DIPONEGORO MEDICAL JOURNAL
(Jurnal Kedokteran Diponegoro)
Online : http://ejournal3.undip.ac.id/index.php/medico
E-ISSN : 2540-8844
Volume 9, Nomor 4, Juli 2020

THE EFFICACY OF TOPICAL CLINDAMYCIN GEL ON SEVERITY DEGREE OF ACNE VULGARIS AMONG FEMALE COLLEGE STUDENTS

Rani Puspita Hapsari[1*], Retno Indar Widayati[2], Liza Afriliana[2], Purnomo Hadi[3]
[1]Department of Medicine, Faculty of Medicine, Diponegoro University
[2]Department of Dermatovenereology, Faculty of Medicine, Diponegoro University
[3]Department of Microbiology, Faculty of Medicine, Diponegoro University
[*)]Corresponding author: Email: ranipuspitahapsari@gmail.com

ABSTRACT

Background: Acne vulgaris is a chronic inflammatory disease in the pilosebaceous follicle of the skin as the result of *Propionibacterium acnes* colonization. Clindamycin is an antibiotic that is effective against most gram-positive anaerobic bacteria such as the strain of *Propionibacterium sp.* Clindamycin in topical form inhibits *P. acnes* lipase enzyme resulting in the decrease of free fatty acid on the skin surface and the decrease of the *Propionibacterium acnes* population. **Aim:** To know the effect of topical clindamycin gel application on the severity degree of acne vulgaris among female college students of Diponegoro University. **Methods:** The study has done on 34 female college students of Diponegoro University who were diagnosed with Acne Vulgaris. All of the subjects underwent a face skin examination where the acne lesions were counted before and after the treatment. The treatment given was the application of clindamycin topical gel once a day for four weeks. The counted acne lesions were classified into the severity degree of acne vulgaris by Plewig and Kligman. The study compared the severity degree of acne vulgaris before and after the treatment. Statistical analysis of this study used the Wilcoxon test. **Result:** The result of pre and post-treatment data showed a significant decrease in the severity degree of acne vulgaris after the treatment application (p=0.000). The decrease of severity degree was marked by the decrease of acne lesion count after having four weeks of treatment. This significant result indicated an effective recovery of acne vulgaris after being given the treatment of topical clindamycin. The antibiotic and anti-inflammation effects of clindamycin were discovered effectively healing the lesions of acne vulgaris, therefore, decreasing its severity. **Conclusion:** Topical clindamycin can effectively reduce the severity degree of acne vulgaris among female college students of Diponegoro University. **Keywords:** topical clindamycin, acne vulgaris

INTRODUCTION

Acne vulgaris is a chronic inflammatory disease in the pilosebaceous follicle of the skin as the result of *Propionibacterium acnes* colonization.[1] Acne is one of the most complained skin diseases in various groups of age.[2] This disease generally experienced by teenagers and young adults in the range of 12-24 years old.[3]

Acne vulgaris that is better known as pimples can cause psychosocial disorders such as confidence disorder and anxiety that can lead to the difficulty of socializing in the community.[3, 4] Even more, in some cases it could trigger mental disorders such as depression until suicide thoughts.[5] Even though acne is a common condition and included as self-limiting diseases,[6] causes anxiety almost in every case. Therefore, effective therapy to overcome acne vulgaris is important to discover.

Clindamycin is an antibiotic that is effective to mostly gram-positive anaerobic bacteria such as the strain of *Propionibacterium sp.*[7] Clindamycin in topical form inhibits *P. acnes* lipase enzyme resulting in the decrease of free fatty acid on the skin surface and the decrease of *Propionibacterium acnes* population. Meanwhile, the anti-inflammation effect of

DIPONEGORO MEDICAL JOURNAL
(Jurnal Kedokteran Diponegoro)
Online : http://ejournal3.undip.ac.id/index.php/medico
E-ISSN : 2540-8844
Volume 9, Nomor 4, Juli 2020

clindamycin is obtained through the chemotaxis suppression mechanism. [8, 9]

METHODS

Subjects

This study used a clinical-experimental research type and was conducted with one-group pre-test and post-test design. The study was conducted to evaluate the disease recovery among patients with acne vulgaris as the result of the treatment using topical clindamycin. The study was conducted with one group consisted of 34 female college students of Diponegoro University. Subjects were selected according to inclusion and exclusion criteria.

Treatment

All of the subjects underwent treatment by applicating the clindamycin topical gel on the acne lesions for four weeks. All of the subjects underwent a physical examination by counting the acne lesions in the area of the face and neck before and after the treatment application. The subject's acne lesions count before and after treatment were converted into the severity degree of acne vulgaris by Plewig and Kligman. The subject's severity degree before and after the treatment application was compared to show any significant difference that indicates the efficacy of the treatment.

Statistical Analysis

Data analysis includes descriptive and analytical analysis. Variables data were analyzed using paired t-test for normal distribution, and *Wilcoxon* test for abnormal distribution. Confounding variables were analyzed using the *Chi-square* test. The value of the degree of significance is $p < 0.05$.

RESULT

Subjects in the study used 34 female college students of Diponegoro University. The research subjects were given a clear explanation about the study before giving their consent to participation in the research. Subjects were asked to complete a questionnaire containing the questions related to inclusion and exclusion criteria and confounding variables.

Table 1. Characteristics of Research Subjects

Parameter	n	(%)
Age (years old)		
17	1	(2.94%)
18	2	(5.88%)
19	2	(5.88%)
20	6	(17.65%)
21	17	(50.00%)
22	6	(17.65%)
History of Acne Vulgaris on Parents		
Paternal only	4	(11.76%)
Maternal only	9	(26.47%)
Both of Paternal and Maternal	6	(17.65%)
None	15	(44.12%)

DIPONEGORO MEDICAL JOURNAL
(Jurnal Kedokteran Diponegoro)
Online : http://ejournal3.undip.ac.id/index.php/medico
E-ISSN : 2540-8844
Volume 9, Nomor 4, Juli 2020

Ongoing Psychological Stress		
Yes	24	(70.59%)
No	10	(29.41%)
Usage of Comedogenic Cosmetics		
Yes	17	(50.00%)
No	17	(50.00%)
Acne appears on Menstruation period		
Yes	29	(85.29%)
No	5	(14.71%)
Acne appears when Consuming Certain Foods		
Yes	7	(20.59%)
Chocolate	0	(0.00%)
Nuts	5	(14.71%)
Egg	3	(8.82%)
Milk	1	(2.94%)
Cheese	1	(2.94%)
Fried snack	3	(8.82%)
Spicy food	2	(5.88%)
No	27	(79.41%)
Consuming those foods routinely (If answered "Yes" on the previous question)		
Yes	2	(5.89%)
No	5	(14.71%)
Having more physical activity at the outside		
Yes	13	(38.24%)
No	21	(61.76%)
Living in an environment with high air pollution		
Yes	34	(100.00%)
No	0	(0.00%)

n (%) = amount of research subjects (%)

The age of the subjects was in the range of 17 to 22 years old with 21 years old had the highest number of all subjects (50%) and 17 years old had the lowest (2.94%). As many as 55.88% of all subjects had a parent or both of parents with the history of acne vulgaris. Subjects who underwent psychological stress were counted for 70.59%, while those who were in using comedogenic cosmetics were counted for 50%. The emersion of acne lesion triggered by menstrual cycle happened among 85.29% subjects. As many as 20.59% of all subjects had acne lesions appeared triggered by consuming certain foods, which 5.89% among them were routinely consuming those foods. Subjects having more physical activity at the outside were counted as many as

DIPONEGORO MEDICAL JOURNAL
(Jurnal Kedokteran Diponegoro)
Online : http://ejournal3.undip.ac.id/index.php/medico
E-ISSN : 2540-8844
Volume 9, Nomor 4, Juli 2020

38.24%. All of the subjects (100%) were currently living in an environment with high air pollution.

Subjects were examined around the face and neck where the lesion was counted, before and after the treatment application. The subject's lesion counts were converted into the severity degree of acne vulgaris by Plewig and Kligman.

Table 2. The Decrease of Severity Degree of Acne Vulgaris

Severity Degree	Treatment (Mean±SD)	*p (post – pre)*
Pre	2.118±1.066	
Post	0.882±0.686	0.000[w]
Difference	-1.236±0.819	

Description: p = significance value; [w] = Wilcoxon

The result of pre and post-treatment data showed the decrease of severity degree of acne vulgaris after the treatment application that was marked by the decrease of acne lesion count during the examination. Statistical results obtained using the Wilcoxon test for pre-post treatment showed a decrease in the severity degree of acne vulgaris indicated by decreasing acne lesion count. Through this statistical analysis, a significant result was obtained (p = 0.000). This significant result indicated an effective recovery of acne vulgaris after being given the treatment.

DISCUSSION

The purpose of this study was to see whether there was a change in the severity degree of acne vulgaris after the application of clindamycin topical gel on medical students of Diponegoro University. Results Data from the study were obtained using physical examination around the area of face and neck where the acne lesions were counted and then were converted into the severity degree of acne vulgaris by Plewig and Kligman. Severity degree of acne vulgaris by Plewig and Kligman consists of 4 grades, where the 1st-grade counts on less than 10 papulopustular lesions, the 2nd-grade counts on 10-20 papulopustular lesions, the 3rd-grade counts on 21-30 papulopustular lesions and the 4th grade counts on more than 30 papulopustular lesions. The decrease of acne lesion count that leads to a decrease in the severity degree of acne vulgaris indicates the effective recovery from the disease.[10, 11] During the research, no subjects were found dropped out, all subjects completed the treatment of clindamycin topical gel.

Previous research revealed that the application of clindamycin topical could provoke recovery of acne vulgaris by decreasing the number of inflammatory and non-inflammatory acne lesions.[12-14] Topical clindamycin is known for having 3 mechanisms of action, such as reducing free fatty acid percentage, resolving inflammation by its anti-inflammation effect, and reducing the number of *Propionibacteria*.[7]

Mechanism of clindamycin's antimicrobial effect is by binding 50 S subunit of bacteria's ribosome and inhibiting protein synthesis. Clindamycin effectively works against most gram-positive anaerobic bacteria, such as the strain of *Propionibacterium sp.* Minimum Inhibitory Concentration (MIC) of clindamycin to gram-positive bacteria is in the range of 0,002-0,8 µg/ml, and its MIC to the strain of

DIPONEGORO MEDICAL JOURNAL
(Jurnal Kedokteran Diponegoro)
Online : http://ejournal3.undip.ac.id/index.php/medico
E-ISSN : 2540-8844
Volume 9, Nomor 4, Juli 2020

Propionibacterium sp. especially is 0,02 µg/ml.[7]

On its development, it's revealed that clindamycin is also capable to inhibit iNOS enzyme and various pro-inflammation cytokines (IL-1β, IL-6, IFN-γ, dan TNF-α). Specifically, anti-inflammation effects of clindamycin include the inhibition of growth, protein synthesis, lipase production, follicular free fatty acid production, and leukocyte chemotaxis on *Propionibacterium acnes*.[7]

CONCLUSION

In summary, topical clindamycin can effectively reduce the severity degree of acne vulgaris among female college students of Diponegoro University. The severity of acne vulgaris among female college students of Diponegoro University after the application of topical clindamycin was better than before.

REFERENCES

1. Omer H, McDowell A, Alexeyev OA. Understanding the role of Propionibacterium acnes in acne vulgaris: The critical importance of skin sampling methodologies. Clinics in dermatology 2017;35:118-29.
2. Tan JKL, Bhate K. A global perspective on the epidemiology of acne. Br J Dermatol 2015;172:3-12.
3. Zeichner JA, Baldwin HE, Cook-Bolden FE, Eichenfield LF, Friedlander SF, Rodriguez DA. Emerging issues in adult female acne. J Clin Aesthet Dermatol 2017;10:37.
4. Gallitano SM, Berson DS. How Acne Bumps Cause the Blues: The Influence of Acne Vulgaris on Self-Esteem. Int J Women Dermatol 2018;4:12-7.
5. Ramrakha S, Fergusson DM, Horwood LJ, Dalgard F, Ambler A, Kokaua J, et al. Cumulative mental health consequences of acne: 23-year follow-up in a general population birth cohort study. Br J Dermatol 2016;175:1079.
6. Solman L, Layton AM. Acne in childhood. Pediatrics and Child Health 2019.
7. Wasitaadmadja Syarif M. Akne, Erupsi Akneiformis, Rosasea, Rinofima, 5 ed. Jakarta: Balai Penerbit FKUI, 2008:253-63.
8. Gollnick H, Cunliffe W, Berson D, Dreno B, Finlay A, Leyden JJ, et al. Management of acne: a report from a Global Alliance to Improve Outcomes in Acne. J Am Acad Dermatol 2003;49:S1-S37.
9. Krautheim A, Gollnick HPM. Acne: topical treatment. Clinics in dermatology 2004;22:398-407.
10. Afriyanti RN. Akne vulgaris pada remaja. Jurnal Majority 2015;4:10-7.
11. Plewig G, Kligman AM. Acne and rosacea: Springer Science & Business Media, 2012.
12. Gollnick HPM. From new findings in acne pathogenesis to new approaches in treatment. J Eur Acad Dermatol Venereol 2015;29:1-7.
13. Zaenglein AL, Pathy AL, Schlosser BJ, Alikhan A, Baldwin HE, Berson DS, et al. Guidelines of care for the management of acne vulgaris. J Am Acad Dermatol 2016;74:945-73.
14. Usodo GP, Wibowo DA, Ariosta A. Terapi Topikal Tretinoin 0,025%+ Zinc Oral Dibandingkan Topikal Nicotinamide 4%+ Zinc Oral Pada Akne Vulgaris. Jurnal Kedokteran Diponegoro 2017;6:583-91.