Topical corticosteroid wet wrap treatment and adrenal suppression: An Auckland perspective

To the Editor: Topical corticosteroids under wet occlusive dressings ("wet wraps") may be used for the treatment of severe eczema and psoriasis.[1,2] Our institution uses a short-contact protocol for dermatology inpatients, where betamethasone 0.1% valerate cream is applied under wet wraps for 20 minutes twice daily.[2] Adrenal suppression has been documented to occur with topical steroids due to systemic absorption of steroids and disruption of the hypothalamic-pituitary-adrenal axis.[3] The aim of this study was to investigate the effect of short-contact wet wrap therapy on the hypothalamic-pituitary-adrenal axis.

In a prospective, single-center, observational cohort study, adult inpatients with psoriasis or eczema admitted for wet wraps were tested for adrenal suppression between 2014 and 2017. Patients with prior use of oral steroids within 1 month, an underlying disease that interrupts the hypothalamic-pituitary-adrenal axis, or a known betamethasone valerate allergy were excluded (Fig 1). All patients

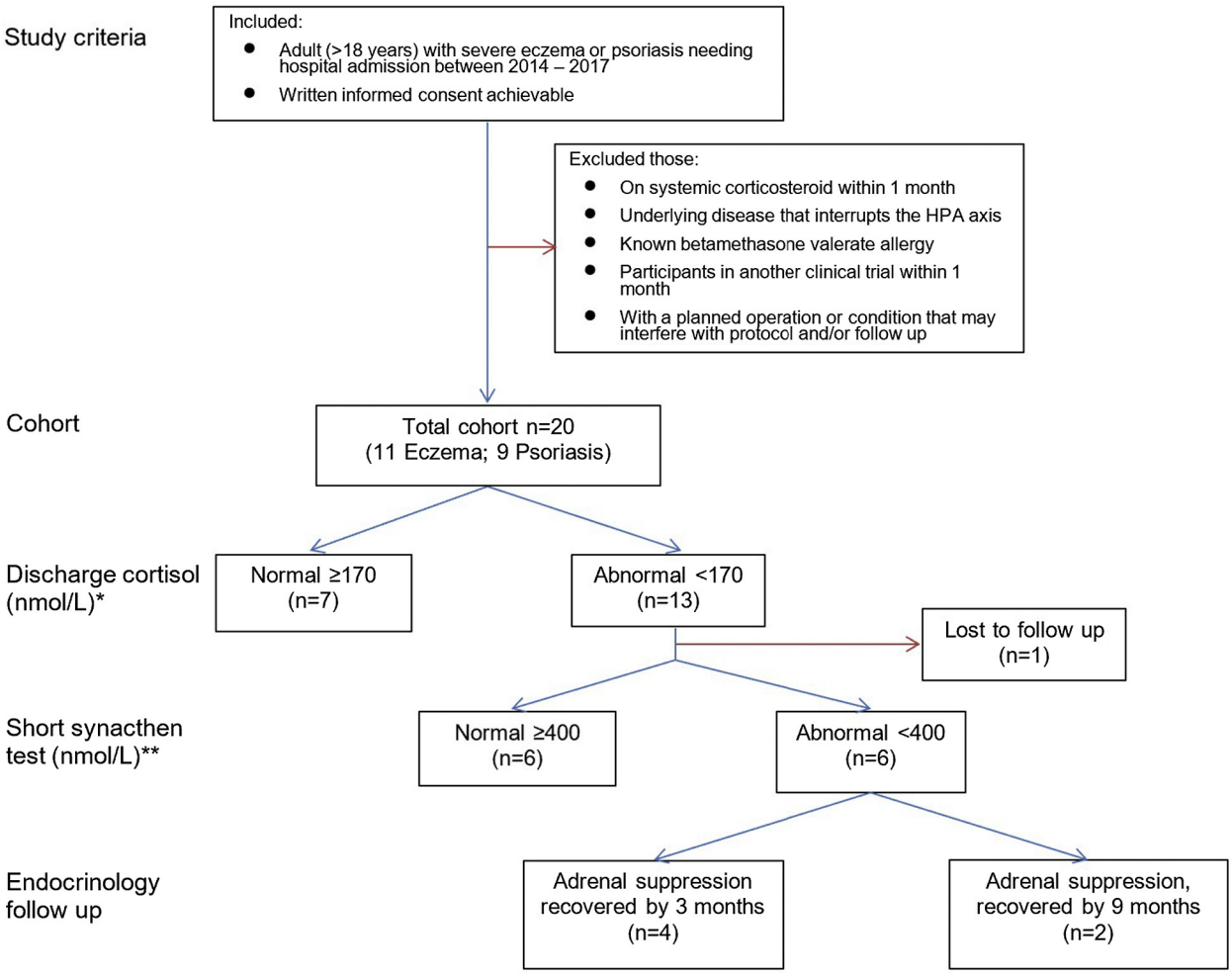

Fig 1. Summary of wet wrap cohort: study inclusion and exclusion criteria, results of testing of adrenal suppression, and clinical outcome from outpatient follow-up. *HPA*, Hypothalamic-pituitary-adrenal.

Table I. Baseline characteristics of dermatology inpatients treated with short-contact wet wraps for eczema and psoriasis

Variables	Eczema (n = 11)	Psoriasis (n = 9)	Total (n = 20)
Mean age (SD), y	41 (14.7)	49 (16.8)	45 (15.7)
Female (%)	6 (55)	5 (56)	11 (55)
Ethnicity (%)			
New Zealand European	6 (55)	4 (44)	10 (50)
Maori/Pacific people	3 (27)	4 (44)	7 (35)
Other	2 (18)	1 (11)	3 (15)
Topical steroid use a month prior to wet wraps (%)	11 (100)	6 (67)	17 (85)
Mean (SD) grams of adjusted steroid used as 1% hydrocortisone acetate per month	1710 (1398)	1933 (1479)	1789 (1384)
Concurrent systemic treatment (excluding corticosteroids) (%)	2 (18)	6 (67)	8 (40)
Methotrexate/cyclosporin (%)	1 (9)	3 (33)	4 (20)
Phototherapy (%)	1 (9)	2 (22)	3 (15)
Etanercept (%)	0 (0)	1 (11)	1 (5)
Concurrent inhaled steroids (%)	3 (27)	2 (22)	5 (25)
Clinical signs of adrenal suppression (%)	1 (9)	0 (0)	1 (5)
Mean SCORAD scores (SD)*			
Admission	48 (19)	NA	NA
Discharge	16 (7)	NA	NA
Mean PASI scores (SD)†			
Admission	NA	21 (9)	NA
Discharge	NA	11 (5)	NA

NA, Not applicable; *PASI*, psoriasis area severity index; *SCORAD*, SCORing Atopic Dermatitis; *SD*, standard deviation.
*Mean difference in scores using paired Student *t* test, $P = .001$.
†Paired Student *t* test, $P = .001$.

received wet wraps to the active dermatoses, and early morning plasma cortisol concentration (PCC) was obtained at baseline and on completion of treatment. Those patients with abnormal PCC at the completion of treatment were referred for a repeat PCC evaluation and 1-μg short synacthen test 1 week later. Formal endocrinology follow-up was arranged for those with an abnormal short synacthen test. Statistical analyses were performed using JMP version 13 (SAS Institute Inc). The cortisol assay and normal range changed during the study; therefore, cortisol measurement was analyzed using repeated measures analysis of variance adjusted for the cortisol assay in use at the time of the sample collection. Nonparametric data were log transformed for analysis. A 2-sided P value of $<.05$ was considered statistically significant.

Twenty patients were included, 11 with eczema and 9 with psoriasis; of all patients, 17 were using topical corticosteroids during the month prior to admission (Table I). Eight patients (40%) had a PCC below the normal level at baseline. The mean duration of wet wrap treatment was 5.2 days (standard deviation = 2.0) with no reported adverse effects. There was a reduction in the PCC following wet wrap treatment (mean PCC (standard deviation): admission, 242.5 nmol/L (191.6 nmol/L) vs discharge, 149.6 nmol/L (173 nmol/L); $P = .02$).

Fig 1 outlines our cohort and results of testing. Thirteen patients had abnormal PCC on discharge; of these patients, 6 had subnormal short synacthen test findings, requiring endocrinology follow-up and oral hydrocortisone replacement. Of those with normal PCC prior to wet wraps, 2 (1 with psoriasis and 1 with eczema) had suboptimal short synacthen test findings (17%). On follow-up, all patients had recovered adrenal suppression by 9 months.

In keeping with our study findings, adrenal suppression is often temporary, resolving even with ongoing topical steroid use.[4,5] The main limitations of this study are the observational design, without a washout period avoiding topical steroid use prior to admission, and small patient numbers that may lead to type II statistical error. Furthermore, serum morning cortisol concentration alone was used to screen for adrenal suppression, which is subject to variation due to physiologic triggers and illnesses.[3]

Adrenal suppression may occur after short-contact wet wrap therapy. Dermatologists should monitor for these adverse effects and consider prompt endocrinology follow-up.

Jenny G. Chung, BSc, MBChB,[a] *Harriet Cheng, BHB, MBChB, MMed, FRACP,*[a,b] *Michael Croxson, MBChB, FRACP,*[c] *Karen Agnew, MBChB,*

FRACP,[a,b] Jane Alsweiler, MBChB, PhD,[d] and Steven Lamb, MBChB, FRACP[a,b]

From the Department of Dermatology[a] and Department of Endocrinology, Greenlane Clinical Centre, Auckland, New Zealand[c]; and Department of Medicine, University of Auckland, Auckland, New Zealand[b]; Department of Paediatrics: Child and Youth Health, University of Auckland, Auckland, New Zealand.[d]

Funding sources: None.

IRB approval status: Reviewed and approved by Health and Disability Ethics Committees, New Zealand (#14N/NTB/157).

Correspondence to: Jenny G. Chung, BSc, MBChB, Department of Dermatology, Greenlane Clinical Centre, Auckland 1051, New Zealand

E-mail: jchung@adhb.govt.nz

Conflicts of interest

None disclosed.

REFERENCES

1. Goodyear HM, Spowart K, Harper JI. 'Wet-wrap' dressings for the treatment of atopic eczema in children. *Br J Dermatol*. 1991;125(6):604. https://doi.org/10.1111/j.1365-2133.1991.tb14807.x
2. Cheng HS, Lamb SR, Medek D, et al. Outcomes for dermatology inpatients treated with a simplified short-contact wet wrap protocol. *Australas J Dermatol*. 2018;59(4):345-346. https://doi.org/10.1111/ajd.12794
3. Levin C, Maibach HI. Topical corticosteroid-induced adrenocortical insufficiency: clinical implications. *Am J Clin Dermatol*. 2002;3(3):141-147. https://doi.org/10.2165/00128071-200203030-00001
4. Levin E, Gupta R, Butler D, Chiang C, Koo JYM. Topical steroid risk analysis: differentiating between physiologic and pathologic adrenal suppression. *J Dermatolog Treat*. 2014;25(6):501-506. https://doi.org/10.3109/09546634.2013.844314
5. Wolkerstorfer A, Visser RL, De Waard van der Spek FB, Mulder PG, Oranje AP. Efficacy and safety of wet-wrap dressings in children with severe atopic dermatitis: influence of corticosteroid dilution. *Br J Dermatol*. 2000;143(5):999-1004. https://doi.org/10.1046/j.1365-2133.2000.03833.x

https://doi.org/10.1016/j.jdin.2021.08.002