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Original Research Article

To measure the morning basal serum cortisol levels on day 1, after which short course of systemic corticosteroids of different class are given in various dermatological diseases: A Retrospective Study

Dr. Sahil Pruthi[1] (Assistant Professor), Dr. Simran Singh Aujla[2] (Assistant Professor) & Dr. Vivek Singh[3] (Senior Resident)

Dept. of DVL, Maharishi Markandeshwar College of Medical Sciences and Research, Ambala[1,2&3]

Corresponding Author: Dr. Vivek Singh

Abstract

Background & Methods: The aim of the study is to measure the morning basal serum cortisol levels on day 1, after which short course of systemic corticosteroids of different class are given in various dermatological diseases. All the participants in the study were subjected to the following detailed personal and clinical history recording. The history included past and present medical history and past and concomitant drug history, study was conducted in MMCMSR, Ambala for duration of 1 year.

Results: Group A (Betamethasone) showed 53.064 % reduction in the serum cortisol level from the baseline values, whereas the Percentage reduction in group B (Prednisolone) was 28.418 %. Group C (Hydrocortisone) showed the least reduction in the serum cortisol level that was 15.5151%.

Conclusion: Our study confirms the safety of the three most commonly used corticosteroids with regards to HPA axis suppression. A five day single early morning non-tapered dose 0.5 mg/kg body weight of prednisolone equivalent of hydrocortisone and betamethasone are safe, even on abrupt withdrawal. Study demonstrates that an intensive short non-tapered course is well-tolerated and is a desirable treatment in many of the dermatological disorders.

Keywords: serum, cortisol, corticosteroids & dermatological.

Study Design: Observational and Retrospective Study.

1. Introduction

The Nobel Prize in Medicine was awarded in 1950 to Hench and associates for their initial work on the beneficial effects and toxicities of glucocorticosteroids (glucocorticoids), which focused on rheumatic disorders. In 1951, Sulzberger and colleagues[1] first reported the use of systemic cortisone and adrenocorticotropic hormone (ACTH) as therapies for inflammatory skin diseases. One year later, Sulzberger and Witten successfully treated eczematous eruptions with topical hydrocortisone. In 1961, Reichling and Kligman[2] employed alternate-day oral glucocorticosteroid therapy for skin conditions. A novel method of high-dose glucocorticosteroid therapy was introduced to dermatology in 1982, who used pulse intravenous therapy for pyoderma gangrenosum.

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The major naturally occurring glucocorticoid is cortisol (hydrocortisone). It is synthesized from cholesterol by the adrenal cortex[3]. Synthetic corticosteroids mimic the actions of naturally occurring corticosteroids and may be used to replace corticosteroids in people with adrenal glands that are unable to produce adequate amounts of corticosteroids. They include prednisone, prednisolone, methylprednisolone, beclomethasone, betamethasone, dexamethasone, and triamcinolone[4].

The question of stress Corticosteroids doses arises primarily with surgery performed on patients who have received prolonged pharmacologic doses of Corticosteroids therapy. Owing to the effects of anesthesia, surgical trauma, or both, most major surgical procedures stimulate a rise in endogenous cortisol production[5]. Historically, the IV form of hydrocortisone is administered at a dose of 100 mg the night before surgery, perioperatively, and every 8 hours on the day of surgery. The dose is reduced by 50% daily until the previous Corticosteroids dose is reached. Although the risk associated with these 'stress doses' is low, supplementing patients during major surgery beyond 1–2 months following cessation of Corticosteroids therapy may be unnecessary[6].

2. Material and Methods

Present study was conducted at Maharishi Markandeshwar College of Medical Sciences and Research, Ambala for 01 Year. All the participants in the study were subjected to the following detailed personal and clinical history recording. The history included past and present medical history and past and concomitant drug history. Social history and personal history were also evaluated. Patients carrying out any form of intense physical activity and suffering from psychological stress were not included. Participants were randomly recruited into the three groups with the help of table of random numbers.

INCLUSION CRITERIA

1. Consenting patients aged between 18-40 years.

EXCLUSION CRITERIA

1. Patient already on steroid treatment, either topical or systemic or who have received systemic corticosteroids within last 6 months.
2. Patients carrying out any form of intense physical activity and having psychological stress.

3. Result

Table 1: Baseline Characteristics of Study Population

Characteristics	Group A	Group B	Group C
Total number of patients	10	10	10
Male	6	6	6
Female	4	4	4
Age (average)	23.7	24.5	27.2
Weight (mean) kg	54.2	56	62.5
Height (mean) cm	158.8	159.3	166.1

During the study period, a total of 59 patients were examined. Out of which, few had already taken steroids within recent time. After excluding these patients, 39 patients were confirmed

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eligible for the study. From these, a total of 30 patients were included in the study. Rest were lost to follow-up and patients who were unable to get their tests done. These subjects were replaced into group by fresh recruits.

Table 2: Average of serum cortisol level in all the three groups

	Mean Baseline serum cortisol level	**Mean Serum cortisol level on 1st follow up**	**Mean Serum cortisol level on 2nd follow up**
Group A	16.50	13.94	14.15
Group B	15.30	10.95	11.83
Group C	17.42	8.18	11.61

Overall, in all the groups, serum cortisol levels on first follow-up (F1) were decreased and started to recover/recovered on second follow-up (F2). Although follow-up (F2) level were within normal range but could not approach to the baseline level.

Table 3: Number of patients who had actually gone below the lowest cut-off

	Baseline (B)	1st Follow-up (F1)	2nd Follow-up (F2)
Group A	00	00	00
Group B	00	01	01
Group C	00	02	00

Group A (Betamethasone) showed 53.064 % reduction in the serum cortisol level from the baseline values, whereas the Percentage reduction in group B (Prednisolone) was 28.418 %. Group C (Hydrocortisone) showed the least reduction in the serum cortisol level that was 15.5151%.

4. Discussion

We have studied most commonly used member each from the three classes of systemic corticosteroids; namely hydrocortisone from short acting, prednisolone from intermediate acting and betamethasone from long acting corticosteroids class[7].

In our subjects, we found that the morning basal cortisol levels declined from the baseline value and recovered within five days following the stoppage of systemic corticosteroid. However, there are certain points to ponder here. First, the morning basal cortisol level showed a general trend of reduction in mean values from baseline to first follow-up and a

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trend towards recovery of mean values on second follow up. Previous studies have found similar effects. The short term regimen have been regarded as relatively free of serious suppressive effects on HPA axis, despite a lack of consistent evidence[8]. Also, because of heterogeneity of patients studied in previous studies, it has been very difficult to determine from previous studies, the cause of recovery after short term suppression and the specific effect of steroid dose and duration.

However, on second follow up subjects are within normal range of morning basal cortisol level but could not be able to achieve values equal or above baseline. Also, 33% of study subjects showed a persistent decline in morning basal cortisol level, where morning basal cortisol level at baseline were more than first follow-up values, which in turn was more than second follow up[9]. Such subjects may be considered as showing delayed suppression of HPA axis. A similar effect has been found with prednisolone and betamethasone. Maximum proportion of subjects showing delayed suppression were from prednisolone group followed by hydrocortisone and last from betamethasone.

5. Conclusion

Our study confirms the safety of the three most commonly used corticosteroids with regards to HPA axis suppression. A five day single early morning non-tapered dose 0.5 mg/kg body weight of prednisolone equivalent of hydrocortisone and betamethasone are safe, even on abrupt withdrawal. Study demonstrates that an intensive short non-tapered course is well-tolerated and is a desirable treatment in many of the dermatological disorders.

6. References

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