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A Review on Acne Vulgaris

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Abstract

Acne is a polymorphic and multifactorial inflammatory disease of pilosebaceous gland characterized by skin lesions. It starts the age of puberty and various key mechanism are involves the formation of acneiform like interference in the sebaceous gland which are correlate with hyperseborrhoea, disregulation of hormones, microenvironment, interconnection with neucleopeptide, variation in sebum fatty acid composion, follicular hyperkeratinizations, disfuction of innate and adaptive immunity and induction of inflammation. Much Allopathy, herbal and homeopathy are playing a significance role for acne vulgaris. In this review focus on the general knowledge about the acne vulgaris, epidemiology, and etiology, pathogenesis of acne vulgaris, classification and treatment.

Keywords: Acne, Therapy, Treatment

Introduction

Acne is a polymorphic and multifactorial inflammatory disease of pilosebaceous gland characterized by skin lesions. Skin lesions are characterized into Non inflammatory included closed comedones (white heads), open comedones (black heads) and outcome from the hypercornification of the pilosebaceous unit. Inflammatory lesions consist of erythematous macules, papules and pastules of cells [1]. Follicular Hyperkeratinization, sebum production and hyper colonization by propionibacterium acne are direct or indirect responsible for the acne inflammations [2]. Acne vulagaris derived from the Greek word “acme” from the writing term indicate the actius Amidennus which means skin eruption and “vulgaris” indicate the common [3]. Acne vulagaris is a remediable disease but it can be influence the major effect on the patient’s life. In our Indian market various type of branded drugs are accessible to the treatment of acne disease but drug’s choices are depend on physician [4]. According to academy of dermatology acne vulgaris are divided into mild, severe and moderate acne while Europeon guideline determine acne vulgaris into comedonal, mild- moderatepapuloposter, severe papuloposter/ moderate nodular, severe nodular/ conglobate [5]. Many herbal drugs also play a vital role in the treatment of acne vulgaris disease [6]. Generally anti bacterial, anti inflammatory, anti oxidant, and anti androgen are four mechanism which used for the anti acne effect of the medicinal plant [7]. Various key mechanism are involves the formation of acneiform like interference in the sebaceous gland which are correlated with hyperseborrhoea, disregulation of hormones microenvironment, interconnection with nuropeptide, variation in composition of sebum fatty acid, follicular hyperkeratinizations, disfuction of innate and adaptive immunity and induction of inflammation [8].

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Some factor are developed to the formation of acne, these factors are genetic (XYY karyotype), some medications (corticosteroids, vitamin B complexes, ramipril), diet (high glyceride food contain), dairy, chocolate, sunlight, obesity, poor level of hygiene load, stress, smoking and pickling [8, 9].

Epidemiology

Generally specialist accepted that the reason of acneiform is uncertain **[10].** It is a common dermatological disease during adolescent is 80% or more. Approximately 80-90% teenagers are suffers from mild acne and utilized non prescription composition while remaining 40% acne patients are used medical practices. 20% populations are affected from the severe acne which outcome in scarring. Acne seen in girl's aged18-19 years but as same age not appeared in boys. Many factors are responsible for the formation of acne and it is common during pregnancy. Many drugs are used for the treatment of acne Valgaris such as naproxen, hydroxychloroquinine, isoniazid, corticosteroid etc and many microorganism are responsible for acneiform like infection by Escherichia coli, Enterobactor, Klebsiella, Proteus etc **[11].**

Etiology

Acne caused by clog up of follicles, hyperkeratinizations, keratin plug formation, enlargement of sebum gland, increase of sebum production. Enlargement of microcomedo also responsible for open comedo (black heads) and closed comedo (white heads). ***Propionibacterium acne*** can be developed inflammation lesions **[12].**

Pathophysiology of acne vulgaris [13, 14, 15]

Pathogenesis of acne have been involves four factor i.e. sebum production, hypercornification of pilosebaceous duct, abnormal bacterial function and production of inflammation. Wound healing of pathogenesis occurred by the three process like inflammation, granulation tissue formation and matrix remodeling.

Factor for pathogenesis of acne formation are explained into the following way -

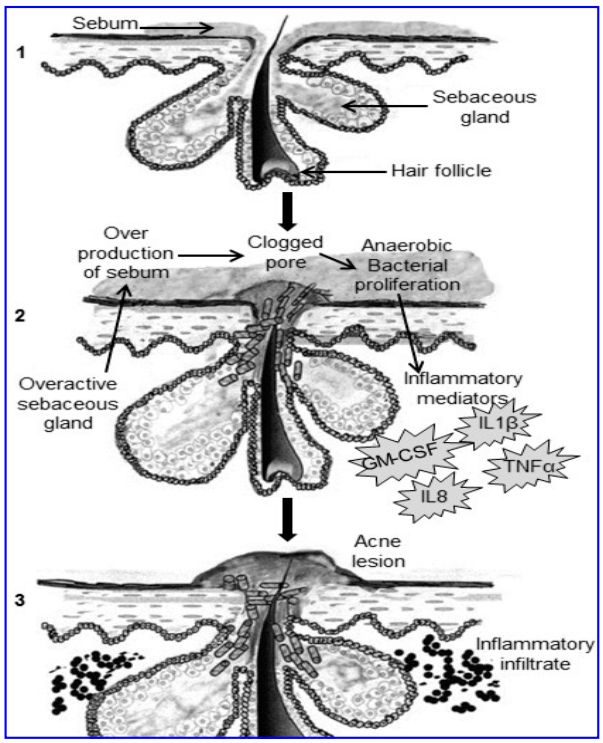

Fig. 1: (A) Normal pilosebaceous unit. (B) Clogged/ Blockage of pore is antagonized by hyperkeratinizations and high sebum production which causes inflammation. (C) Inflammatory infiltrate causes the formation of high degree of intensity in inflammatory acneiform

Increase sebum production

It is affected the common are such as cheek, chest, back and forehead, high amount of sebum production are called as the acneiform. Increasing sebum production is interconnected to the seborrhea which is right turn on the enlargement and production of sebaceous gland which is undergoing the control of androgen.

Hypercornification of pilosebaceous duct

Blockage of pilosebaceous canal leads to the formation of acne lesions in which accumulation of keratinization cells within the canal results to the impact of androgens. Irregularity in sebaceous lipid causes the hyperkeratinizations of corneocytes. Formation of comedones may also leads to the lack of lenoleic acid in the pilosebaceous unit.

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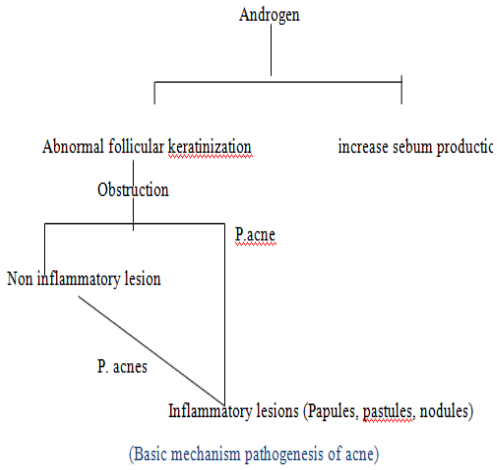
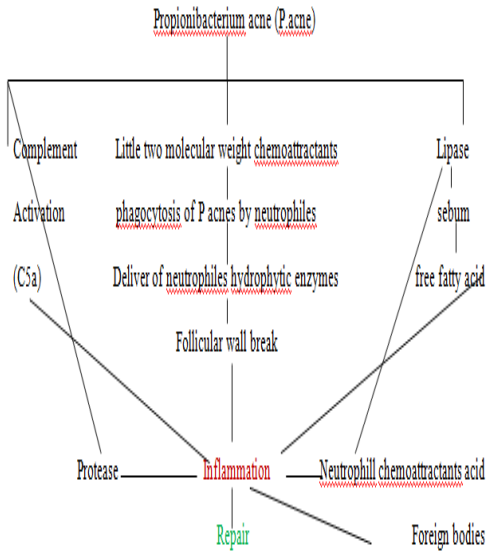


(Basic mechanism pathogenesis of acne)



(Acne inflammation Influence by P. acne.)

Abnormal bacterial functions

Microflora are existing in a normal sebaceous follicules causes to the comedones. Generally it involves the three types of co-existing bacteria such as coagulase- negative staphylococci (Staphylococcus epidermis), anaerobic diptheroides (P.acne and Propionibacterium granulosum), lipophilic yeast (Pityrosporum species). Staphylococcus epidermidis and propionibacterium acne responsible for colonization in skin surfaces on acne zone, leading to hydrolyses sebum triglycerides and secretes free fatty acid.

Production of inflammation

Antibiotic therapy is playing a vital significance for repression of P.acne. Propionibacterium acne produces the different kind of chemotherapy factor (lymphocytes, neutrophiles and macrophytes), these factors are causes follicular damage, rupture and leakage of bacteria and lipid into the surrounding dermis which produces the inflammation. Inflammations occur by the foreign bodies, enzyme of P.acne, neutrophiles hydrophilic enzyme. Collection of sebum, keratin and micro organism bring out to the delivery of pro- inflammatory mediators and also aggregation of foreign body giant cell, neutrophiles, T-helper lymphocytes which are responsible for development of inflammatory, papules, pustules and nodulocytes.

Classification of acne vulgaris [16, 17, 18]

Non Inflammatory

Injury type- Black heads
Type of acne- Comedonica
Degree- 1st
Gravity- Mild

Inflammatory

Injury type- Pimple, pustule, nodule, cyst, scars.
Type of acne- Nodular, pustular, papular
Degree - 1st, 3rd, 4th or, 5th or fulminant.
Gravity- Moderate, moderate to severe, severe, serious.

According to the grade, it is classified into the following way

- Grade 1- comedones, occasional pastules.
- Grade 2- papules, few pustules, comedones.
- Grade 3- predominant pustules, nodules, abscesses
- Grade 4- abscess, mainly cysts, wide spread scaring.

Treatment of acne vulgaris

Allopathy treatment for mild acne vulgaris [19, 20, 21]

Table 1: Topical antibiotic for the acne vulgaris

Antibiotic	Characteristics/ Comments
Benzoyl peroxide	Lipophilic, produce irritation, 2.5-10% once daily.
Azaleic acid	Slightest Lipophilic, 20% twice daily
Tretioin	0.1- 0.25% once daily once daily
Tetracyclin	Least used, avoid in pregnancy or in children 4% twice daily.
Clindamycin	More Lipophilic than erythromycin 1% twice daily
Isotretioin	0.05% once/ twice daily.
Erythromycin/ zinc combination	Slightest Lipophilic, safe in pregnancy, 20% and 4% with zinc acetate 1-2% twice daily.
Erythromycin/ retinoid combination	Avoid sun exposure and pregnancy, 4% erythromycin/ 0.025% retinoid solution 2% erythromycin/ 0.05% isotretionoin gel 4% erythromycin/ 0.1% isotretinoin gel Apply once daily at night.
Erythromycin/ benzoylperoxide combination	Require refrigeration, benzmycin are cheap than erythromycin and benzoyl peroxide apply separately.
Clindamycin/ benzoylperoxide combination	1% clindamycin gel/ 5% benzoyl peroxide gel.

Table 2: Antibiotic treatment for moderate acne vulgaris

Antibiotic	Characteristic
Topical treatment	**Same as mild acne vulgaris**.
Oral antiandrogen	**Cyproterones acetate-** 2mg. **Ethinyloestradiol** -35ug once daily.
Oral antibiotic	**Erythromycin-** 500mg twice daily, gastrointestinal adverse effect cause, safe in pregnancy, potential drug interaction such as carbamazepine, theophylline and warfarin. **Doxycycline-** 100mg once daily, gastrointestinal and photosensitivity adverse reaction cause, can be take in renal disease and consume with water. **Minocycline-** 100mg once daily and 50mg twice daily. Less cost effective drug, consume with food.

Table 3: Antibiotic treatment for severe acne vulgaris

Antibiotic	Characteristic
Oral retinoid	**Isotretionoin-** 1mg/kg body weight daily.
Oral antibiotic	**Tetracyclin-** 1.5-2 gm daily. Erythromycin- 1.5-2 gm daily **Minocyclin-** 100mg twice daily. **Lymecycline-** initial dose (150-300mg/day), maintenance dase (150mg/day), gastrointestinal adverse effect, relative cost. **Trimethoprime-** initial dose (300mg b.i.d), maintenance dose (300mg/day), macculopapular drug eruption adverse effect, relative low cost. **Doxycycline-** initial dose (100mg b.i.d), maintenance dose (100mg/day), photosensitivity and gastrointestinal upset adverse effect cause, consume with food and these medications are safe for renal patients. **Teracyclin hydrochloride/ oxyteracyclin-** initial dose (500mg b.i.d), maintenance dose (500mg/day), **Teracyclin hydrochloride/ oxyteracyclin-** initial dose (500 b.i.d), maintenance (500mg/day),

	discoloration of deciduous teeth, these medications take on an empty stomach due to poor absorption in the presence of food, avoid in pregnancy, hepatic and renal patients. **Trimethoprim+ sulfamethoxazol**- initial dose (160mgTMP+ 800 mg SMX b.i.d), maintenance dose (160mg TMP+ 800mg SMX/day), hypersensitivity reaction and bone marrow suppression cause.

Herbal drug treatment for acne vulgaris [22, 23, 24]

Ingredients	**Parts used**	**Activity and uses**
Turmeric (Curcuma longa rhizome)	Rhizome	Anti-inflammatory activity, Useful treatment for all kind of dermatological disease (acne, itching, rashes).
Neem (Azardirchta indica)	leaf	Antiseptic and anti bacterial activity, provide moisture for skin and its anti fungal properties play effective role in lighten scars and pigmentation.
Kesar	stigma	Antifungal activity, saffron is very helpful for treatment of acne, blemishes and blackheads.
Rasberry	Seed	Anti aging properties, secure pimples from infections, maintain oil production, resist acne, eliminate bacteria, metamorphosis, reduce pores, disappear scars.
Wheat germ oil	Wheat grain	Anti-oxidant properties, wheat germ oil enrich with vitamin A and E which are helpful for treatment for dry skin. Its oils are free from the radicals which playa great role to stimulate cell reconstruction in dermatology.
Aloe vera (Xanthorrhoeaceae)	Extract	Anti bacterial and Anti-inflammatory properties.
Curcuma longa (Zingiberaceae)	Extract	Anti bacterial and Anti-inflammatory properties
Terminalia chebula (Combretaceae)	Extract	Anti bacterial and Anti-inflammatory properties
Butyrospermum paradoxum (Sapotaceae)	Oil	Anti bacterial activity.
Hemidesmus Indus	Extract	Anti bacterial and anti

(Apocynaceae)		inflammatory activity.
Withania somnifera (solanaceae)	Extract	Anti bacterial and anti inflammatory activity.
Comniphora mukul (Burseraceae)	Standardized Extract of the oleoresin	Anti bacterial activity
Camellia sinesis L. (Theaceae)	Polyphenol Polyunsaturated Fatty acid.	Anti inflammatory and 5a reductase inhibitory activity.
Vitex negundo (Verbenaceae)	Flavonoid	Anti bacterial, anti inflammatory, anti androgen, anti oxidant.
Aloe barbadensis (Asphodelaceae)	Powder and complex extract	Anti bacterial, anti inflammatory, anti androgen, anti oxidant.
Lens culinnaris (Fabaceae)	Powder and complex extract	Anti bacterial, anti inflammatory, anti androgen, anti oxidant.
Hippophae rhamnoides L. (Elaegnaceae)	Fruit extract	Type 1- α reductase inhibitory activity.
Melaleuca alternifalia (Myrtaceae)	Oil	Anti bacterial and anti inflammatory
Andrographis paniculata (Acanthaceae)		Anti bacterial, anti inflammatory, anti androgen, anti oxidant.
Salmolia Malabarica		Anti bacterial, anti inflammatory, anti androgen, anti oxidant

Homeopathic treatment for acne vulgaris [25, 26]

Homeopathic drug	Pulsatilla, Silicea, Sulphura iodatum, Calcarea Carbonica, Antimonium tartaricum, Hepar sulphuris Calcalreum, Calcareum Sulphurica, Calendula gel, Kali bromatum, Antimonium Crudum, Berbaris Aquifolium, Natrum Muriaticum, Asterias Rubens, Belladonna, Nuxvomica, Nitricum Acidum, Bovista, Arsenicum Iodatum, Chelidonium Majus.

Unani treatment for acne vulgaris [26]

Name of drug	Dosage of duration	Rate of administration	Side effect
Syp. Mussafi/ Safi	10-12 ml, 8-12 hourly	Orally administered	Loose motion
Syp. Nilofar	10-12 ml, 8-12 hourly	Orally administered	-
Arq. Mundi	10-12 ml, 8-12 hourly	Orally administered	-
Jamad Mohasa	Q.S upto 1 month	Topical application	-
Single dose			-
Azadirecta Indica	As directed by physician	Topical application	
Piper Nigrum	As directed by physicia	Topical application	-

	n		
Glycosmic	As directed by physician	Topical application	-
Pentaphylla	As directed by physician	Topical application	-

Conclusion

On the basis of this review, it's simplified that the Pathophysiology and treatment of acne vulgaris is not common. Acne is a chronic and inflammatory disease which affecting the pilosebaceous gland. Allopathy, herbal and homeopathic drugs are useful for the acne vulgaris but treatment with the combination of systemic and topical drugs are playing a great role for the treatment of this disease. Commonly used topical treatment is benzoyl peroxide, antibiotic, retinoids, azelaic acid while systemic treatment include antibiotic, oral contraceptics, antiandrogens and retinoids. These medications are varying as per situation and major problem is that the therapeutics drugs cause the adverse effect. This medication is direct at upgrade appearance, irritation and social well being.

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