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CLINICAL AND MICROBIOLOGICAL ASPECTS OF IMPETIGO IN RAMADI CITY

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ABSTRACT

The aims of this study was to detect the clinical and microbiological criteria used in the diagnosis of impetigo addition to understand the susceptibility pattern of the bacterial causative agents of impetigo to selected antimicrobial agents.

A total of Fourty five patients infected with impetigo were included in this study. Microbiological examination was performed based on direct examination, staining with Gram stain, biochemical test and culture. The antimicrobial susceptibility test was performed by standardized Kirbey-Bauer disc diffusion method.

Out of 45 specimens obtained, 15(33.3%) were diagnosed bullous impetigo and 30 (66.7%) as impetigo contagiosa. Out of 30 patients of non bullous impetigo, 25 (83.3%) were appeared as a primary infection while five (16.7%) of them followed other infection like scabies. The study results showed that Staphylococci were the main bacterial causative agents of bullous impetigo. In non-bullous impetigo, staphylococci isolated in 17 cases and Streptococcus pyogenes in 10 (33.3%) of patients. With regard to antimicrobial susceptibility tests, staphylococcal isolates were appeared 100% of sensitivity against ciprofloxacin, vancomycin, rifampicin and amikacin. Cloxacillin alone and ampicillin/cloxacillin combination revealed resistance in 4 (28.6) and 3 (21.4%) respectively. Three (12%) of isolates were resistant to third generation cephalosporines (cefotaxime, ceftriaxone and ceftazidime) respectively.

Staphylococci were the main bacterial causative agents of bullous impetigo while in non-bullous impetigo, Streptococcus pyogenes in addition to staphylococci predominantly S aureus were the predominant causative agents. Further, ciprofloxacin, vancomycin, rifampicin and amikacin were the most effective antimicrobial agents against study isolates of S aureus.

Introduction:-

Methicillin-resistant Staphylococcus aureus (MRSA), which produces a penicillin-binding protein 2 (PBP2) with a low affinity to ß-lactam antibiotics is a major nosocomial pathogen throughout the world 1. The PBP2 is encoded by the mecA gene that is located on a genetic element called the staphylococcal cassette chromosome (SCC) in Staphylococcus aureus 2. SCCmec has been classified into five major types according to gene structure.

Types I, II, and III of SCCmec are found in health care-associated MRSA (HMRSA) strains, whereas types IV and V are found in community-associated MRSA (C-MRSA) strains 3. An increase in the number of C-MRSA strains carrying type IV SCCmec has became a matter of public concern.

Impetigo and staphylococcal scalded skin syndrome (SSSS), which are diseases primarily of young children and neonates, are blistering skin diseases that are caused by exfoliative toxins (ETs) produced by S. aureus4. Serologically, ETs involved

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in human diseases consist of two types: ET-A and ET-B proteins 4 . The eta gene, encoding ETA, is located on a chromosome, whereas the etb gene, encoding ETB, is found on a plasmid. Almost all MRSA strains (i.e., C-MRSA) isolated from outpatients with impetigo and SSSS were reported to carry type IV SCCmec and were susceptible to various antibiotics except ß-lactam antibiotics. However, the decreased susceptibility of C-MRSA to macrolides and aminoglycosides has also been reported 5.

The aims of this study was to detect the clinical and microbiological criteria used in the diagnosis of impetigo, A secondary aim of our study was to understand the susceptibility pattern of the bacterial causative agents of impetigo to selected antimicrobial agents.

Patients and methods:-

Study Patients:-

A total of Fourty five patients with impetigo were attended to the Dermatology Department of AL-Ramadi General Hospital from April to September, 2007. The age ranged between 8 months to 13 years. A full history was taken from each patient according to the questionnaire, about age, gender (males and females), duration of the disease, occupation, family history and previous drug treatment. Clinical examination was performed on each patient in this study with the help of experient dermatologist, including general physical and skin examination.

Microbiological examination was performed based on direct examination, staining with gram stain and culture on different agar plates (nutrient , MacConkey and blood agar) in addition to staphylococcal selective media (mannitol salt agar). The study isolates were well bacteriollogically identified and confirmed by biochemical test following method mentioned by Finegold, et. al 6.

The antimicrobial susceptibility testing was performed by the standardized Kirbey-Bauer disc diffusion method using the Muller Hinton agar. Antibiotic discs with the following potencies were used:- ampicillin (10µg), gentamicin (10 µg), cloxacillin (5 µg), ampiclox (10 µg), tobramicin (30 µg), Ceftazidime (30 µg), ceftriaxone (30 µg), vancomycin (30 µg), ciprofloxacin (5 µg), piperacillin (100 µg), cephalexine (30 µg), and rifampicin (30 µg). The procedure accepted by the National Committee for Clinical Laboratory Standard (NCCLS)7.

Results:-

A total of 45 specimens were obtained from patients infected with impetigo. Of these, 15(33.3%) were diagnosed bullous impetigo and 30 (66.7%) as impetigo contagiosa or non-bullous impetigo. Out of 30 patients of non bullous impetigo, 25 (83.3%) were appeared as a primary infection while five (16.7%) of them followed other infection like scabies or etc (table 1).

Our result showed that in bullous impetigo, out of 15 cases, 11 (73.4%) were male and 4 (26.6%) were female with male to female ratio 1:2.8. In impetigo contagiosa out of 30 cases, 18 (60%) were male and 4 (26.6%) were female with male to female ratio 1:1.5 (table 2).

The study result showed that Staphylococci were the main bacterial causative agents of bullous impetigo divided to 11 (73.3%) by Staphylococcus aureus and 3 (20%) caused by Staphylococcus epidermidis while one (6.7%) specimen was sterile. In non-bullous impetigo, staphylococci isolated in 17 cases divided to 14 (46.7%) caused by S aureus and 3 (10%) by S epidermidis. On the other hand Streptococcus pyogenes isolated in 10 (33.3%) of patients. In addition to that, three (10%) of patients revealed sterile specimens (table 3).

With regard to antimicrobial susceptibility tests, our result revealed that ciprofloxacin, vancomycin, rifampicin and amikacin were the most effective antimicrobial agents against 25 study isolates of S aureus which no any resistant isolates observed. Cloxacillin alone and ampicillin/cloxacillin combination revealed resistance in 4 (28.6) and 3 (21.4%) respectively. Three (12%) of isolates were resistant to third generation cephalosporines (cefotaxime, ceftriaxone and ceftazidime) respectively (table 4).

Discussion:-

Cutaneous staphylococcal and streptococcal infections are important in children. They cause a wide spectrum of illness depending on the site of infection, the organism, and the host's immunity. Impetigo is a superficial skin infection characterised by golden crusts. It is caused by Staphylococcus aureus or Streptococcus pyogenes 8. Impetigo is the third most common skin disease in children, after dermatitis and viral warts, with a peak incidence at 2-6 years of age 9, 10. Lesions are highly contagious and can spread rapidly by direct contact, through a family, nursery, or class11. The condition is more common in children with atopic dermatitis, in those living in tropical climates, and in conditions of overcrowding and poor hygiene. Nasal carriage of organisms may predispose to recurrent infection in an individual12.

Our results showed that Staphylococci were the main bacterial causative agents of bullous impetigo divided to 11 (73.3%) by Staphylococcus aureus and 3 (20%) caused by Staphylococcus epidermidis while one (6.7%) specimen was sterile. In non-bullous impetigo, staphylococci isolated in 17 cases divided to 14 (46.7%) caused by S aureus and 3 (10%) by S epidermidis. On the other hand Streptococcus pyogenes isolated in 10 (33.3%) of patients. In addition to that, three (10%) of patients revealed sterile specimens. It is well authorized that impetigo can occur either as a primary infection or secondary to another condition, such as atopic dermatitis or scabies, which disrupts the skin barrier. It can be classified clinically as impetigo contagiosa (non-bullous impetigo) or bullous impetigo. Impetigo contagiosa is caused by S aureus or S pyogenes. Bullous impetigo is invariably caused by toxin-producing S aureus 12.

Impetigo contagiosa (non-bullous impetigo) is the most common form of impetigo. Lesions begin as vesicles or pustules that rapidly evolve into gold-crusted plaques, often 2 cm in diameter. They usually affect the face and extremities and heal without scarring. Constitutional symptoms are absent. Satellite lesions may occur due to autoinoculation 12.

In the field of antimicrobial susceptibility pattern, our result revealed that ciprofloxacin, vancomycin, rifampicin and amikacin were the most effective antimicrobial agents against 25 study isolates of S aureus which no any resistant isolates observed. Cloxacillin alone and ampicillin/cloxacillin combination revealed resistance in 4 (28.6) and 3 (21.4%) respectively. Three (12%) of isolates were resistant to third generation cephalosporines (cefotaxime, ceftriaxone and ceftazidime) respectively.

The study concluded that staphylococci were the main bacterial causative agents of bullous impetigo while in non-bullous impetigo, Streptococcus pyogenes in addition to staphylococci, predominantly S aureus were the predominant causative agents. Further, ciprofloxacin, vancomycin, rifampicin and amikacin were the most effective antimicrobial agents against study isolates of S aureus especially MRSA ones.

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Table 1. The distribution of study patients according to clinical forms of impetigo.

Bullous impetigo	impetigo contagiosa (non-bullous impetigo		
	Primary infection	Secondary infection	Total
15 (33.3%)	25 (83.3%)	5 (16.7%)	30 (66.7%)

Table 2. The distribution of study patients according to age and sex.

Clinical form	Age (range)	Sex		
		Male	Female	Male to Female ratio
Bullous impetigo	2-13 y.	11 (73.4%)	4 (26.6%)	1: 2.8
Non-bullous impetigo	8 m.-13 y.	18 (60%)	12 (40%)	1: 1.5

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Table 3. The distribution of microbial causative agents among patients with bullous and non-bullous impetigo.

Clinical form		Staphylococci		*S. pyogenes*	Sterile swab	Total
		S. aurues	*S. epidermidis*			
Non-bullous impetigo	14 (46.7%)	3 (10%)	10 (33.3%)	3 (10%)	30	
Bullous impetigo	11 (73.3%)	3 (20%)	-	1 (6.7%)	15	

Table 4. The results of antimicrobial susceptibility test among 25 study isolates of Staphylococcus aureus isolated from bullous and non-bullous impetigo..

Antimicrobial agents	Resistant	Intermediate	Susceptible
Cephalexine	5 20%)	2 (8%)	18 (72%)
ampicloax	3(12%)	2(8%)	20 (80%)
Amoxiclave	1 (4%)	4(16%)	20(80%)

Vancomycin	Tobramycin	Amikacin	Cloxacillin	Rifampicin	Ceftazidime	Ceftriaxone	Cefotaxime	Ciprofloxacin
0.0	1(4%)	0.0	4 (16%)	0.0	3(12%)	3(12%)	3(12%)	0.0
0.0	2(8%)	0.0	1(4%)	0.0	0.0	1.0(4%)	0.0	0.0
25 (100%)	22(88%)	25 (100%)	20(80%)	25 (100%)	22(88%)	2184%)	22(88%)	25 (100%)

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الجوانب السريرية والمايكروبايولوجية لمرض (impetigo) في مدينة الرمادي.

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الخلاصة

إن أهداف هذه الدراسة هي لتحديد الوسائل السريرية والمايكروبايولوجية في تشخيص مرض (impetigo) ومدى حساسية البكتريا المسببة له للمضادات الحياتية. شملت الدراسة السريرية ٤٥ مريض مصابين بهذا المرض. استندت اختبارات المايكروبايولوجي على الاختبارات المباشرة والصبغ بملون كرام واختبارات الكيمياء الحياتية والميكروبية. أنجز فحص الحساسية للمضادات باستخدام طريقة انتشار الأقراص كيربي –باور. أظهرت نتائج الدراسة بانه من مجموع ٤٥ عينة(33.3%)15 شخصت كامبيتيغو قيحي و٣٠ (٦٦.٧%) شخصت بالشكل غير القيحي من المرض. من النوع الثاني ظهر بان (83.3%) 25 يمثلون خمج أولي في حين مثل (16.7%) 5 خمجا ثانويا. بينت الدراسة بان بكتريا العنقوديات كانت الأكثر سيادة في الشكل القيحي من المرض في حين عزلت الاخيرة في ١٧ عينة، وبكتريا المسبحيات القيحية في ١٠ حالات في الشكل غير القيحي من المرض. أظهرت فحوصات الحساسية الدوائية بان بكتريا العنقوديات كانت حساسة للمضادات السبروفلوكساسين والفانكومايسين والريفامبيسين والاميكاسين بنسبة ١٠٠%. في حين أظهرت هذه البكتريا مقاومة الى الكلوكساسيلين والامبيكلوكس في (28.6) 4 و(21.4%) 3على التوالي كما أظهرت ٣ (١٢%) من البكتريا العنقودية مقاومة الى السيفوتاكسيم والسيفترياكسون والسيفتازيديم. تستنتج الدراسة بان بكتريا العنقوديات كانت الأكثر سيادة في الشكل القيحي من المرض في حين عزلت الاخيرة وبكتريا المسبحيات القيحية في الشكل غير القيحي من المرض. كذلك تظهر الدراسة بان السبروفلوكساسين والفانكومايسين والريفامبيسين والاميكاسين هي الأكثر تأثيرا في البكتريا العنقودية المسببة لهذا المرض.