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SHORT COMMUNICATIONS

EVALUATION OF RELATIVE POTENCIES OF TOPICAL CORTICOSTEROIDS WITH HISTAMINE PIN-PRICK METHOD

B S N Reddy, R Shantharaman

Relative potencies of different topical steroids in two serial concentrations were evaluated over the flexor aspect of human forearm in 50 volunteers. The results indicated that the order of potency for different steroid solutions ranged from the lowest with hydrocortisone acetate to the highest with betamethasone dipropionate while other steroids occupied intermediate positions. Further, it was noted that the potency of steroids is enhanced significantly by increasing their concentration.

Key Words: Topical steroids, Histamine bioassay

Introduction

Topical corticosteroids are indispensable in today's dermatologic practice. With the initial success of topical hydrocortisone observed in 1972 by Sulzberger and Witten[1] in many recalcitrant dermatoses, a large number of synthetic topical corticosteroids have been produced in recent years. These are being marketed in a variety of commercial formulations such as ointments, creams, lotions, gels, etc. Proper evaluation of their efficacy is extremely important to the clinician to provide optimum therapeutic response. The present work was undertaken to assess the relative potencies of different topical steroid solutions in alcohol using the histamine pin-prick bioassay.

From the Department of Dermatology and S T D, JIPMER, Pondicherry - 605 006, India.

Address correspondence to : Dr B S N Reddy

Material and Method

Topical steroid powders (listed below) were dissolved in either ethanol or methanol in two different serial concentrations and tested over the flexor aspect of human forearm in 50 healthy volunteers according to the histamine pin-prick method of Reddy and Singh.[2]

Hydrocortisone	1.00 and 2.0 %
Prednisolone	0.25 and 0.5%
Dexamethasone sodium phosphate	0.25 and 0.5%
Desoxymetasone	0.05 and 0.1%
Triamcinolone acetonide	0.05 and 0.1%
Betamethasone 17-valerate	0.05 and 0.1%
Betamethasone dipropionate	0.05 and 0.1%

Results

The data pertaining to the histamine wheal response of the skin over the control and steroid-applied sites are summarized in table I. There is a statistically significant difference in the mean histamine response noted over the control and steroid sites on one hand and also between different steroid-treated sites themselves on the other hand when compared with hydrocortisone

Table I . Histamine response of the skin with different topical corticosteriods

		Range (Sq mm)	Mean	SD	% of potency
Control		9.62 - 25.96	17.43	3.75	
Hydrocortisone acetate	1%	7.06 - 21.64	9.90	2.41	43.20
	2%	5.93 - 19.63	7.88	2.26	54.79
Prednisolone	0.25%	5.93 - 19.93	9.85	2.60	44.48
	0.5%	3.97 - 15.90	7.61	2.28	56.33
Dexamethasone sodium phosphate	0.25%	5.93 - 19.63	9.65	2.28	44.63
	0.5%	3.97 - 17.72	7.66	2.52	56.05
Desoxymetasone	0.25%	5.93 - 17.72	8.54	2.50	51.00
	0.5%	3.14 - 14.18	6.26	2.20	64.04
Triamcinolone acetonide	0.05%	5.93 - 21.64	8.20	2.87	52,95
	0.1%	3.14 - 17.72	6.21	2.54	64.37
Betamethasone valerate	0.05%	4.90 - 15.9	8.51	2.57	51.17
	0.1%	3.97 - 14.18	6.15	1.66	64.71
Betamethasone dipropionate	0.05%	4.90 - 15.90	6.87	2.30	60.58
	0.1%	1.22 - 9.62	4.44	1.54	74.52

$P < 0.001$ $n = 50$

($P < 0.001$). Further, it was noted that by increasing the concentration of the steroids, there is enhanced suppression of histamine response.

Comments

Relative potencies of various topical steroids ranged from the lowest with hydrocortisone acetate to the highest with betamethasone dipropionate while other steroids occupied intermediate positions. These findings are in general agreement with similar earlier studies.[2-4]

The effect of concentration on the percutaneous penetration of the steroids noted in the vasoconstrictor bioassay reveals that there is an increased penetration of the steroid by increasing its concentration.[5] This is further established in the present study by the fact that the maximum suppression of histamine wheal response was seen with higher concentration of the steroids investigated. In fact, this has an important clinical bearing and clearly points out that, in general, increasing the concentration is one valuable method of enhancing the steroid efficacy in patients who are less corticosteroid responsive as suggested by Robertson and Maibach.[6] However, the information available in relation to the concentration and response for topical corticosteroids is meagre and the concentration response curve flattens out rapidly after an initial rise, indicating a different optimal concentration for each steroid.[7-9] Further investigations are needed to find out the optimal concentration of different topical steroids to produce maximum suppression of the histamine wheal response over the skin.

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