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Mupirocin 2% Cream in Acne Vulgaris

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Abstract

Background

No studies have been done on the use of Mupirocin 2% cream (MC) in Acne Vulgaris (AV). This is the first report on the use of MC in AV.

Objective

To study the effect of MC in AV.

Results

The study was divided into two parts Matched placebo randomized study (MPRS) and Double Blind Study (DBS). 35 patients completed the MPRS study. 30 patients completed the DBS study.

Result

120 patients having AV have been included in the MPRS study. Of the 120 patients who were included the MPRS study 35 patients came for follow up at week 4 and week 8. 149 patients having AV have been included in the DBS study. Of the 149 patients who were included the DBS study 30 patients have come for follow up at week 8. 41 patients have come for follow up at week 4. Results of MPRS study are of patients who came for follow up at week 4 right side Good 27 (77.1%) left side Good 11 (31.4%) came for follow up at week 8 right side Good 23 (65.7%) left side Good 15 (42.85%). For MPRS Study regarding Grading of Acne at Initial Visit right side Mild 0 left side Mild 4 (11.45%) came for follow up at week 4 right side Mild 8 (22.85%) left side Mild 9 (28.7%) came follow up at week 8 right side Mild 10 (28.55%) left side Mild 11 (31.4%). Results of DBS study are of patients who came for follow up at week 4 Mupirocin 2% cream MC (Active) Good 16 (53.3%) Placebo cream (PC) Good 6 (20%). MC Good 39 (54.9%) PC Good 16 (22.5%). Patients who came for follow up at week 8 MC Good 23 (76.7%) PC Good 12 (40%). For DBS Study regarding Grading of Acne at Initial Visit MC Mild 3 (4.2%) PC Mild 9 (12.7%) came for follow up at week 4 MC Mild 13 (18.3%) PC Mild 14 (19.7%) came for follow up at week 8 MC Mild 9 (30%) PC Mild 7 (23.3%).

Conclusion: MC is of help in AV.

Keywords: Mupirocin 2% cream; Acne vulgaris

Introduction

Acne vulgaris is one of the commonest skin disorders which dermatologists have to treat, mainly affect adolescents, though it may present at any age. Acne by definition is a multifactorial chronic inflammatory disease of pilosebaceous units [1]. Various clinical presentations include seborrhea, comedones, erythematous papules and pustules, less frequently nodules, deep pustules or pseudocysts, and ultimate scarring in few of them. Acne has four main pathogenetic mechanism—increased sebum productions, follicular hyperkeratinization, *Propionibacterium acne (P. acne)* colonization, and the products of inflammation [2-5]. In recent years, due to better understanding of the pathogenesis of acne, new therapeutic modalities are designed [3]. Availability of new treatment options to compliment the existing armamentarium should help to achieve the successful therapy of greater numbers of acne patients, ensure improved tolerability and fulfill patient expectations. Successful management of acne needs careful selection of anti-acne agents according to clinical presentation and individual patient needs. Hence this study is conducted to know the effect of MC in AV.

Materials and Methods

- Sample size estimation MPRS Study 35 DBS Study 30
- Inclusion and Exclusion criteria
- Inclusion criteria MPRS Study 120 patients 12 years to 30 years
- DBS Study 149 patients 12 years to 48 years
- Exclusion criteria pregnant women
- Study design
- RCT Randomized Clinical Trial
- Study period DBS Study 9/4/2011 to 25/3/2014

The study was divided into two parts Matched placebo randomized study (MPRS) and Double Blind Study (DBS). Mupirocin 2% cream MC (Active) was told to apply on right side of face and forehead. Placebo cream (PC) was told to apply on left side of face and forehead. The response to treatment was assessed at week 4 and week 8 as follows:

Excellent response: Complete healing of acne lesions clinically
Good response: 50% or more reduction in number of acne lesions
Fair response: 25%-50% reduction in number of acne lesions
Poor response: No response, flare-up of lesions, or less than 25% reduction in number of acne lesions [6].

The grading of acne was done as follows Mild: Fever than 10 lesions Moderate: 10-25 lesions Severe: More than 25 lesions [7].

Statistical analysis was carried out using Chi-square test Degrees of freedom and P value. The data was tabulated using MS Excel sheet and analysis was done using percentages, rates and ratios. Chi square test was used to find association between attributes.

Results

Table 1 to Table 4 show the results of Mupirocin 2% cream in Acne Vulgaris
Socio demography data
Age MPRS Study Youngest 12 years Female Oldest 30 years Female
DBS Study Youngest 12 years Male Oldest 30 years Female
Sex MPRS Study Males 12 Females 23
DBS Study Males 9 Females 21

Table 1 MPRS study response to treatment of patients who came for follow up at week 4 and week 8

	Week 4			
	Good	Fair	Poor	Total
Right side	27(77.1%)	4(11.45%)	4(11.45%)	35
Left side	11(31.4%)	18(51.4%)	6(17.2%)	35
Total	38	22	10	70
X2 =16.046 DF=2 P=0.0003				
Came for follow up at Week 8				
	Good	Fair	Poor	Total
Right side	23(65.7%)	8(22.85%)	4(11.45%)	35
Left side	15(42.85%)	16(45.7%)	4(11.45%)	35
Total	38	24	8	70
X2 =4.351 DF=2 P=<0.114				

Table 2 MPRS study Grading of Acne of patients who came at Initial Visit Week 4 and Week 8

Initial Visit				
	Mild	Moderate	Severe	Total
Right side	0	7(20%)	28(80%)	35
Left side	4(11.45%)	13(37.15%)	18(51.4%)	35
Total	4	20	46	70
X^2=7.974 DF=2 P=0.018				
Week 4				
	Mild	Moderate	Severe	Total
Right side	8(22.85%)	17(48.6%)	10(28.55%)	35
Left side	25.7(28.7%)	9(25.7%)	17(48.6%)	35
Total	17	26	27	70
X^2=4.335 DF=2 P=0.114				
Week 8				
	Mild	Moderate	Severe	Total
Right side	10(28.55%)	18(51.4%)	7(20%)	35
Left side	11(31.4%)	12(34.3%)	12(34.3%)	35
Total	21	30	19	70
X^2=2.563 DF=2 P=0.277 X^2 = Chi-square DF=Degrees of freedom				

Table 3 DBS study response to treatment of patients who came for follow up at week 4 and week 8 (n=30)

Week 4				
	Good	Fair	Poor	Total
Active	16(53.3%)	11(36.7%)	3(10%)	30
Placebo	6(20%)	11(36.7%)	13(43.3%)	30
Total	22	22	16	60
X^2=10.795 DF=2 P=0.005				
Week 8				
	Good	Fair	Poor	Total
Active	23(76.7%)	5(16.7%)	2(6.6%)	30
Placebo	12(40%)	12(40%)	6(20%)	30
Total	35	17	8	60
X^2=8.399 DF=2 P=0.015				

Table 4 DBS study Grading of Acne of patients who came at Initial Visit Week 4 and Week 8

Initial Visit				
	Mild	Moderate	Severe	Total
Active	3(4.2%)	20(28.2%)	48(67.6%)	71
Placebo	9(12.7%)	20(28.2%)	42(59.2%)	71
Total	12	40	90	142
X^2 =3.400 DF=2 P=0.183				
Week 4				
	Mild	Moderate	Severe	Total
Active	13(18.3%)	28(39.4%)	30(42.3%)	71
Placebo	14(19.7%)	26(36.6%)	31(43.7%)	71
Total	27	54	61	142
X^2 =0.128 DF=2 P=0.938				
Week 8				
	Mild	Moderate	Severe	Total
Active	9(30%)	11(36.7%)	10(33.3%)	30
Placebo	7(23.3%)	11(36.7%)	12(40%)	30
Total	16	22	22	60
X^2 =0.433 DF=2 P=0.806				
X^2 = Chi-square DF=Degrees of freedom				

For the MPRS Study

The result at week 4 is statistically significant. The result at week 8 is not statistically significant. At the later stage of treatment at week 8 even though MC is showing better result compared to PC the difference is not statistically significant. For the DBS study, from the result at week 4 and week 8 follow up Active drug MC seems to be better than PC as patients receiving Active drug MC have shown significantly high percentage of good response as compared to PC. Regarding Grading of Acne: After Grading of Acne there was not much difference between the Active drug MC and PC at Initial visit week 4 and week 8 follow up.

Discussion

Topical Therapy

Topical therapy is useful in mild and moderate acne, as monotherapy, in combination and also as maintenance therapy.

Benzoyl Peroxide

It is an effective topical agent since many years and is available in different formulations (washes, lotions, creams, and gels) and concentrations (2.5–10%) [7-15].

The stability is very dependent on its vehicle. Gels are generally more stable and active and water-based gel being less irritant is more preferred over creams and lotions [8,9]. Benzoyl peroxide is a broad spectrum bactericidal agent which is effective due to its oxidizing activity [8]. The drug has an anti-inflammatory, keratolytic, and comedolytic activities, and is indicated in mild-to-moderate acne vulgaris. Clinicians must make a balance among desired concentration, the vehicle base, and the risk of adverse effects, as higher concentration is not always better and more efficacious [10].

The main limitation of benzoyl peroxide is concentration dependent cutaneous irritation or dryness and bleaching of clothes, hair, and bed linen [11]. It can induce irritant dermatitis with symptoms of burning, erythema, peeling, and dryness [12]. This occurs within few days of therapy and mostly subsides with continued use.

Topical Retinoids

Retinoids have been in use for more than 30 years. Topical retinoids target the microcomedo–precursor lesion of acne. There is now consensus that topical retinoid should be used as the first-line therapy, alone or in combination, for mild-to-moderate inflammatory acne and is also a preferred agent for maintenance therapy.

Its effectiveness is well documented, as it targets the abnormal follicular epithelial hyperproliferation, reduces follicular plugging and reduces microcomedones and both noninflammatory and inflammatory acne lesions [13-15]. Their biological effects are mediated through nuclear hormone receptors (retinoic acid receptor RAR and retinoids X receptor RXR with three subtypes α, β, and γ) and cytosolic binding proteins [16]. Retinoic acid metabolism blocking agents (RAMBAs) such as liarozole have been developed recently to overcome the emergence of all-trans-retinoic acid resistance [17].

Tretinoin, adapalene, tazarotene, isotretinoin, metretinide, retinaldehyde, and β-retinoyl glucuronide are currently available topical retinoids [18]. The most studied topical retinoids for acne treatment worldwide are tretinoin and adapalene [19]. There is no consensus about relative efficacy of currently available topical retinoids (tretinoin, adapalene, tazarotene, and isotretinoin). The concentration and/or vehicle of any particular retinoid may impact tolerability [20]. Adapalene was generally better tolerated than all other retinoid with which it was compared [21,22]. Tretinoin has recently become available in formulations with novel delivery systems which improves tolerability. One such product Retin-A Micro (0.1% gel) contains tretinoin trapped within porous copolymer microspheres. Avita, the tretinoin is incorporated within a polyoylprepolymer (PP-2). Each of the theses formulations releases tretinoin slowly within the follicle and onto the skin surface, which in turn reduces irritancy with the same efficacy [23].

The main adverse effects with topical retinoid is primary irritant dermatitis, which can present as erythema, scaling, burning sensation and can vary depending on skin type, sensitivity, and formulations.

Topical Antibiotics

Many topical antibiotics formulations are available, either alone or in combination. They inhibit the growth of *P. acne* and reduce inflammation. Topical antibiotics such as erythromycin and clindamycin are the most popular in the management of acne and available in a variety of vehicles and packaging [23]. Clindamycin and erythromycin were both effective against inflammatory acne in topical form in combination of 1–4% with or without the addition of zinc [24-26]. An addition of topical 2% zinc sulfate and nicotinamide was no different than placebo for the treatment of acne [27-29]. Topical clarithromycin, azithromycin, and nadifloxacin are available in India, but trials for their efficacy and safety are lacking.

Side effects though minor includes erythema, peeling, itching, dryness, and burning, pseudomembranous colitis which is rare, but has been reported with clindamycin [30]. A most important side effect of topical antibiotics is the development of bacterial resistance and cross resistance; therefore, it should not be used as monotherapy.

Other Topical/New Agents

Combination Therapy

Benzoyl peroxide has the advantage to prevent and eliminate the development of *P. acne* resistance. Therefore it is being more preferred as combination therapy. Its efficacy and tolerability are enhanced when combined with topical erythromycin or clindamycin, confirmed on various trials [7,32-35]. Benzoyl peroxide can be combined with tretinoin and found to be superior to monotherapy. Both the molecules should not be applied simultaneously as benzoyl peroxide may oxidize tretinoin [36]. A combination of topical retinoid and topical antimicrobial is more effective in reducing both inflammatory and noninflammatory acne lesions than either agent used alone [37]. Topical clindamycin and benzoyl peroxide applied once daily and fixed clindamycin phosphate 1.2% and tretinoin 0.025% in aqueous-based gel formulation used once daily are both found to be effective treatment for acne. Addition of zinc acetate to clindamycin and erythromycin gel showed equivalent efficacy but probably reduces the development of microbial resistance [38].

Salicylic Acid

It has been used for many years in acne as a comedolytic agent, but is less potent than topical retinoid [39].

Azelaic Acid

It is available as 10–20% topical cream which has been shown to be effective in inflammatory and comedonal acne [40,41].

Lactic Acid/Lactate Lotion

It is found to be helpful in preventing and reduction of acne lesion counts [42].

Tea Tree Oil 5%

Initial clinical response with this preparation is inevitably slower compared to other treatment modalities [43].

Picolinic Acid Gel 10%

It is an intermediate metabolite of the amino acid, tryptophan. It has antiviral, antibacterial, and immunomodulatory properties. When applied twice daily for 12 weeks found to be effective in both type of acne lesions, but further trials are needed to confirm its safety and efficacy [44].

Dapsone Gel 5%

It is a sulfone with anti-inflammatory and antimicrobial properties. The trials have confirmed that topical dapsone gel 5% is effective and safe as monotherapy and in combination with other topical agents in mild-to-moderate acne vulgaris [45].

Limitation of the study is that no studies have been done on the use of Mupirocin 2% cream (MC) in Acne Vulgaris (AV). This is the first report on the use of MC in AV.

Conclusion

MC is of very much help in AV. MC can be used successfully in the management of AV. There is a need to do more studies in this regard to prove the effectiveness of MC in AV.

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