Study of bacterial causative agents of acne and the effect of some antibiotics on them

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Abstract

This study was designed to determine the percentage and the main causative agent causing acne among Iraqi patients aged between 15 to 40 years and complaining from different stages of acne in Baghdad. Results showed that the percentage of infection was 47 % the main causative agents were Staphylococcus spp. including (**S.aureus** , **S. epidermedis**) and other than Staphylococcus which includes(**Spedomonas** , **E.coli** , **Klebsiella** and ά-hemolytic streptococci) .Regarding the age factor ,results showed that the highest infection rate was among the age group (15-20 years) and (20 -25 years) (64.89%)and (15.95%)respectively while the lowest was in (25 – 30 years) and (30 -40 years) (12.76%) and(6.38) respectively .

All bacterial strains isolated from patient were submitted to sensitivity test, results showed various reactions towards different types of antibiotics used in the study.

دراسة المسببات البكتيرية لمرض حب الشباب ودراسة تأثير بعض انواع المضادات الحياتية على الاحياء المعزولة

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الخلاصة :
صممت هذه الدراسة لتحديد نسبة الاصابة وألاحياء المجهرية المسببة لمرض حب الشباب عند المرضىمن عمر 15-40 سنة والذين يعانون من مستويات مختلفة من الاصابة في مدينة بغداد ، أظهرت النتائج ان نسبة الإصابة 64.19 % من مجموع المرضى المشمولين بالدراسة وقد تم تحديد نوع الاحياء المجهرية المسببة للمرض عن طريق زرع الدم فوجد انها, بالدرجة الاساس الى عائلة البكتريا المعوية والتي شملت تعود (**Enterobacter**, **Klebsiella** , **E.coli**, **Pseudomonas**)

وتم ايضا عزل أنواع بكتيرية لا تعود الى العائلة المعوية مثل **Streptococcus pneumonia** , **Staphylococcus aureus** , **Staphylococcus epidermidis** , _ hemolytic streptococci.

بالنسبة الى عامل العمر أظهرت النتائج اان الفئة العمرية (15-20 سنة) شهر كانت ألاكثر عرضة للأصابة بنسبة بلغت 64,89 % تلتها الفئة العمرية الاكبر قليلا (20-25 سنة) بنسبة بلغت 15,95% فيما كانت الفئة العمرية (30-40 سنة) ألاقل عرضة للأصابة بنسبة بلغت 6,38%
كل السلالات البكتيرية المعزولة تم أخضاعها للأختبار الحساسية لتقدير مدى أستجابتها لأنواع مختلفة من مضادات الحياة وقد أظهرت النتائج أن كل سلالة استجابت بشكل مختلف عن غيرها من السلالات وتم الحصول على مدى واسع من ألاستجابات للأنواع المستعملة في هذه الدراسة .

Introduction

Acne dermatological infections remain a major cause of skin abnormalities in patients undergoing treatment for acne of both sexes and different age groups. However, all recent epidemiological and therapeutic studies underline the absolute need for knowledge of the factors governing the infections in each center (El-Mahallawy, 2005,43)

Acne is one of the most common, unsightly and embarrassing skin conditions. Its causes are sometimes confusing and misunderstood, making it hard to properly treat the condition. Understanding what causes acne can help the sufferer take the proper steps to cleaning the skin and living a life free from skin blemishes (El-Mahallawy, 2005,43).

Knowledge of the pattern of acne dermatological infections can help to determine antibiotics prescribing policy and infection control procedures (Cray, 2004,530)

Acne dermatological infections could be caused by many pathogens: **S**. **aurous**, the acute dermatological infection caused by bacterial of genus **Staphylococcus,** (Ashkinazi, 2004,246) has a worldwide distributions with an estimated annual incidence of (164.3) million cases, of which (163.2) million occur in developing countries, 69% of all episodes and 61% of all **Staph.**-related deaths involve different infections other than acne (Ashkinazi, 2004,246)

The clinical presentation of acne was more gradual, and associated with other complications like rash and itching was less pronounced. (Bar-Meir,2005,651)

These findings may contribute in part to the inadvertent discharge of acne patients from the emergency department. (Bar-Meir,2005,651)

The skin and soft tissues infections caused by **Haemophilus influenza** type b (Hib) (Otero-reigada,2005,29) are usually mild but can be potentially serious due to the high probability of acne. Prompt in saturations of empiric intravenous antibiotic therapy according to the localizations and characteristics of the lesion is mandatory to prevent severe complications. (
Otero-reigada,2005,29)

Haematogenous infections are rare complications of acne caused by viridians group streptococci. Patients complain of sever infections associated with viridians streptococcal infections should be carefully evaluated for the presence of streptococcal pyogenic complications and rhabd myolusis. (Sand Lund,2005,277)

Aim of the Study

1- Determine the incidence of acne among both male and female adult Iraqi patients.

2-Specify the most age group that are exposed to infection and responses beyond that

3- Specify the most frequent microorganisms that are responsible for causing acne in patients.

4- Determine the most effective antibiotics that can be used to treat acne.

Material & methods

Samples

400 patients aged between 12 – 40 years were included in this study along the period January – June 2006 attending Al-Mansor teaching hospital (medical city) complaining from different stages of acne of both males and females.

Isolation :

Data were collected from acne patients of both sexes n Iraq during the period from January – June 2006 from Al-Mansor teaching hospital (medical city). Patients were diagnosed clinically by specialist dermatologist and laboratory by direct wet skin smear to investigate the causative bacterial agent.

Skin swab were taken from patients, cultured on blood agar medium, Chocolate agar medium and MacConkey agar medium then incubated for 24 h. at 37°C normally for blood and MacConkey agar medium and under Co2 for Chocolate agar medium (Bates,d.w, 1994).

Each plate then must be examined for morphological characteristics as a first step in diagnosis, clear zones of complete hemolysis was noticed around the colonies, then gram stain for examine under microscope to distinguish G (+ve) from G (-ve) bacteria, and its morphology (Bates,d.w, 1994).

Diagnosis :

Sets of biochemical tests are made for further diagnosis include (Coagulase test with human serum to identify **Staphylococcus aureus** and **S.epidermedis**), test was made by culturing suspected colonies in test tubes containing blood plasma, incubated at room temperature for 3 h. then tubes were examined to see the agulation of plasma.

(Culture on nutrient agar for noticing the pigmentation of **Pseudomonas** spp. then oxidase test is made for further diagnosis)

- hemolytic Streptococci is noticing on blood agar plate then examined under microscope after staining with gram satin.(Cray,2004,530)

Chocolate agar medium showed 1 type of bacterial growth, suspected **Hemophilus** spp.is further diagnosed by showing(+ve) results for V factor test it shows satallitism phenomenon.(Cray,2004,530)

All isolated bacterial strains were submitted to sensitivity test to evaluate their response to different types of antibiotics that might be used in the treatment of infection.

Table (1): The biochemical tests used in the identification of microorganisms.

Bacterial Spp,	Biochemical tests							
	Coagulase	Oxidase	Gelatinase	indol	MR	VP	Citrate	Mannitol salt agar
S.aureus	+							
S.epidermedis	-							
Pseudomonas		+						

Result and Discussion

400 patient were included in this study (males & females) aged between12- 40 years, 188 (47 %) patients' showed growth of different types of micro-organisms while 212 patient (53 %) showed no growth as shown in figure (1).

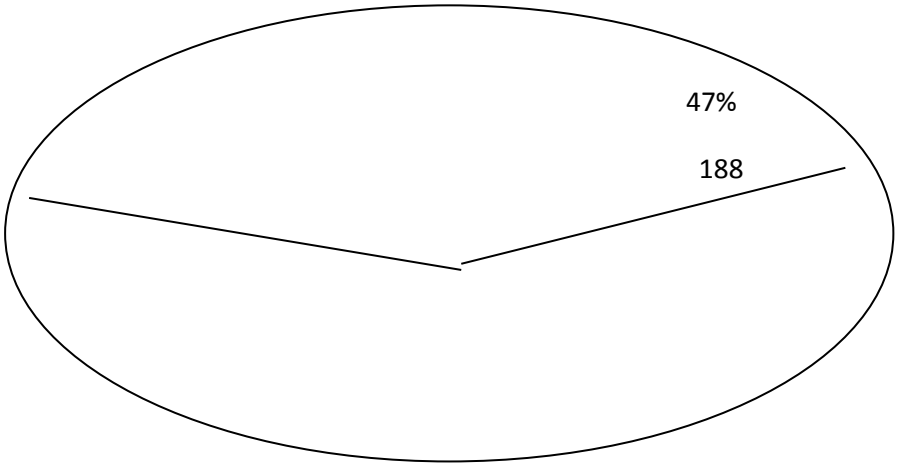

Figure (1): The distribution of infection among the studied samples

The percentage 47% is relatively normal in consideration that the skin is exposed to a lot of contaminants .plus, this is due to other infections that patients could be infected with like diarrhea or respiratory tract infections or urinary tract infections that might cause

spread of the causative agent from the infected organs to the skin or might be nosocomial infections that patients might infected with during admission to the hospital

Results also showed that the type of the causative organisms isolated from patient were different .Table (2) show us the details:-

Table (2): type of causative organism isolated from patients.

Type of organism	No. of Patients	% of infection
-Hemolytic streptococci	80	20 %
S.aureus	140	35 %
S.epidermidis	153	38.25%
Klesiella spp.	11	2.75 %
E.coli	10	2.5%
Pseudomonas spp.	6	1.5%

The highest infectious causative agent mostly isolated from samples was **S.epidermedis** and **S.aureus** (38.25)% and (35)% respectively .this may be due to the fact that these two species are widely spread on the skin so it might be transmitted by contamination of the needle during sampling or can invade the blood stream through wound infection or burns or other infections in the skin .Other causative agents (including enteric & other species)are found in blood stream may be due to other infections in the body such as diarrhea or respiratory tract infection or urinary tract infections so the causative microorganism can invade the blood steam from these organs and cause bacteremia .

Regarding age factor results on table (3) showed the highest are group mostly exposed to infection:-

Table (3): distribution of the infection among patients group

Age group	No .of cases	% of cases
15-20 year	122	64.89 %
20-25 years	30	15.95%
25-30 years	24	12.76 %
30-40 years	12	6.38 %
total	188	100 %

The age group which is mostly exposed to infection was 15 – 20 year (64.89%), this result seems to be acceptable because of the hormonal disturbances & changes of children at this age, plus the shortage in many hygienic habits that most teenagers are not aware enough about cleaning their skin properly and being unable to protect the skin against microorganism.

The lowest infections rate was among the age group (30-40) years (6.38%) this result seems to be logic since the adults are more aware than teenagers in their hygienic habits besides the immune system is completed in this age gives a further support to protect the body against various infections.

All bacterial isolated were submitted to sensitivity test to recognized their respond to various types of antibiotics; results are shown in the table (4)

Table (4): Sensitivity test of bacterial isolated for different types of antibiotics

Bacteria	Sensitive	Resistant
ά- **hemolytic strept**	Vancomycin Oxycycline Cephalothin Erythromycin Ampicillin Ciprofloxacin	Amikacin Augmentin
Staphylococcus.**aureus**	Lincomycin Vancomycin	Oxycycline Cephalothin Erythromycin Ttrimethoprim
Klebsiella	Ciprofloxacin	Amikacin Ampicillin Cephalothin Nalidixic acid
Pseudomonas	Ciprofloxacin Amikacin Cephalothin	Clindamycin Ampicillin Cephalosporin Trimethoprim Nalidixic acid
E.**coli**	Gentamycin Amikacin	Ciprofloxacin Cephalothin Oxycycline Erythromycin
S. epidermedes	Amikacin Ciproploxacin	Ampicillin Cephalothin Cephalosporin Nalidixic acid

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