaerobic jar ) for ( 2-3 ) days for separation of *P. acnes* .Also conduct anaerobic implant upon Brewer and anaerobic hugging in an anaerobic jars kit ) for a period of ( 5-7 ) days .**Identification of the Isolate**:Identification of isolate depend upon appearance characteristics of the implanted item against implanting medium including ( size , color , edges and heights of the colonies and conducting bio-chemical tests according to

( Bergy's Manual of determinative ) ( Bacteriology -1994 ) .**Topical Treatment Sensitivity Tests:**

( 10) Topical treatments were used in the experiment and we tested the sensitivity of microbes toward topical treatments by using wells methods ( 16 ) and put ( 40) microliter of topical treatments into the wells after inoculation of different bacterial isolates and then incubated them at ( 37C° ) for ( 18- 24 ) hours .All clinical results subjected to statistical analysis by using analysis of variance ( ANOVA ) . The moral was valued at the level (  $R < 0.05$  ) .**Clinical Results**:Clinical results of the current study revealed which included ( 312) patients infected with acne , their ages ranging between ( 19-39) years in which the infections of the males was ( 132) at the percentage of ( 42.30% ) , while at the female was ( 180) infections at the percentage of ( 57.69% ) ,( appendix-1).

### III Results:

**Table ( 1):The relation of acne occurring with age group for both sexes :**

Age groups	Male%	Female%	Total number
12-17	52(39.39)	82(45.55)	134( 45.55)
18-23	64(48.48)	75(41.66)	139(44.55)
24-29	12(9.09)	19( 10.55)	31(9.93)
30-35	4(3.03)	4(2.22)	8(2.56)
Total	132( 42.30)	180(57.69)	312

#### Microbiology Results

(438) samples were implanted infected by acne including ( 116) comedones and ( 132) pustules . After separation and identification of all germ isolates according to the gender and type depending upon appearance characteristics for both types , and biochemical tests , the results showed the lesion of both types illustrated in figures ( 2 , 3 ) which refers to identified isolates germ from ( 116 ) samples ( comedone ) and ( 322) pustule .

**Table( 2 ) :Types of isolates bacteria from ( 116 ) comedone**

Isolates bacteria	Percentage
<i>P. acnes</i>	68.96
<i>S. epidermidis</i>	65.51
<i>S. aureus</i>	8.62

**Table ( 3 ) : Types of isolates bacteria from (322) pustule:**

Isolates bacteria	Percentage
<i>S. epidermidis</i>	71/32
<i>P. acnes</i>	37.26
<i>P. aeruginosa</i>	11.49
<i>S. aureus</i>	9.93
<i>E. coli</i>	7.14

It was noticed that the domination of isolation of bacterial microscope organism ( *P. acnes* ) at percentage of ( 68.96% ) followed by bacterial type of ( *S. epidermidis* ) at isolate percentage of ( 65.51% ) , then the third grade comes negative bacteria of gram stain .( appendix No. 2 , 3 ) .

#### Test Of Microbe sensitivity towards topical treatment by using Muller Hinton agar

Test carried out to check the sensitivity of all bacterial I (10) topical treatments and the results illustrated on the table which the results showed that ( Benoxide ) has fatal effect to all bacterial isolates .

**Table(4):Patterns Of Sensitivity of topical treatment For ( 180 )  
*P. acnes* isolates**

Percentage	Name of topical treatment
100	Ben - oxide
100	Neo - medrol
100	Genidin
100	Retin - A -
100	Soframycin
100	Salicyclic acid
90	Ultraderm
77.77	Fucin
75.55	Samacy cline
0	Smooderm

**Table(5):Patterns Of Sensitivity of topical treatment For ( 42 ) *S.aureus* isolates**

percentage	Name of topical treatment
100	Ben - oxide
100	Neo - medrol
100	Genidin
100	Retin - A -
100	Soframycin
100	Salicyclic acid
71.20	Samacycline
65.21	Ultraderm
61.90	Fucin
0	Smooderm

**Table(6): Patterns Of Sensitivity of topical treatment For ( 23 ) *P.aeruginosaisolates* .**

percentage	Name of topical treatment
100	Ben - oxide
100	Neo - medrol
100	Genidin
100	Retin - A -
100	Soframycin
100	Salicyclic acid
71.20	Samacycline
65.21	Ultraderm
61.90	Fucin
0	Smooderm

**Table (7): Patterns Of Sensitivity of topical treatment For ( 23 ) *E. coli*isoltes**

Percentage	Topical treatment
100	Ben - oxide
100	Neo - medrol
100	Genidin
100	Retin - A -
100	Soframycin
100	Salicyclic acid
91.30	Ultraderm
69.56	Samacycline

65.21	Fucin
0	Smooderm

## 82 Discussion:

### Clinical Results :-

It was noticed that clinical results under study the repletion of infection with the female more than male especially in the age between ( 12-17 ) due to sexual maturity stage and appearance of adolescence much earlier than male .Appearance of acne is the beginning of sexual maturity stage for both sexes (6) .These results agreed with international studies ( 7&8 ), and local study ( 9,10 ), but differ with local studies (11) . While conducting statistical analysis , we found there were moral differences at (  $P < 0.003$  ) between male and female regarding the relationship of the disease with both sexes and their age categories for each .

### Microbiology Results

Domination of the type (*P. acnes*) refers to oxygen pressures in comedone which helps to create suitable anaerobic environments of this type ( 12 ) . Domination of the type (*S. epidermidis*) in pustules refers to high oxygen pressures and change of Hydrogen basis of the medium which lead to create suitable environment of above-mentioned type and non-suitability of other type (*P. acnes*) .

Also the swept of white blood cells ( Neutrophil ) in infected area will lead to lessen of (*P. acnes*) which excreted enzyme of chemical attractive characterized by its low molecular of neural cells which lead to preferring the neural cells (*P. acnes*) more than other types (13) .

Separation of negative bacteria of gram color from both ( *P. aeruginosa* , *E. coli* ) at total percentage of (17.07%) agreed with a study in this regard ( 14) whereas the existence of these organism very few in natural conditions , but possibility of its existence refers to world –wide using of antibiotic and long period of medication with lead to allowance of these organism to make colony and grow ,and reproduction in pustules , and this case called ( G-ve folliculitis )- inflammation of the hair follicle by negative microbiology with gram stain form which inflame the pustules and creates inflammatory papules more than comedone . Testing microbes sensitivity of plant extracts by using ( Moller-Hinton Agar ) . The results showed that Genidin , Retin-A , Soframiccin , Neomedrol , Salicylic acid had fatal bacterial activity to all bacterial isolates under study . Others had different antibacterial effect to all isolates under study while ( Smooderm ) had no effect to all isolates under study ( table 4 , 5 , 6 , 7 ) .The topical treatment Benoxide have ( 100% ) killing all bacterial isolates under study because containing Benzoin –Peroxide ( 10% ) that had oxidizing properties against all bacterial isolates from acne (17) and this results typical to other researches ( 18 , 19 ) .The topical treatment Neomedrol had fatal activity because had neomycin that had bactericidal effect and also Genidin had the same activity because having gentamycin and had bacterial effect and also to Salicylic acid killed all isolates because had bactericidal effect . While other topical treatments under study appear different Antibacterial activities because resisting of the bacterial to these treatment .

## V Conclusions:

We have noticed in the conclusions of the study that infections with the females were more than male regarding clinical study .Also we noticed that ( *P. acnes* ) bacteria was dominated in the samples of acnes ( comedones ) , while ( *S. epidermidis* ) bacteria has dominated in ( pustules samples ) regarding bacteriology study . Regarding the study of effect of Benoxide , Neomedrol , Genidin , Retin-A , Soframycin and Salicylic acid were noticed and affect all kinds of bacteria of aerobic and anaerobic bacteria .

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