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Research Paper

Evaluation of the Effectiveness of Ciprofloxacin in Comparison to Clindamycin Solutions on Acne Vulgaris

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ABSTRACT:

BACKGROUND:

Acne vulgaris is a common skin condition; about 74% of patients with acne have moderate to severe effects on their quality of life. Acne management aims to alleviate symptoms, clear existing lesions, limit disease activity by preventing new lesions from forming and scars developing and avoid negative impact on quality of life.

OBJECTIVE:

To evaluate the effectiveness of both Clindamycin and Ciprofloxacin solutions topically in the treatment of mild to moderate acne vulgaris.

PATIENTS AND METHODS:

A single-blinded therapeutic trial that was conducted at Baghdad Teaching Hospital/Department of Dermatology, out clinic, for the period (April 2019 - March 2020). All patients with mild-moderate acne vulgaris who attended the out clinic of dermatology were enrolled in the study. Sixty-six patients participated in this study and were divided into 2 groups (Ciprofloxacin group: 33 patients were treated topically with Ciprofloxacin solution 2% and Clindamycin group: 33 patients were treated topically with Clindamycin solution 1.5%). Important ethical approval and formal consent were obtained from MOH and patients respectively. The severity index was recorded. Statistical analysis was done using SPSS V26.

RESULTS:

The mean acne severity index (ASI) for the Ciprofloxacin group in the first visit was significantly higher than that at week 12th after topical application of Ciprofloxacin. Total percent reduction was 32.3% ($P<0.001$). The mean acne severity index (ASI) for the Clindamycin group in the first visit was significantly higher than that at week 12th after topical application of clindamycin. Total percent reduction was 31.8% ($P<0.001$). No statistical significance among both groups regarding the reduction in comedones mean; $P>0.05$. Statistical significance was observed among the Ciprofloxacin group regarding the reduction of papules and pustules in comparison to the Clindamycin group; $P<0.05$. No statistical significance among both groups regarding side effects; $P>0.05$.

CONCLUSION:

Ciprofloxacin and Clindamycin when used topically are both effective in the treatment of mild to moderate acne vulgaris. Both have antibacterial and anti-inflammatory actions.

KEYWORDS: Ciprofloxacin solution, Clindamycin Solution; Topical Treatment, Acne Vulgaris, Acne Severity Index

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INTRODUCTION:

Acne vulgaris is a common skin condition; about 74% of patients with acne have moderate to severe effect on their quality of life, with patients of college education and unmarried patients having more profound effect according to an Iraqi study [(1)]. Acne is a polymorphic inflammatory disease of the skin which occurs most commonly on the face (in 99% of cases) and to a lesser extent on the back (60%) and chest (15%)[(2)].

The pathogenesis of acne is multifaceted and at least four factors have been identified: follicular epidermal hyperproliferation, sebum production, *Propionibacterium acnes,* and inflammation and immune response [(3, 4, 5)]. *P. acnes* is gram-positive

anaerobic bacterium that plays a primordial role in inducing and maintaining the inflammatory phase of acne [6]. *P. acnes*-induced secretion of proinflammatory cytokines IL-8, IL-12, and TNF-α in monocytes has been shown to involve TLR2, which is expressed on macrophages surrounding the sebaceous follicles of acne lesions [7].

An Iraqi microbiological study on acne lesions showed that comedones were colonized by *P. acnes* (83.7%) more than pustules (60%), while *Staphylococcus epidermidis* was encountered more in pustules (70%) than comedones (65%) [8].

Clindamycin has antibacterial and anti-inflammatory effects [9-11]. Other indications for topical Clindamycin include folliculitis, pseudofolliculitis barbae, hidradenitis suppurativa, erythrasma, pitted keratolysis, trichomycosis axillaris [12].

Ciprofloxacin, a fluoroquinolone antibacterial agent, is active against a broad spectrum of aerobic Gram-positive and Gram-negative bacteria. Resistance to this drug develops slowly, and minimal toxicity is associated with its use [13].

Ciprofloxacin belongs to the second generation of quinolones [14]. Topically, Ciprofloxacin is used in the treatment of eye and ear bacterial infections [15, 16]. It has been shown to be effective against both *staphylococci* and *propionibacteria* [17]. An Iraqi study proved the efficacy of Ciprofloxacin 1% gel in the treatment of mild to moderate acne [18]. Ciprofloxacin solution 1.5% is like effect of Clindamycin 1.5% in management of acne in another Iraqi study comparing the two[19], and when combined with oral Ciprofloxacin it end-up acne in 74.1% of moderate acne within eight weeks of therapy [19].

AIM OF THE STUDY:

To evaluate the effectiveness of Ciprofloxacin in comparison to Clindamycin solutions topically in the treatment of mild to moderate acne vulgaris.

PATIENTS AND METHODS:

A single blinded therapeutic trial that was conducted at Baghdad Teaching Hospital/ department of dermatology, out clinic, for the period from beginning of May-2019 till beginning of May-2020.

Patients with acne-vulgaris attended to out clinic of dermatology were enrolled in the study; excluding pregnant women, breast feeding women, and patients who had taken systemic retinoid or topical antibiotics for acne. Sixty six patients participated in this study and divided in to 2 groups: (***Ciprofloxacin group***: 33 patients were treated topically with Ciprofloxacin solution 2%. The preparation of the solution was carried out as follows: Two grams Ciprofloxacin [(CIPROSAM)^{R} Produced by: The State Company for Drugs Industry & Medical Appliances (SDI) Samarra, Iraq, 500mg], four tablets crushed by coffee grinder, dissolved in 75ml rectified spirit and 25ml distilled water mixed and kept in the hospital in a dark glass container. ***Clindamycin group***: 33-patients managed topically by Clindamycin 1.5% [(Lanacin) R, 150mg]). The preparation of the solution was carried out as follows: One and half grams Clindamycin [(Lanacin)^{R} produced by: Pharma International Co., Amman, Jordan, 150mg], ten capsules dissolved in 75ml rectified spirit and 25ml distilled water mixed and kept in the hospital in a dark glass container.

Important ethical approval and formal consent was obtained from MOH and patients respectively.

Severity index was recorded [20] depending on comedones, papules and pustules count. Color photographs were taken using Samsung Galaxy S6 Edge. Complete instructions of therapy were given to the patients. Apply solution on the face 2 times/ day for 12 weeks. History, physical, and clinical examination were considered / 2-wks. For all 3 month; where re-evaluation for lesions and treatment was done. Statistical analysis was done using SPSS V26. Chi square test and independent t test was used. ANOVA was applied. P value of less than 0.05 was significant.

RESULTS:

Mean age of Ciprofloxacin group was 18.9±4.7 years which was not significant from that of Clindamycin group 17.8± 3.8 years, P=0.053. Females were the most common gender among both groups (25 (75.8%) with no significant difference, P=1. Table 1.

Table 1: Demographic features of studied groups.

Variables	Ciprofloxacin group	Clindamycin group	P value
Age/ year (mean±SD)	18.9± 4.7	17.8± 3.8	0.053
Male %	8 (24.2%)	8 (24.2%)	1
Female %	25 (75.8%)	25 (75.8%)	
Total %	33 (50%)	33 (50%)	

Mean acne severity index (ASI) for Ciprofloxacin group in the first visit was significantly higher than that at week 12th after topical application of Ciprofloxacin. Total percent reduction was 32.3% (P<0.001). Table 2.

Mean acne severity index (ASI) for Clindamycin group in the first visit was significantly higher than that at week 12th after topical application of Ciprofloxacin. Total percent reduction was 31.8% (P<0.001). Table 2.

Table 2: Mean acne severity index (ASI) for studied groups at each visit.

Visits/ weeks	ASI (mean±SD)	
	Ciprofloxacin group	Clindamycin group
1st visit	62.1 ± 34.2	49.5 ± 20.3
2 wks.	50.9 ±30.9	39.9 ±19.9
4 wks.	45.3 ± 28.2	36.3 ±19.6
6 wks.	42.8 ± 28.7	34.9 ±18.3
8 wks.	42.2 ± 29.1	34.6 ±18.9
10wks	42.5 ± 29.3	33.9 ±18.4
12 wks.	42.6 ± 29.2	33.7 ±18.1
F-test	90	75
P* value	<0.001	<0.001

***ANOVA (F-test)**

2. Comparing the effect among studied groups

1. Comedones

In Ciprofloxacin group; the mean comedones in the first visit for the patients was 84.8 ± 58.9 and at 12th week was 85.3 ± 58.4. The reduction in comedones count was statistically not significant, P>0.05.

In Clindamycin group; the mean comedones in the first visit was 67.6 ± 34.6 and at 12th week was 66.7 ± 35. The reduction in comedones count was statistically not significant.

No statistical significance among both groups regarding the reduction in comedones mean; P>0.05. **Figures 1 & 4.**

2. Papules

Level of papuls in Ciprofloxacin gr in first visit was 7.2 ± 4.1 and at 12th week was 0 ± 0. One hundred percent is the percent of reduction with significant difference.

In Clindamycin group; the mean papules in the first visit was 6.2 ± 2.6 and at 12th week was 0.1 ± 0.6. Total percent reduction was 98%.

Statistical significance was observed among Ciprofloxacin group regarding the reduction in papules in comparison to Clindamycin group; P<0.05. **Figures 2 & 4.**

3. Pustules

For Ciprofloxacin gr, levels of pustules in first visit was 6.2 ± 4.3 and at 12th week was 1 ± 1.3. Total percent reduction was 70.5%.

In Clindamycin group; the mean pustules in the first visit was 4.7 ± 2.7 and at 12th week was 0 ± 0. Total percent reduction was 100% (p<0.0001, highly significant).

Statistical significance was observed among Ciprofloxacin group regarding the reduction in pustules in comparison to Clindamycin group; P<0.001. **Figures 3 & 4.**

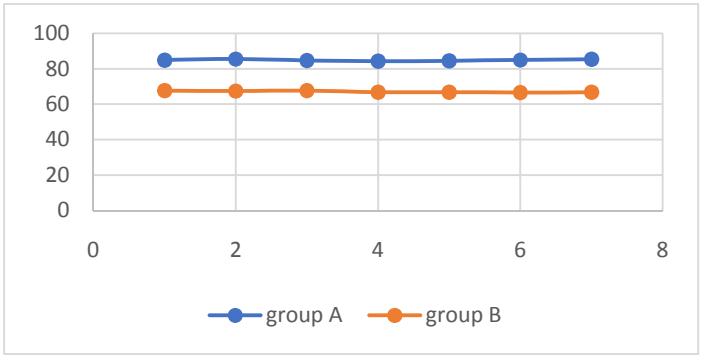

Figure 1: Comedones reduction among studied groups; Ciprofloxacin Group=group A, Clindamycin group= Group B.

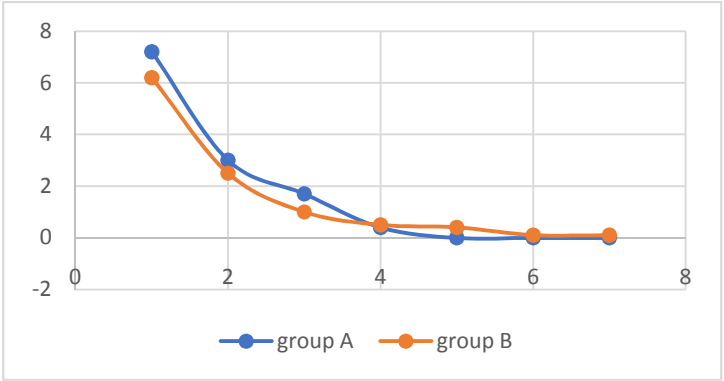

Figure 2: Papules reduction among studied groups; Ciprofloxacin Group=group A, Clindamycin group= Group B.

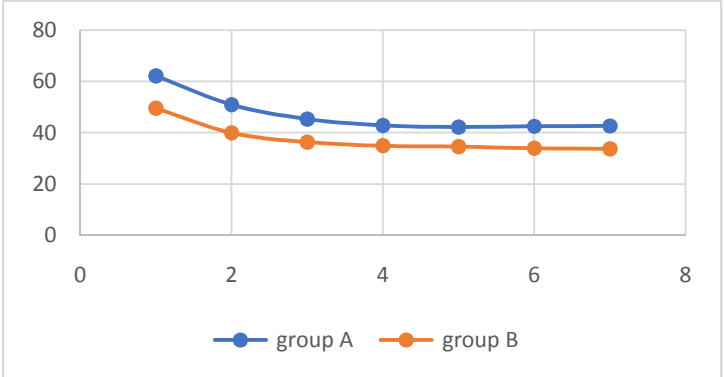

Figure 3: Pustules reduction among studied groups; Ciprofloxacin Group=group A, Clindamycin group= Group B.

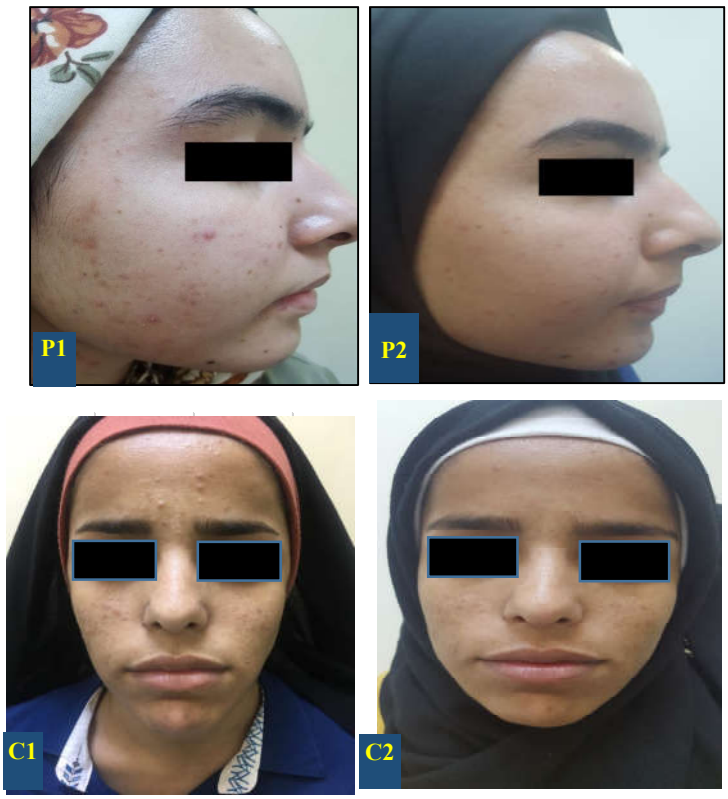

Figure 4: Effect of topical treatment among studied groups;
P= 17-years female; mild acne-vulgaris (P1) before-treatment; (P2) 12 wks. After-treatment + topical Ciprofloxacin 2%.
C: Eighteen-years female; mild acne-vulgaris (C1) before-treatment; (C2) 12 wks. After-treatment + topical Clindamycin 1.5%

3.Relapse rate after stopping the treatment among studied groups

For Ciprofloxacin group; ASI at 12 weeks was 42.6 ± 29.2. 4 wks.-after end up treatment it became 42.8 ± 29.6. (Statistically not significant, P=0.474).

For Clindamycin group; ASI/12wks is 33.7 ± 18.1. 4 wks.-after end up treatment it became 33.8 ± 17.9 (Statistically not significant, P=0.676). Table 3.

Table 3: Relapse rate after stopping the treatment among studied groups.

ASI	12 weeks	4 weeks after stopping therapy	P* value
Ciprofloxacin group	42.6 ± 29.2	42.8 ± 29.6	0.474
Clindamycin group	33.7 ± 18.1	33.8 ± 17.9	0.676

***Paired t-test**

4. Side effects among studied groups

In both groups; Ciprofloxacin group and Clindamycin group, 3 (9.1%) patients had itching sensation and 6 (18.2%) patients had burning sensation.

No statistical significance among both groups regarding side effects; P>0.05. Table 4.

Table 4: Side effects among studied groups.

Groups	Itching		Burning	
	No.	%	No.	%
Ciprofloxacin group n=33	3	9.1%	6	18.2%
Clindamycin group n=33	3	9.1%	6	18.2%

DISCUSSION:

In this study using topical Ciprofloxacin 2% solution resulted in a 100% reduction in papules and pustules count and a 32.3% reduction in ASI. Upper-effect is obtained at 4th.wks. & continued till 12th-week. In Vali et al. study topical Ciprofloxacin 0.3% solution was used for six weeks [22] while Sharquie et al. used 1.5% solution for eight weeks [19] and Al-Ethawi used 1% gel [18]. All these studies showed similar results to the current study. Tunca et al. showed similar results when using topical Nadifloxacin 1% cream in the treatment of mild to moderate acne [23]. Nadifloxacin is a synthetic bactericidal fluoroquinolone similar to Ciprofloxacin but the latter is more cost effective for the patient. Side-effects are itching-9% & burning-18%; much higher than those reported in Sharquie et al. study [19], probably because of higher concentration of Ciprofloxacin used in this study.

According to the Clindamycin group; there were significant decrease in the mean of papules 98%, pustules 93%, and ASI 31.8%. Higher effect was observed from 4th week and go on to 12th week.

This is consistent with reports of Zhang,et al & Alirezaï,et al [24, 25] they reported significant decrease in inflammation. Side-effects are itching-5.7% & burning-18.2%. This result was consistent with Guay D study [26].

Comedones count was not affected; this was comparable to another study by Vali A et al, 2009,[27] which reported no reduction of comedones count after Ciprofloxacin treatment; while William J et al, 2002,[28] concluded that combination gel (Clindamycin phosphate/benzoyl peroxide) for 16 weeks treatment produced a significant reduction in the number of comedones in comparison to Clindamycin only. This may explain the not affected comedones in our study; however, the reduction in the inflammatory lesions was higher, probably because of the higher concentration of Ciprofloxacin solution. Similarly, Zhang et al. and Alirezaï et al. [24, 25] showed significant reductions in the inflammatory lesions.

CONCLUSION:

Ciprofloxacin and Clindamycin when used topically are both effective in the treatment of mild to moderate acne vulgaris.

Ciprofloxacin and Clindamycin both have antibacterial and anti-inflammatory actions.

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Authors' declaration: Nothing to be declared, and the manuscript was original and not previously published or sent to other journals. We hereby confirm that all the Figures and Tables in the manuscript are ours. The project was approved by the local ethical committee of Iraqi board for medical specialization.

Conflicts of Interest: None

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