Modified Goeckerman therapy for chronic skin diseases in a resource-limited setting: A case series from Kenya

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INTRODUCTION

Africa faces a profound shortage of dermatologic care with approximately 1 dermatologist for every 0.5-1 million inhabitants, of which a majority practice in urban areas.[1] In Kenya, the ratio is even smaller with around 1 dermatologist for every 2 million inhabitants.[2] This severe workforce shortage directly limits access not only to specialist evaluation, but also to advanced therapies that require expert initiation and monitoring.

In addition to the scarcity of dermatologists, access to biologic therapies for those with more complex inflammatory dermatoses remains restricted. While biologics have been shown to be highly efficacious in controlling inflammatory skin diseases in the United States, their use in Sub-Saharan Africa is restricted by high costs, limited access to the medications, and under-resourced infrastructure for laboratory and clinical monitoring.[3,4] These barriers underscore the need for effective, affordable, and locally sustainable strategies for management of chronic skin diseases.

Cutaneous T-cell lymphoma (CTCL) is a particularly challenging skin condition to treat in West Africa. Case series in Nigeria have reported treatment with radiotherapy, methotrexate, phototherapy ± psoralen, and systemic steroids with varying improvement.[5,6] Despite phototherapy's central role in CTCL management, access to phototherapy remains extremely limited across Africa, contributing to the therapeutic gap for CTCL and other chronic inflammatory dermatoses. To address this need, we have launched the first narrow band ultraviolet B (NB-UVB) phototherapy service in Western Kenya at Moi Teaching and Referral Hospital (MTRH), establishing a sustainable platform for phototherapy-based interventions.

Within this context of limited access to advanced therapies, Goeckerman therapy represents a compelling alternative. Goeckerman therapy was first

Abbreviations used:

AD:	atopic dermatitis
CCT:	crude coal tar
CTCL:	cutaneous T-cell lymphoma
MTRH:	Moi Teaching and Referral Hospital
NB-UVB:	narrowband ultraviolet B
PsO:	psoriasis

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Table I. Demographics, diagnoses, treatment, and clinical outcomes of patients receiving modified Goeckerman therapy

Case	Age/ sex	Place of residence in Kenya	Diagnosis	Baseline BSA (%)	Combined NB-UVB + coal tar (d)	Coal tar alone (d)	Concurrent medications	Total (d)	Clearance* (%)	Adverse events
1	67/M	Kakamega	CTCL, plaque stage	70	10	10	MTX, clobetasol (10 d)	20	50	None
2	60/F	Elgeyo Marakwet	CTCL, plaque stage	40	10	4	MTX, clobetasol (10 d)	14	60	None
3	39/F	Kisii	CTCL, tumor stage	85	13	0	MTX, clobetasol (13 d)	13	50	None
4	54/F	Webuye	CTCL, plaque stage	70	12	0	Clobetasol (12 d)	12	40	None
5	21/M	Eldoret	Plaque PsO	70	10	0	Clobetasol (10 d)	10	45	None
6	40/F	Naivasha	Plaque PsO	85	11	5	MTX, clobetasol (10 d)	16	40	None
7	75/F	Ainabkoi	AD	98	10	7	MTX, clobetasol (10 d)	17	30	None

AD, Atopic dermatitis; *BSA*, body surface area; *CTCL*, cutaneous T-cell lymphoma; *MTX*, methotrexate; *NB-UVB*, ultraviolet B; *PsO*, psoriasis.
*Clearance calculated as the % improvement from baseline BSA.

described in 1925 by Dr William Goeckerman for the treatment of psoriasis (PsO) vulgaris.[7] It combines crude coal tar (CCT) application with NB-UVB phototherapy. Goeckerman therapy is highly effective for the treatment of PsO with several studies reporting that 100% of patients achieved a PASI-75 response within 1-3 months with remission lasting 6-8 months[8,9] Its use has also been explored in atopic dermatitis (AD) and other chronic cutaneous disorders, although published efficacy data remains limited.[10-12]

We present 7 Kenyan patients with PsO, AD, and CTCL treated with modified Goeckerman therapy, at MTRH in Eldoret, Kenya. All patients experienced marked clinical improvement following 10−20 days of treatment. To our knowledge, this is the first report demonstrating successful use of Goeckerman therapy in CTCL.

PATIENT SUMMARY

Seven patients with severe chronic inflammatory skin disease, including CTCL (n = 4), plaque PsO (n = 2), and AD (n = 1), were treated with modified Goeckerman therapy at MTRH in Eldoret, Kenya. Treatment was delivered in an inpatient setting, given the time-intensive nature of the therapy and the long travel distance (2-4 hours) for most patients in this case series. The modified protocol consisted of daily NB-UVB phototherapy combined with CCT, with some receiving additional days of CCT alone on weekends when phototherapy was unavailable, according to individual schedule. Adjunctive therapies included topical clobetasol propionate (n = 7, 100.0%), while several patients continued a stable regimen of oral methotrexate at a dose of 15 mg weekly (n = 5, 71.4%), which had been ineffective as first-line systemic monotherapy and was maintained at a constant dose throughout treatment without escalation. These patients were closely monitored for phototoxic reactions, with no increased phototoxicity observed.

The treatment protocol was adapted from previously published work in a resource-limited Kenyan setting.[13] In brief, patients were initiated on 2% CCT, which was escalated to 5% as tolerated, with occlusion using plastic wrap. All patients were Fitzpatrick skin types V-VI and were started on NB-UVB phototherapy at 350 mJ (type V) and 400 mJ (type VI), with gradual dose escalation of 60 mJ and 65 mJ, respectively, based on tolerance. This modified protocol differs from the traditional Goeckerman protocol by utilizing a shorter treatment period (approximately 2 weeks vs a minimum of 6 weeks).

Patients were majority female (n = 5, 71.4%) and had a mean age of 50.9 years (range: 21-75). Baseline body surface area involvement ranged from 40% to 98%, with disease duration spanning 3-20 years. Clinical improvement, defined as the percent reduction from baseline body surface area, was observed in all patients, with clearance ranging from 30% to 60% overtreatment durations of 10-20 days. Detailed patient characteristics and treatment regimens are summarized in Table I, while representative clinical responses are shown in Figs 1 to 3. Fig 1 depicts clinical responses in CTCL cases (Cases 1-4). Fig 2 illustrates plaque PsO cases (Cases 5-6), and Fig 3 demonstrates response in the AD case (Case 7).

DISCUSSION

In this case series, we present 7 patients with CTCL, PsO, and AD treated with modified Goeckerman

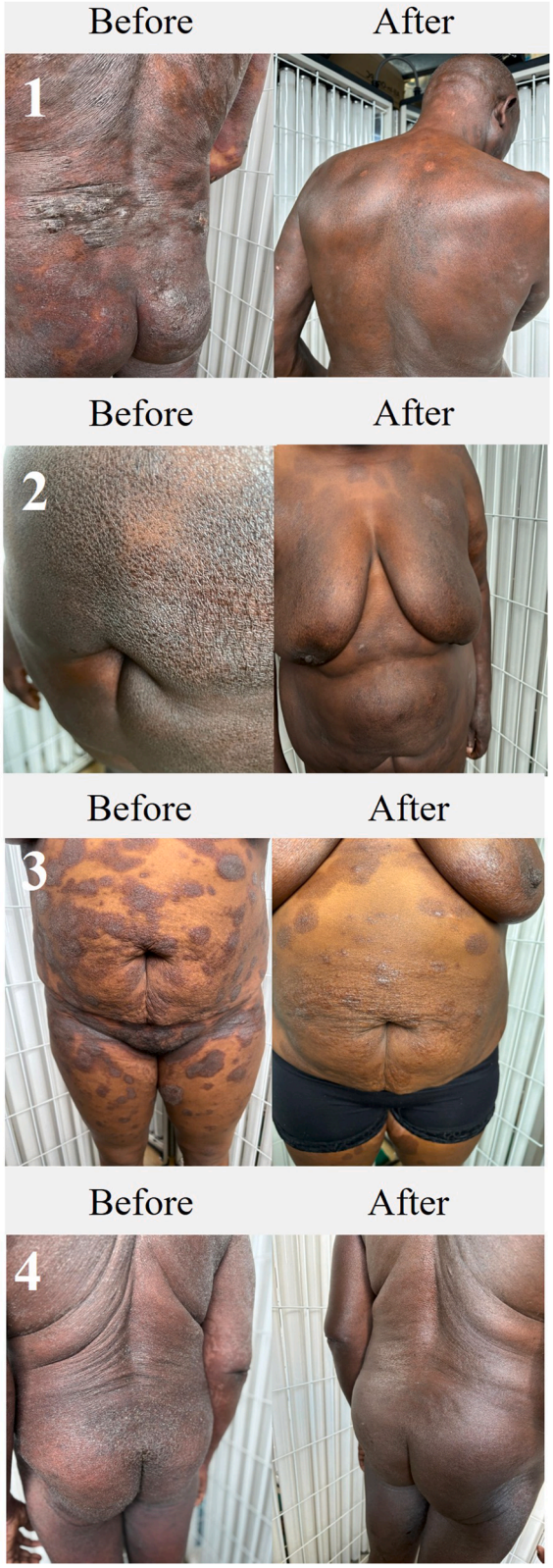

Fig 1. Clinical response in patients with CTCL treated with modified Goeckerman therapy (Cases 1-4). Representative before treatment and post treatment photographs demonstrate improvement in cutaneous disease following therapy. *CTCL*, Cutaneous T-cell lymphoma.

therapy at MTRH in Eldoret, Kenya. All patients demonstrated clinical improvement with a 30% to 60% reduction in body surface area following treatment. The therapy was well tolerated, with no patients reporting adverse effects including no side effects from the NB-UVB treatment.

Access to phototherapy remains limited across Africa, representing a significant unmet therapeutic need. The success described in this case series supports the rationale for establishing new services rather than serving as a barrier to implementation. Goeckerman therapy was selected specifically for its suitability in resource-limited settings. NB-UVB requires no complex drug supply chains, carries a favorable safety profile that minimizes the need for long-term cancer surveillance, and can treat a broad range of photoresponsive dermatoses with a single device. Although biologics have transformed the management of inflammatory skin diseases, access remains limited in sub-Saharan Africa due to cost, infrastructure constraints, and monitoring requirements.[3] In regions where the use of biologic therapies are not readily accessible, Goeckerman therapy offers a practical, efficacious, and affordable treatment option for managing inflammatory skin diseases.

Previous studies utilizing Goeckerman therapy have demonstrated high clearance rates in PsO and meaningful improvement in severe AD, with remission typically lasting 6-12 months and minimal adverse effects.[10] Our findings expand the clinical utility of the Goeckerman regimen beyond its well-established efficacy in PsO. To our knowledge, this is the first report of Goeckerman therapy in patients with CTCL, suggesting a potential broader clinical application.

Prior work by El Derouti has described a very unusual regimen for CTCL, consisting of coal tar combined with ultraviolet A therapy and compared this approach with Psoralen + ultraviolet A therapy alone.[14] There was no statistically significant difference in clinical outcome between the groups. In contrast, the Goeckerman therapy used in our study consisted of NB-UVB in combination with CCT, reflecting the traditional Goeckerman regimen. In CTCL, modified Goeckerman therapy may be most useful in patch/plaque stage disease. However, in tumor stage CTCL with extensive skin involvement modified Goeckerman may be helpful for symptom relief in conjunction with systemic oncologic therapies. For AD and PsO, modified Goeckerman can be beneficial in all severity types including patients refractory to topical steroids or methotrexate.

The mechanism of action of NB-UVB in CTCL is not fully understood but is thought to involve inhibition of

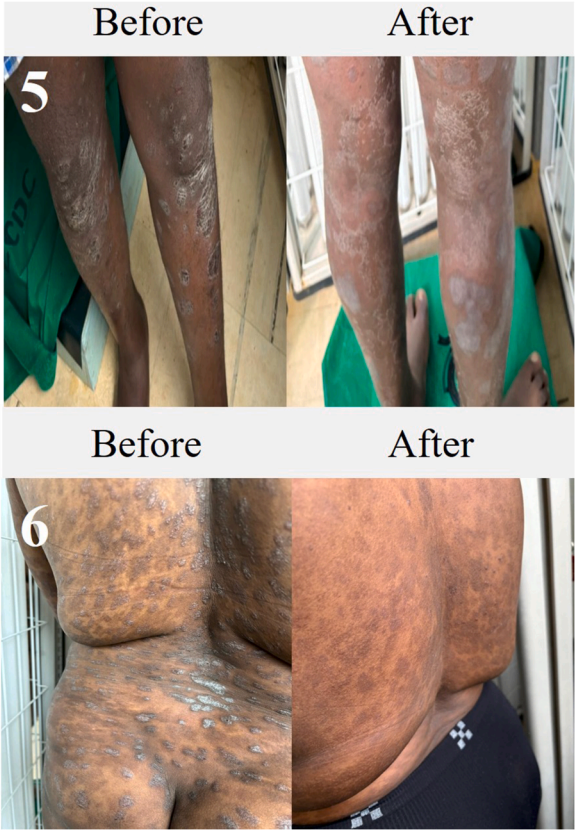

Fig 2. Clinical response in patients with plaque PsO treated with modified Goeckerman therapy (Cases 5-6). Representative before and after treatment photographs demonstrate improvement in cutaneous disease following therapy. *PsO*, Psoriasis.

Langerhans cell antigen presentation, dysregulation of inflammatory cytokines, and apoptosis of neoplastic T lymphocytes.[15] Coal tar may complement these effects by independently reducing T-lymphocyte numbers in the skin, inhibiting keratinocyte proliferation, and modulating cytokine expression.[4] Together, these mechanisms provide a strong therapeutic rationale for the Goeckerman approach in CTCL. The Goeckerman protocol used in this series was adapted to better suit the needs of the local patient population.[13] The treatment course was shortened to approximately 2 weeks, reducing barriers to accessing and completing therapy. However, this adaptation may limit the overall therapeutic effect, as prior studies in PsO have primarily evaluated 1-3-month treatment durations.[8,9] Additional limitations of this study include the small sample size and limited follow-up duration, which precludes our ability to draw conclusions about long-term remission.

In conclusion, this case series suggests the broader clinical utility of Goeckerman therapy as a feasible and affordable treatment for severe inflammatory skin diseases in settings where systemic and biologic therapies are less readily available. The inclusion of patients with CTCL is a unique aspect of this case series and adds to the limited existing literature on the potential use of Goeckerman therapy in this context. While these cases demonstrate that Goeckerman therapy can be adapted for diverse dermatologic conditions in a resource-constrained environment, further studies with larger cohorts and longer follow-up are needed to better define its efficacy and role in clinical practice.

Fig 3. Clinical response in a patient with AD treated with modified Goeckerman therapy (Case 7). Representative before and after treatment photographs demonstrate improvement in cutaneous disease following therapy. *AD*, Atopic dermatitis.

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Conflicts of interest

Author Gupta is a consultant for Cabaletta Bio. Dr Liao is a consultant for AbbVie. Authors Kemeness, Schandua, Muraguri, Cheruiyot, Biwott, Rose Boit, Marquez-Grap, Leung, Juli Boit, Kiprono, and Drs Spangenberg, Kranyak, and Maurer have no conflicts of interest to declare.

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