

CLINICAL REPORT

Is There an Additional Value of Inpatient Treatment for Patients with Atopic Dermatitis?

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An inpatient treatment and education programme has been developed for patients with difficult to control atopic dermatitis (AD), with the aim of achieving adequate self-management and long-term disease control. This observational study included adult patients diagnosed with difficult to control AD, admitted for a structured inpatient treatment and education programme. The primary outcome was the Six Area, Six Sign Atopic Dermatitis (SASSAD) score. In total, 79 patients (mean \pm SD age 38.8 ± 17.1 years) were included. The median duration of hospitalization was 11 days (interquartile range 8–14). The mean percentage decrease in SASSAD score between admission and discharge was 60.7%, of which 64 (81.0%) patients achieved SASSAD50. The mean percentage decrease in SASSAD score was 69.0% during follow-up, of which 63 (79.7%) patients still had a SASSAD50. In the majority of these patients with difficult to control AD the admission resulted in sustained disease control. This could be achieved by optimization of treatment with topical corticosteroids. Key words: atopic dermatitis; admission; hospitalization; education; self-management.

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Atopic dermatitis (AD) is a chronic relapsing skin disease resulting from complex interactions between genetic and environmental factors (1–3). Health-related quality of life is worsened in AD due to its negative influence on work, self-confidence, sport, sleep and social interaction. This may result in loss of social functioning and psychological wellbeing (4–6).

In the majority of patients, AD can be controlled adequately with topical corticosteroids, topical immunomodulators, coal-tar preparations, and/or ultraviolet phototherapy. Despite these therapeutic options, a subgroup of patients with difficult to control AD remains; in this group treatment with oral immunosuppressive drugs is sometimes required to achieve disease control.

Education to enhance disease knowledge, psychological improvement in disease perception and scratch control behaviour modification, together with regular daily treatment, will lead to better skin care. Previous studies have shown an improvement in disease control and quality of life resulting from education about AD; in particular, time spent with the patient and the qualification of the trainer are important in order to achieve a positive outcome (7–9).

The Department of Dermatology at the University Medical Center Utrecht (UMCU) has a multidisciplinary team consisting of dermatologists, dermatological nurses, social workers, dieticians and other specialists, to instruct and support patients with AD at the outpatient clinic. All patients are informed about the chronicity of the disease, the use of topical corticosteroids, how to cope with exacerbations, itch, and, if necessary, psychosocial care (10). The majority of patients can control their eczema after adequate instruction and further support delivered by dermatological nurses in an outpatient setting, face-to-face or online. However, in patients with more severe and extensive eczema, this treatment requires a lot of effort and motivation. Treatment may fail due to inability to combine time spent on treatment with work, family activities and social activities. Patients are sometimes too exhausted due to sleep deprivation to be able to deal with intensive topical therapy. Other factors responsible for outpatient treatment failure are psychosocial factors; for instance, depression or lack of social support.

To improve therapy outcome for patients with difficult to control AD, a standardized inpatient treatment and education programme has been developed. The aim of the present observational study was to evaluate the efficacy of an inpatient treatment and education programme for patients with AD.

METHODS

Patient selection and intervention

This observational study included patients with difficult to control AD in an outpatient setting admitted to the clinical Department of Dermatology at the UMCU between March 2010 and data lock in January 2014. Inclusion criteria were the availability of the Six Area, Six Sign Atopic Dermatitis

(SASSAD) score at admission, discharge and follow-up (until 3 months after discharge) (11). All patients were diagnosed with AD according to the criteria of Hanifin & Rajka (12) or the criteria of Williams (13). Only the first admission of patients with more than one admission to the UMCU was evaluated. Some patients had earlier admissions to other hospitals; however, not according to a structured treatment and education programme.

During admission, all patients received a structured treatment and education programme according to the protocol for inpatient treatment (Fig. 1). Patients were treated with topical corticosteroids class III (potent corticosteroids). Some patients received additional treatment with oral immunosuppressive drugs, antihistamines and antibiotics. In all patients treatment with emollients was optimized; together with the patient different emollients were tested in order to choose the most comfortable one for body and face. Specialized nurses taught the patients how to use the topical treatment (fingertip unit, use of a tapering schedule) and how to relieve itch and to cope with (nocturnal) itch attacks and scratching (14). The treatment of other atopic diseases was optimized with consultations of other specialists. Patients were offered self-management training, with attention on coping with AD and the consequences of AD in daily life.

After inpatient treatment, a visit to the multidisciplinary outpatient clinic was scheduled (<3 months after discharge) to monitor disease activity and to evaluate self-management and reintegration. During follow-up the use of topical corticosteroids was tapered to a safe maintenance scheme.

Thereafter, visits to the outpatient clinic were performed only if indicated. A personal digital eczema portal to communicate with the dermatological nurse remained available for all patients (15).

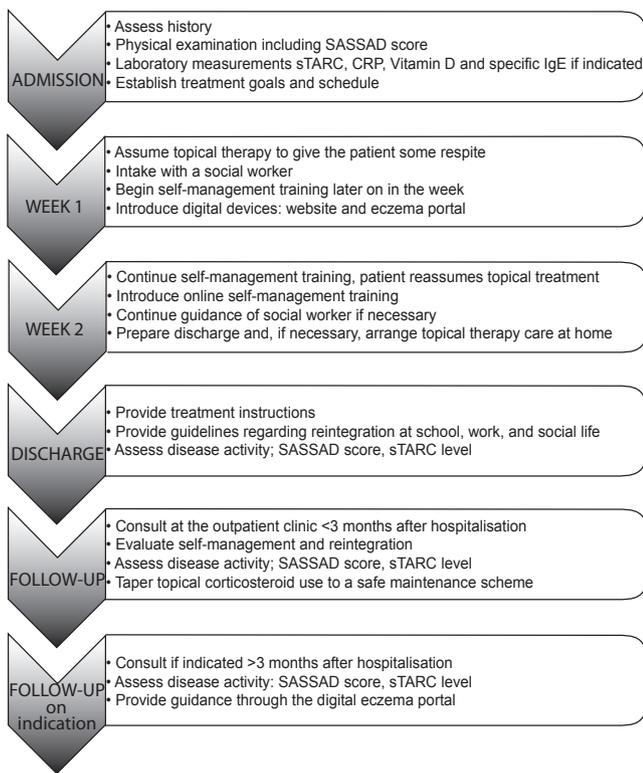


Fig. 1. Clinical treatment and education programme for patients with difficult to control atopic dermatitis (AD) in the University Medical Center Utrecht (UMCU).

Outcome measures and data analysis

The primary outcome was the SASSAD score. Secondary outcome parameters included serum thymus and activation-regulated chemokine (sTARC) level and the need for oral immunosuppressive treatment to achieve controlled AD (16, 17).

Statistical analysis of the data was performed using SPSS 21.0 (SPSS Inc. Chicago IL, USA). Descriptive statistics were used to describe patient characteristics. Data description was based on means \pm SD and median (IQR) for continuous end-points and on frequencies for categorical variables. SASSAD50 (score reduction of 50% or more) and SASSAD75 (score reduction of 75% or more) were calculated for admission – discharge and admission – follow-up. Mean SASSAD scores were compared using the paired sample *t*-test. sTARC and the need for oral immunosuppressive treatment were compared between admission and discharge, and discharge and follow-up using the Wilcoxon signed-rank test and McNemar test. *p*-values <0.05 were considered statistically significant. Subgroup analysis of patients was performed with both a structured multidisciplinary outpatient treatment as inpatient treatment and patients with direct inpatient treatment. To evaluate the effectiveness of the outpatient treatment, SASSAD scores before outpatient treatment of patients with a multidisciplinary outpatient treatment were collected and compared with the SASSAD score at admission using the paired sample *t*-test.

RESULTS

Patient characteristics

In total, 79 patients, with a mean \pm SD age of 38.8 ± 17.1 years were included, of whom 38 (48.1%) were male. The indication for admission in all patients was failure or expected failure of treatment in an outpatient setting. Thirty-six (45.6%) patients had both a structured multidisciplinary outpatient treatment and inpatient treatment. Forty-three (54.4%) patients were admitted at their first outpatient consultation. Comparison of the characteristics of patients with both multidisciplinary outpatient treatment and inpatient treatment and direct inpatient treatment showed no significant differences with respect to SASSAD scores at admission (data not shown).

Table I shows the therapeutic history of the patients; 51 (64.6%) patients had used oral immunosuppressive drugs in the past; 19 patients (24.1%) had admissions for AD in the past. The numbers of patients known to

Table I. Therapeutic history^a

	n (%)
Topical treatment only	11 (13.9)
Oral immunosuppressive drugs	17 (21.5)
Oral immunosuppressive drugs and phototherapy	22 (27.8)
Oral immunosuppressive drugs and previous admission ^b	3 (3.8)
Oral immunosuppressive drugs, phototherapy and previous admission ^b	9 (11.4)
Phototherapy	10 (12.7)
Phototherapy and previous admission	5 (6.3)
Previous admission ^b	2 (2.5)

^aAll patients used topical corticosteroids. ^bPrevious admission before March 1, 2010.

have psychiatric comorbidities were as follow: 4 with depression or anxiety disorder, 3 with an autism spectrum disorder, 2 with bipolar disorder, and one with mental retardation.

Hospitalization period

The median duration of hospitalization was 11 days (IQR 8–14). At discharge, 64 (81.0%) patients achieved SASSAD50. Thirty-four (43.0%) patients achieved SASSAD75. The mean percentage decrease in SASSAD score between admission and discharge was 60.7%; the mean ± SD SASSAD decreased significantly from 34 ± 13.2 at admission to 11 ± 6.7 at discharge ($p < 0.001$). The individual course of SASSAD scores between admission and discharge for all patients is shown in Fig. 2.

Median sTARC was significantly lower at discharge (892 pg/ml; IQR 507–1,919) compared with admission (5,717 pg/ml; IQR 2,061–10,615) ($p < 0.001$) (sTARC missing in 25 patients).

In 59 (74.7%) patients controlled AD was achieved using only topical corticosteroids. In 6 patients (7.6%), admitted with uncontrolled AD despite the use of oral immunosuppressive drugs, AD control was achieved by optimizing additional topical treatment with corticosteroids. In 1 (1.3%) patient AD was insufficiently controlled with topical corticosteroids during hospitalization, and therefore treatment with an oral immunosuppressive drug was added. In 13 (16.5%) patients it was possible to discontinue treatment with an oral immunosuppressive drug, and to achieve adequate disease control using only topical corticosteroids.

There was a significant decrease between admission and discharge in the number of patients needing oral immunosuppressive drugs to achieve controlled AD ($p = 0.002$) (Table II).

Follow-up (< 3 months)

At the time of the follow-up visit in the outpatient clinic, 63 (79.7%) patients had still achieved a SASSAD50. Forty-four (55.7%) patients had achieved a SASSAD75. The mean ± SD SASSAD at follow-up (9 ± 7.4) was not

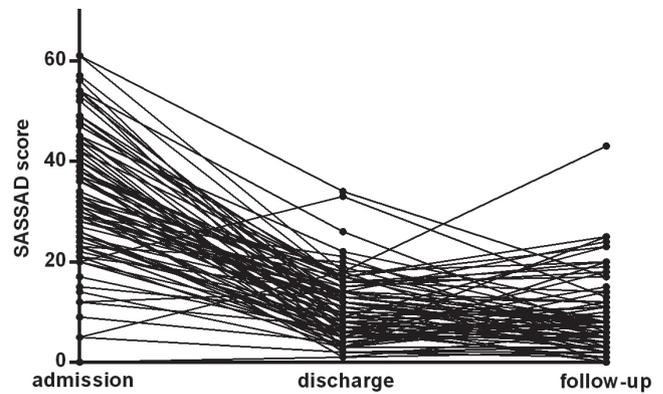


Fig. 2. Course of Six Area, Six Sign Atopic Dermatitis (SASSAD) score at admission, discharge and follow-up.

significantly different compared with the mean ± SD SASSAD at discharge (11 ± 6.7) ($p = 0.154$). The mean percentage decrease in SASSAD score at follow-up was 69.0% compared with admission. The individual course of SASSAD score between discharge and follow-up for all patients is shown in Fig. 2.

sTARC levels were not significantly different between discharge (1,133 pg/ml; IQR 528–2,065) and follow-up (911 pg/ml; IQR 555–1,623) ($p = 0.674$) (sTARC missing in 37 patients). There was no significant difference in the need for oral immunosuppressive drugs to achieve controlled AD during follow-up compared with discharge ($p = 0.500$). In 3 (3.1%) patients a readmission < 3 months after discharge was indicated.

Long-term follow-up (> 9–< 12 months)

Twenty-eight patients still visited the outpatient clinic > 9 months after discharge. At follow-up (> 9 – < 12 months), 21 (75.0%) patients still had a SASSAD50 and 8 (27.6%) patients a SASSAD75. The mean percentage decrease in SASSAD score was 52.4% during long-term follow-up compared with admission. Five (17.9%) patients started oral immunosuppressive drugs due to insufficient disease control with topical treatment. Twenty-three (82.1%) patients had sufficient control of AD with topical corticosteroids. In another 6 (6.1%) patients a readmission < 12 months after discharge was indicated.

Table II. Six Area, Six Sign Atopic Dermatitis (SASSAD) and treatment need at admission, discharge and follow-up (3 months)

	Admission	Discharge	Follow-up	Admission – discharge <i>p</i> -value	Discharge – follow-up <i>p</i> -value
SASSAD, mean ± SD	34 ± 13.2	11 ± 6.7	9 ± 7.4	0.001 ^a	0.154 ^a
SASSAD50, <i>n</i> (%)		64 (81.0)	63 (79.7)		
SASSAD75, <i>n</i> (%)		34 (43.0)	44 (55.7)		
Treatment need, <i>n</i> (%)					
Topical corticosteroids monotherapy	60 (75.9)	72 (91.1)	70 (88.6)	0.002 ^b	0.500 ^b
Oral immunosuppressive drugs	19 (24.1)	7 (8.9)	9 (11.4)		

^aPaired sample *t*-test. ^bMcNemar test. SD: standard deviation.

DISCUSSION

The present study shows a significant and sustained clinical effect of an inpatient treatment and education programme in a large group of patients with difficult to control AD. This study showed that patients with difficult to control AD were not always difficult to treat. Although, more than 60% of the patients had a history of oral immunosuppressive drug use for AD, suggesting difficult to treat AD, disease control with topical treatment was achieved with an inpatient treatment and education programme and psychosocial support in the majority of patients.

All patients had difficult to control AD in an outpatient setting. In half of the patients, multidisciplinary care in our outpatient clinic, sometimes in combination with oral immunosuppressive drugs, was insufficient. In the other half of the patients exhaustion, psychological and psychosocial disturbance/disruption were a reason for admission at the first presentation in our centre. An alternative treatment option for these patients would be starting oral immunosuppressive drugs or increasing the dose of the oral immunosuppressant already used. The results of this study show that controlled AD was achieved by optimizing topical treatment with corticosteroids in the majority of these patients. Treatment with oral immunosuppressive drugs was no longer indicated or was discontinued. The fact that, at admission, 19 (24.1%) of 79 patients were treated with oral immunosuppressive drugs and, at follow-up, only 9 (11.4%) patients were being treated with these drugs, underlines the additional value of the clinical treatment and education programme.

In the first week of the inpatient programme, the main treatment goals were to optimize topical treatment, including topical corticosteroids and emollients, and to identify the barriers to adequate treatment at home. In the second week the patient was actively involved in application of topical treatment, with strong emphasis on self-management and coping with exacerbations of AD. Great attention was paid to acquiring skills to incorporate skin treatment in daily life at home. Relatives or community care were involved in the treatment and education programme if indicated.

Previous studies on the effect of inpatient treatment of AD show comparable results in smaller patient groups (6, 18–20). Quality of life before and after hospitalization was the outcome in the majority of these studies. Only 2 studies determined clinical skin scores and sTARC levels and one study reported follow-up data. The type of treatment and structure of the programme of the hospitalization period was often not discussed.

Improvements in disease control and quality of life can also be achieved after education and training in outpatient settings, such as outpatient clinics, day-care units and eczema schools (7–9). Although the majority

of patients with AD benefit from these training programmes, there is a subgroup who are still not able to control their eczema. This was the situation in half of the patients in our study. In the other half of patients in our study, admission was indicated because of exhaustion, psychological and psychosocial disturbance/disruption.

Time to rest and getting out of the daily routine are major advantages of an inpatient treatment and education programme. In addition, support from the dermatological nurse during nocturnal itch attacks and a complete focus on the skin are factors that contribute to success.

The present study showed a rapid improvement in severity of AD in the majority of the patients between admission and discharge, and a sustained improvement during follow-up. The long-term effect of the clinical treatment and education programme is difficult to measure in a daily practice setting. The primary aim of the programme is to improve self-management. Therefore, follow-up visits >3 months after discharge were performed only when indicated; for instance, in case of exacerbations, need for psychosocial support or safety monitoring of oral immunosuppressive treatment. Therefore, SASSAD scores of patients with follow-up >9 months probably represent a selection of patients with more severe disease (17.9% of these patients were treated with oral immunosuppressive drugs).

Some patients were admitted despite low SASSAD scores. The indications for hospitalization in these patients were: severe eczema around the eyes, exhaustion caused by the AD and psychosocial problems. In 2 patients the SASSAD score was increased at discharge compared with admission. In the first patient treatment with extended release tacrolimus had to be tapered due to side-effects during admission. In the second patient an improvement in AD during hospitalization is described in the medical records. This anomalous result might be attributed to the inter-observer variability of the SASSAD score (21).

The clinical treatment and education programme was not successful for all patients. In 3 (3.1%) patients readmission <3 months after discharge was indicated. In another 6 (6.1%) patients readmission <12 months after discharge was indicated due to non-compliance, significant psychosocial problems and co-morbidity. In the majority of these patients controlled AD was achieved after readmission.

The current study has several limitations. It was an observational daily practice study, and therefore no control group was included. A subgroup analysis of patients with both a structured inpatient as outpatient treatment showed that the outpatient treatment was unsuccessful as there was no significant difference between the SASSAD scores of patients before and after outpatient treatment (data not shown). This supports the fact that the multidisciplinary outpatient treatment

was of insufficient effect and these patients could act as their own control.

For further studies it would be interesting to compare our inpatient programme to a 2–3 week intervention with fast-acting oral immunosuppressive drugs combined with education and self-management training in an outpatient setting. Another limitation of our study is that no patient-reported outcomes measures (PROMs) were included. In the current programme the Patient-Oriented Eczema Measure (POEM) and Dermatology Quality of Life Index (DLQI) are used in the follow-up of all patients, including the patients who do not have scheduled visits.

In conclusion, a structured inpatient treatment and education programme for adult patients with uncontrolled AD in an outpatient setting is effective in the majority of patients and therefore may prevent or delay systemic immunosuppressive treatment. To assess long-term efficacy PROMs, such as POEM, should be included in further studies.

The authors declare no conflict of interest.

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