



A Comprehensive Guide to Uses, Side Effects and Precautions of Topical Clindamycin in Acne Vulgaris

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ABSTRACT

Clindamycin the 7(s)-chloro-7-deoxy derivative of lincomycin, has stood the test of time in the treatment of anaerobic infections. Clindamycin is in a class of medications called lincomycin antibiotics. It works by slowing or stopping the growth of bacteria. Topical clindamycin comes as a foam, a gel, a solution (liquids), a lotion and a pleget to apply to skin. Clindamycin is a very strong basic compound (based on its pKa). In humans, clindamycin is involved in clindamycin action pathway. Orally or parenterally administered clindamycin has been associated with severe colitis which may result in patient death.

Topical clindamycin is used to help control acne. Clindamycin is a commonly prescribed topical medication to treat acne, and we can usually apply it with minimal side effects. Ideally you can use it for a short amount of time in combination with other acne treatments to experience. It has a short half life and hence it should be taken every six hours. (8)

Acne vulgaris is a common and chronic skin disease and is a frequent source of morbidity for affected patients. Treatment of acne vulgaris is often difficult due to the multifactorial nature of this disease.

Clindamycin is a lincosamide antibiotic, developed in 1966 by chemically modifying the naturally occurring lincomycin. (12) Topical antibiotics such as erythromycin and clindamycin are the most popular in the management of acne. Side effects through minor includes erythema, peeling, dryness and burning pseudomembranous colitis which is rare, but has been reported itching with clindamycin. Clindamycin is used in different types of combination therapies such as nicotinamide, phosphate, benzoyl peroxide, hydrochloride, etc specially for the acne treatment.

Keywords: Clindamycin: antibiotic, bacterial infections, antimicrobial activity, acne vulgaris, clindamycin phosphate, clindamycin hydrochloride, anti-inflammatory activity.

Introduction

Clindamycin is a lincosamide antibiotic medication used for the treatment of a number of bacterial infections. These antibiotic used to treat serious infections caused by susceptible anaerobic, streptococcal, staphylococcal and pneumococcal bacteria as well as topically used for acne vulgaris. Clindamycin is a strong broad spectrum antibiotic. (3)

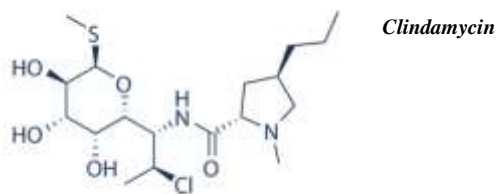
Route of administration of clindamycin: injectable, intravaginal, oral and topical.

There has been increased interest in the use of clindamycin because it achieves high intracellular levels in phagocytic cells, high levels in bone and appears to be able to reduce toxin elaborating strains of streptococci and staphylococci. (Invasive group a streptococcal infection and toxic shock syndrome: diagnosis, epidemiology and clinical manifestations).

According to the American academy of dermatology, clindamycin is a first-line acne treatment for mild to moderate acne. (5)

Acne vulgaris is a common and chronic skin disease affecting millions of people worldwide. It is most common skin disorder in the USA and in the number one reason for visiting dermatologist. It is a common source of morbidity and variety of topical and systemic medications have been developed to treat acne. The major limitation associated with many fixed combinations is irritation and dryness. (7)

Structure



Clindamycin

Drug class : lincosamide antibiotic

Chemical formula : C₁₈H₃₃ClN₂O₅S

Synonyms : clindamycin

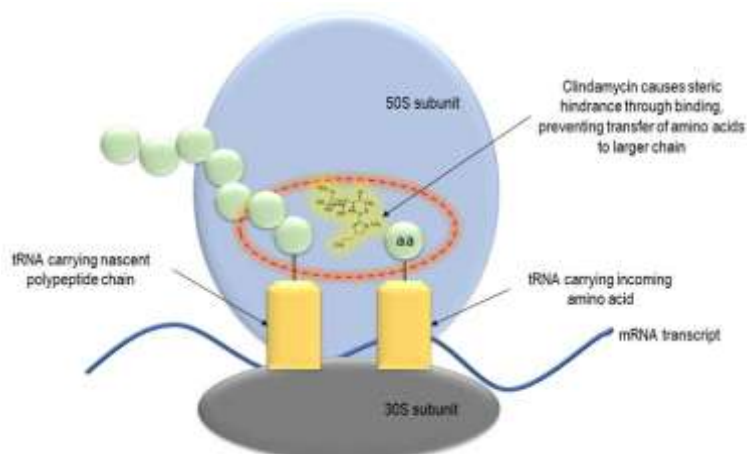
Trade names : cleocin, clinacin, dalacin

Other name : 7-chloro-lincomycin

7-chloro-7-deoxylincomycin

Route of administration : oral, topical, intravenous, intravaginal.

Mechanism of action:



It reversibly binds on to the 23s portion of 50s subunit of the bacterial ribosomes. It suppresses protein synthesis by interfering with aminoacyl translocation reactions thereby inhibiting early chain elongation. Clindamycin may potentiate the opsonization and phagocytosis of bacteria even at sub inhibitory concentrations. By disrupting bacterial protein synthesis clindamycin causes changes in cell wall surface which decreases adherence of bacteria to host cell and increases intracellular killing of organisms. Exerts an extended post antibiotic effect against some strains of bacteria, which may be attributed to persistence of the drug at the ribosomal binding site. Topical clindamycin reduces free fatty acid concentration on the skin and suppresses the growth of propionic bacterium acnes.(6)

Pharmacokinetic data :

Bioavailability : 90% (by mouth)

4-5%(topical)

Protein binding : 95%

Metabolism : liver

Elimination half-life : 2-3 hours

Excretion. : bile duct and kidney (around 20%).

IUPAC name : methyl 7-chloro-6,7,8-trideoxy-6-[[[(4R)-1-methyl-4-propyl-L-prolyl]amino]-1-thio-L-threo- α -D-galacto-octopyranoside.

Chemical and physical data :

Formula. : C₁₈H₃₃CIN₂O₅S

Molar mass. : 424.98 g/mol.

Indications. : streptococcal tonsillopharyngitis

Infection of lower respiratory tract

Skin and soft tissue infection including diabetic foot

Bone and joint infection

Intra – abdominal infection

Pelvic infection

Taxoplasmosis

Severe acne

Bacterial vaginosis

Side effects: Not unusual place aspect outcomes encompass nausea, vomiting, diarrhea, rashes and ache on the webweb page of injection.it will increase the chance of hospital -acquired clostridium difficile colitis approximately fourfold and as a result is best endorsed whilst different antibiotics aren't appropriate. Alternative antibiotics can be endorsed as a result.it seems to be secure in pregnancy.

Skin and mucous membranes pruritus,vaginitis and uncommon times of exfoliative dermatitis had been found throughout clindamycin therapy.

Local reactions – ache and abscess had been stated after intramuscular injection and thrombophlebitis after intravenous infusion.response can minimized or averted via way of means of giving deep intramuscular injections and fending off extended use of indwelling intravenous caterers.(9)

Musculoskeletal -rare instances of polyarthritis have been reported.

Therpeutic uses : skin and soft tissue infection including acne.

Abdominal infection

Protozoal infection

Pneumonia

Prophylaxis

Septic arthritis

Contraindications. : hypersensitivity

Hx of regional enteritil,IBD, antibiotic associated colitis

Lactation

Myasthenia gravis

Atopic dermatitis

Severe liver disease

Objectives. : identify clindamycin indications.

Describe the different routes of administration of clindamycin.

Check for clindamycin contraindications.

Summarize the importance of antibiotic stewardship and how it affects antimicrobial drug choice as it relates to improving coordination of care among professional teams when initiating antibiotic therapy with clindamycin.(8)

Table 1 : structural information for clindamycin and related components:

Compound name	Biotransformation	R1	R2	R3
Clindamycin	-	-CH ₃	-OH	-SCH ₃
Clindamycin phosphate	-	-CH ₃	OPO ₃ H ₂	-SCH ₃
Clindamycin palmitate	-	-CH ₃	OCOC ₁₅ H ₃₁	-SCH ₃

Clindamycin sulfoxide	S-oxidation	-H	-OH	-SCH ₃
N-demethyl clindamycin	N-dealkylation	-CH ₃	-OH	-SOCH ₃

These compounds are bioactive metabolites of clindamycin, undergoing human phase I metabolic reactions.(4)

Topical antibiotics : The most common Topical antibiotics used for the treatment of acne include clindamycin and erythromycin. these antibiotics are used for acne treatment because they target p.acnes colonization and proliferation. clindamycin and erythromycin are antibiotics that work by targeting the 50s subunit of bacterial ribosomes and interfering with protein synthesis there by exerting antibacterial effects. In addition to antibacterial activities, clindamycin also has anti-inflammatory properties. it is well known that p.acnes can induce an inflammatory response.(7)

Combination therapy : benzoyl peroxide and topical antibiotics

Before the introduction of combination therapy, the development of erythromycin-resistant and clindamycin-resistant p.acnes in patients receiving only topical or systemic antibiotics was a significant problem.

Topical combination therapy may involve the simultaneous use of several medications, such as antihypertensive medications, antibiotics, and retinoids, or may be available as fixed-dose combination therapy.



Clindamycin 1.2% and benzoyl peroxide 5% :

It was found to be better than monotherapy with either drug alone. In 1997, Lookingbill et al³² conducted two double-blind, controlled clinical trials to determine the efficacy and safety of the combination of clindamycin 1.2% and BP 5% gel. (clindamycin - BP 5%) compared to either agent alone, and efficacy and safety of vehicle were assessed at baseline and again at weeks 2, 8, 11.(7)



Clindamycin phosphate 1.2% and benzoyl peroxide 3.75% :

Recently, clindamycin phosphate 1.2% and BP 3.75% fixed combination hydrogel was established as a new intervention for moderate to severe acne vulgaris with BP 3.75%, the combination was designed to be superior to clindamycin BP 2.5% and better tolerated than clindamycin BP 5% a combination(1)



Clindamycin phosphate 1.2% and tretinoin 0.025% :

Recently a clindamycin phosphate 1.2% and BP 3.75% constant aggregate aqueous gel become created as a singular intervention for the remedy of moderate-to-extreme pimples vulgaris at BP 3.75%, the aggregate become designed to have advanced efficacy over the clindamycin-BP 2.5%, with elevated tolerability over the clindamycin BP 5% aggregate.(2)

Clindamycin hydrochloride :

Clindamycin hydrochloride is the hydrated hydrochloride salt of clindamycin. clindamycin is a semi artificial antibiotic produced through a 7(s)-chloro-substitution of the 7@-hydroxyl institution of the discern compound lincomycin. Clindamycin hydrochloride is a drug water soluble and antibiotic drug in macrolide groups, this is kind of antibiotic drug used for the remedy of micro organism in lungs, vagina or a acne.(8)

Table 2 : currently approved products – select non US countries and regions.(22)

Active Ingredient	Concentration	Dosage Form	Route of Administration	Approved for Use		
				Country	Status	Approval Date ^b
Clindamycin HCl	150 mg, 300 mg	Capsule	Not mentioned	Abu Dhabi	Active	-
	150 mg, 500 mg			Namibia	-	7/8/1970
	150 mg			New Zealand	Prescription	8/24/1972
	150 mg		Oral	Australia	Prescription	8/2/1991
	150 mg, 300 mg			Canada	Prescription	12/31/1970
	150 mg			Hong Kong	Prescription	12/8/2015
	300 mg			Ireland	Prescription, non-renewable	5/15/2009
Clindamycin	150 mg, 300 mg	Solution	Latvia	Prescription	7/21/1998	
Clindamycin HCl	150 mg, 300 mg		Saudi Arabia	Prescription	-	
	75 mg, 150 mg, 300 mg		UK	Prescription	2/20/1989	
Clindamycin HCl	10 mg/mL	Solution	Not mentioned	Namibia	-	4/14/1983
	1%		Topical	Australia	Prescription	11/23/1998
Clindamycin	20 mg/g	Cream	Vaginal	Latvia	Prescription	10/14/1998



Nicotinamide compared with clindamycin gel :

Nicotinamide is the physiologically lively shape of niacin and is the supply of diet B3 observed in a majority of multivitamin products. AS a pharmacologic agent, nicotinamide has been used for its anti inflammatory properties. nicotinamide gel probably appearing thru an anti inflammatory mechanism of action, to be equal in efficacy to topical clindamycin for the remedy of zits vulgaris. nicotinic acid (niacin) and niacinamide (nicotinamide) are in addition powerful as a diet. Topical software of niacinamide improves the floor structure, smoothes out wrinkles and inhibits photocarcinogenesis and therefore, is powerful in growing old skin.

4% nicotinamide and 1% clindamycin gel :

In this randomised, double-blind medical trials sufferers with mild inflammatory facial pimples vulgaris have been randomly allotted to acquire both topical 4% nicotinamide (n=40) or 1% clindamycin gels (n=40) two times daily.

Conclusion :

Acne stays a totally not unusual place inflammatory dermatosis, that is frequently related to huge mental morbidity. Clindamycin works via way of means of decreasing pimples inflicting micro organism. Topical clindamycin works excellent while it's blended with different pimples remedies like benzoyl peroxide, nicotinamide, phosphate, chlorides, etc. Clindamycin is to be had beneathneath one-of-a-kind logo names and as a mixture medication. Clindamycin with tretinoin lightens submit pimples darkish spots via way of means of switching the broken pores and skin cells with more recent ones. thus, it lightens the tone of the pores and skin and makes it brighter and more potent than before.

Clindamycin is hardly ever the drug of preference for both gram nice or anaerobic infections. Inflammatory pimples is while micro organism blocks pores and the body's immune device responds to the micro organism and reasons inflammation. topical antibiotics like clindamycin paintings via way of means of decreasing the variety of micro organism that reason pimples. Commonly visible in city human beings and aggravates on the use of cosmetics, because of strain and additionally seasonal vibration too.

Reference :

1. Clindamycin/benzoyl peroxide gel : a review of its use in the management of acne. Gregory T Warner et al. Am J. clin dermatol 2002.
2. Clindamycin phosphate 1.2% / tretinoin 0.025% : a novel fixed dose combination treatment for acne vulgaris. F. ochsendorf. J eur acad dermatol venereol 2015 Jun.
3. Development of clindamycin loaded oral microsponges (clindosponges) for antimicrobial enhancement : in vitro characterisation and simulated in vivo studies. Rana M. F. Sammour, a Gazala Khan, b Sandy Sameer, c Shoomeela Khan, c Tuqa Zohair, c Sara Saraya, c and Bazigha K. Abdul Rasool*.
4. Review of ways to improve insights into clindamycin pharmacology and pharmacokinetics tailored to practice. Laura Armengol Álvarez 1,*, Greet Van de Sijpe 2,3, Stefanie Desmet 4,5, Willem-Jan Metsemakers 6,7, Isabel Spriet 2,3, Karel Allegaert 2,6,8 and Jef Rozenki 1
5. Review of Effect of clindamycin in acne among college students. Nefcy Navas*1, Dhanya Dharman2, Deepa Manohar3, Shaiju S Daran4, Rukzana Bisar1, Ashima Basher1.
6. National Library of medicine, clindamycin Patrick B Murphy, karlyle G. bistas; Jacqueline K Lc.
7. Review of profile of clindamycin phosphate 1.2% benzoyl peroxide 3.75% aqueous gel for the treatment of acne vulgaris Tuyet A Nguyen.
8. Efficacy and safety of clindamycin phosphate 1.2% and tretinoin 0.025% gel for the treatment of acne and induced post inflammatory hyperpigmentation in patients with skin of colour. VALERIE D. CALLENDER, MD; CHERIE M. YOUNG, MD; CHESAUNA KINDRED, MD, MBA; SUSAN C. TAYLOR, MD. Callender Center for Clinical Research, Glenn Dale, Maryland; Society Hill Dermatology, Philadelphia, Pennsylvania
9. Efficacy and safety of fixed dose clindamycin phosphate 1.2% benzoyl peroxide 3.1%, and adapalene 0.15% gel for moderate -to-severe acne : a randomised phase 2 study of the first triple -combination drug. Linda Stein Gold1 · Hilary Baldwin2,3 · Leon H. Kircik4,5,6 · Jonathan S. Weiss7,8 · David M. Pariser9,10 · Valerie Callender11,12 · Edward Lain13 · Michael Gold14 · Kenneth Beer15 · Zoe Draelos16 · Neil Sadick17,18 · Radhakrishnan Pillai19 · Varsha Bhatt19 · Emil A. Tanghetti20
10. An aqueous gel fixed combination of clindamycin phosphate 1.2% and benzoyl peroxide 2.5% for the once daily treatment of moderate -to-severe acne vulgaris : assessment of efficacy and safety in 2813 patients. Diane Thiboutot, MD, a Andrea Zaenglein, MD, a Jonathan Weiss, MD, b Guy Webster, MD, PhD, c Barry Calvarese, MS, d and Diana Chen, MD. Hershey and Wilmington, Pennsylvania; Snellville, Georgia; and Petaluma and Redwood City, California.
11. The clindamycin catastrophe : A case of antibiotic induced skin eruption.
12. M Smieja. Current indications for the use of clindamycin: A critical review. Can J Infect Dis 1998;9(1):22-28.
13. <https://en.m.wikipedia.org/wiki/Clindamycin>.
14. Study Kinetics model of clindamycin hydrochloride from poly(D,L- lactic -co-glycolic acid) particles. Article · April 2021 DOI: 10.18178/ijpmbs.10.2.68-74
15. Formulation and evaluation of clindamycin hydrochloride in situ gel for vaginal application. Priya Patel, Paresh Patel. Department of Pharmaceutical Sciences, Saurashtra University, Rajkot, 1 Shivam Pharmaceutical Studies and Research Center, Valasan, Gujarat, India
16. <https://www.ncbi.nlm.nih.gov/books/NBK519574/>
17. Dermatology of international literature review service topical nicotinamide compared with clindamycin gel in the treatment of inflammatory acne vulgaris.

18. Comparison of topical 5% nicotinamide gel versus 2% clindamycin gel in the treatment of the mild- moderate acne vulgaris : A double -blinded randomised clinical trials.Zabiollah Shahmoradi, Farib Iraj, Amir Hossein Siadat, Azamosadat GhorbainiSkin Disease and Leishmaniasis Research Center, Department of Dermatology, Isfahan University of Medical Sciences, Isfahan, Iran
19. Topical 4% nicotinamide vs 1% clindamycin in moderate inflammatory acne vulgaris.international journal of dermatology/volume 52, issue 8/ p.999-1004.
20. Treatment outcome of acne vulgaris with topical application of clindamycin gel and benzoyl peroxide gel as supplementary files.
21. An unreported clindamycin adverse reaction: wrist monoarthritis. inIranian Journal of Pharmaceutical Research · March 2012Source: PubMed
22. UNB DIGITAL ARCHIVE Clindamycin hydrochloride: Summary Report Prepared by: University of Maryland Center of Excellence in Regulatory Science and Innovation (M-CERSI)University of Maryland School of Pharmacy December 2020