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Out-Patient Treatment of Atopic Dermatitis with Crude Coal Tar

Abstract

Background: Patients with atopic dermatitis benefit from treatment with crude coal tar. We started a program for the treatment of patients with atopic dermatitis in an out-patient facility using intermittent applications of crude coal tar. Objective: To study the efficacy and feasibility of an out-patient regimen using crude coal tar in atopic dermatitis. Methods: We treated 18 patients in the out-patient setting. A trained nurse and after thorough instruction the patients themselves at home applied crude coal tar in a zinc paste 2 or 3 times a week. We studied the improvement by visual scoring and compared the results with patients treated with daily applications at the in-patient department. Results: The improvement was comparable at the end of the treatment period for both settings. The treatment period, however, was longer for the patients treated in the out-patient setting. Conclusion: The out-patient programme proved to be an efficacious and a well-appreciated approach.

Crude coal tar has a history of many centuries in the treatment of skin disorders. Already Hippocrates treated patients with inflammatory skin conditions with tar preparations [1].

It is effective in the treatment of chronic lesions in atopic dermatitis and may be a substitute for long-term treatment with topical corticosteroids [2]. Coal tar is manufactured as crude coal tar (pix lithantraeis) or as an alcoholic extraction designated as solutio carbonis detergens. Although animal experiments and industrial exposure to crude coal tar indicate that tar preparations have a carcinogenic potential [3–7], clinical studies suggest that therapeutic applications are safe [8–11]. Other treatments such as corticosteroids, cyclosporin and phototherapy are effective to varying extent in atopic dermatitis, however side effects limit the application of these treatments.

Crude coal tar is mainly used in an in-patient setting. At the out-patient department this treatment is less popular as it stains and smells. From a cosmetic point of view solutio carbonis detergens is more popular as home treatment. The efficacy of solutio carbonis detergens is inferior to the efficacy of crude coal tar [2]. An alternative for the in-patient treatment of atopic dermatitis might be intermittent treatment with crude coal tar at the out-patient department. To the best of our knowledge, a comparative study between daily applications of crude coal tar (in-patient department) and intermittent applications (3 times per week at the out-patient department) has never been carried out. An effective intermittent treatment with coal tar at the out-patient department obviously would be advantageous from a socioeconomic point of view.

Recently, an intensive out-patient treatment programme was developed which consists in daily treatment with crude coal tar 1.5–5% in zinc paste. During the first week a specially trained nursing staff carried out the applications, whilst instructing the patients. After the patients had learned how to do it correctly themselves with the help of their partners, they carried out the treatments at home.
However, once a week the treatment was carried out at the out-patient department.

In the present study, clinical improvement and acceptability of the intensive out-patient schedule for intermittent tar treatments was compared with the in-patient treatment with daily applications of crude coal tar. In total, 37 patients were included for either (i) daily in-patient treatment with crude coal tar or (ii) intermittent out-patient treatment with crude coal tar. Clinical improvement and patients’ acceptability were assessed by the same investigator in both protocols.

**Patients and Methods**

**Treatment Protocols**

The intensive out-patient tar treatment protocol was carried out by a nursing staff, trained in these treatments. The patients visited the treatment unit 2 or 3 times weekly, depending on the degree of involvement. Following the application of the tar preparation the skin was protected by Tubifast Bandages (Seton Health Care Group, Oldham, UK). After the patient had learned how to carry out the treatments, she or he visited the unit once a week for treatment and instruction whilst the remaining applications were carried out by the patient at home. If the skin of the face was affected we applied clobetasol butyrate cream intermittently and solutio carbonis detergens 25% in equal parts of white petrolatum and lanettewax cream. In the first week of treatment betametasone valerate cream was applied underneath the tar on very active lesions. If the skin was very dry solutio carbonis detergens 10% in equal parts white petrolatum and lanettewax was applied underneath the tar.

The in-patient tar treatment protocol was carried out by a well-trained nursing staff. Tar applications are carried out by the nurses. Again, following the application of the tar preparation Tubifast Bandages were applied. If active lesions were present topical corticosteroids were used during a few days.

Tar preparations consisted of crude coal tar 1.5–5% in zinc. In general, the concentration of coal tar was 5%. The concentration was reduced in case of irritation.

**Patients**

Between October 1993 and July 1994 in total 37 patients with atopic dermatitis were included. Patients were selected older than 18 years. We included 18 patients (mean age 25 years; 8 males and 10 females) treated in the out-patient facility and 19 patients (mean age 31; 3 males and 16 females) treated in the in-patient department. Patients fulfilled the diagnostic criteria according to Hanifin and Rajka [12]. Patients with erythroderma or systemic treatment of their skin disease were excluded. All patients had not responded satisfactorily to the usual out-patient treatments such as topical corticosteroids and tar preparations. The inclusion for the in-patient regimen and the intensified out-patient regimen was not at random. If patients were living at a large distance from our center they were more likely to be included for in-patient treatment. If patients had a demanding social life, in general these patients were more likely to be included for treatment at the out-patient unit. Information concerning the extent of the lesions is listed in table 1.

### Table 1. Extent of lesions

<table>
<thead>
<tr>
<th>Number of patients</th>
<th>Costa score (range)</th>
<th>Costa score (median)</th>
<th>Costa score (mean ± SD)</th>
</tr>
</thead>
<tbody>
<tr>
<td>In-patient treatment</td>
<td>18</td>
<td>25–65</td>
<td>46</td>
</tr>
<tr>
<td>Intensive out-patient treatment</td>
<td>19</td>
<td>34–79</td>
<td>50</td>
</tr>
</tbody>
</table>

**Evaluation of Treatment Results**

Before treatment and at weekly intervals assessment of the severity scores were carried out by the same investigator using a scoring system simplified as suggested by Costa et al. [13].

The system consists of 10 severity criteria (erythema, edema, vesicles, crusts, excoriations, scaling, lichenification, depigmentation, pruritus and sleeplessness). The criteria were graded: 0 = absent; 1 = slight; 2 = moderate; 3 = severe. We scored 5 symmetrical areas (arms, hands, knees, legs and feet) and 4 asymmetrical areas (scalp, face, anterior aspect of the trunk and nates) according to the listed criteria.

The extent of the lesions was graded: 0 = 0%; 1 = 1–25%; 2 = 26–50%; 3 = 51–75%; 4 = 76–100%.

A total score for the severity criteria was calculated by adding up and multiplying by 2.

The extent of the lesions was calculated by adding up the scores of both symmetrical areas each and the scores of the asymmetrical areas. The final score was calculated by adding up the score for the severity criteria and the score for the extent of the lesions.

Statistical analysis of the scores was carried out using a nonparametric test: Mann-Whitney test. Correlation between Costa scores before treatment and the treatment period was assessed using the Spearman's rank coefficient. p < 0.05 was designated to be statistically significant.

**Results**

For intensive out-patient treatment with tar and for in-patient treatment 18 and 19 patients, respectively, were included. Relatively more female patients were admitted at the in-patient department. No significant difference could be observed between the in-patient group and the out-patient group with respect to the Costa scores before treatment.

In table 2 the percentage of patients with early withdrawal are listed. Withdrawal type I was defined as an unsatisfactorily response without significant improvement during 3 weeks. Withdrawal type II relates to patients who regarded the treatment unacceptable for personal reasons (e.g. too time-consuming). Three patients (18%) regarded this treatment as unacceptable.
Table 2. Withdrawals during treatments

<table>
<thead>
<tr>
<th>Type I withdrawal</th>
<th>Type II withdrawal</th>
</tr>
</thead>
<tbody>
<tr>
<td>n</td>
<td>%</td>
</tr>
<tr>
<td>Intensive out-patient treatment</td>
<td>0</td>
</tr>
<tr>
<td>In-patient treatment</td>
<td>0</td>
</tr>
</tbody>
</table>

Table 3. Total treatment period and Costa scores after treatments (mean ± SD)

<table>
<thead>
<tr>
<th></th>
<th>Total treatment period weeks</th>
<th>Average decreases of Costa scores</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intensive out-patient treatment</td>
<td>6.1 ± 1.5</td>
<td>29.5 ± 9.5</td>
</tr>
<tr>
<td>In-patient treatment</td>
<td>3.7 ± 1.0</td>
<td>35.0 ± 10.9</td>
</tr>
</tbody>
</table>

Table 4. Effect of treatment schedules on daily activities

<table>
<thead>
<tr>
<th></th>
<th>Discontinuation</th>
<th>Impairment of daily work</th>
<th>Impairment of daily life</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>% patients</td>
<td>days/week</td>
<td>% patients</td>
</tr>
<tr>
<td>Intensive out-patient treatment</td>
<td>71</td>
<td>3.7</td>
<td>83</td>
</tr>
<tr>
<td>In-patient treatment</td>
<td>100</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

The duration of treatments before a moderate (Δ Costa score between 50 and 60%), pronounced (Δ Costa score between 60 and 70%) and an excellent (Δ Costa score more than 70%) response were reached, are summarized in figure 1. No statistically significant difference could be shown between both treatment protocols. The total durations of the treatments are summarized in table 3. It can be seen that the total treatment period was longer at the unit for intensified out-patient treatment compared to the treatment period at the in-patient department. The decrease of the Costa scores during treatment was comparable for both treatment settings.

At the unit for intensive out-patient treatment 71% of the patients were absent from their work for an average of 3.7 days per week. Impairment of daily work at home and impairment of quality of life was experienced by 83 and 92%, respectively, of the patients at the out-patient unit. Table 4 summarizes these aspects.

Discussion

Efficacy analysis of the protocols for intensive out-patient tar treatment and in-patient tar treatment revealed that both treatments were highly effective in patients with atopic dermatitis. The treatment periods before a moderate, pronounced and excellent improvement had been reached were comparable for both protocols, although the treatment periods tended to be longer at the intensive unit for outpatient treatments. The total treatment periods, again, tended to be longer at the out-patient unit compared to the in-patient department. The longer duration can be explained by a tapering-off period instituted in the out-patient department facility in order to avoid fast recurrences. The clinical improvement at the end of the treatment was comparable for the two regimens. It is of interest that the intermittent tar applications (2-3 times per week) are not inferior to the classical daily applications. The combined treatment-instruction programme proved to be a successful approach. No single patient discontinued treatment at the in-patient or outpatient unit due to inefficacy.

The intensified out-patient treatment protocol was well appreciated by the patients. After a stay of 1-2 h at the treatment unit, the patients returned to home or work and following the instructions the patients were able to carry out the treatments at home. However, 71% of the patients had to refrain from work or school for an average of 3.7 days.
per week. In 83% of the patients daily work at home or daily life was impaired. In 18% of the patients treatment had to be discontinued for personal reasons. Of course the load of atopic dermatitis and the load of the treatment on daily life might be of relevance in this respect.

As the present study is uncontrolled without at-random allocation preselection might be a serious bias. However, the severity of atopic dermatitis was comparable for both the in-patient and the out-patient schedules.

In conclusion, the efficacy of intermittent tar applications at the intensive out-patient unit proved to be comparable with daily tar applications at the in-patient department. In general, the patients felt that it was advantageous to be treated at the out-patient unit. However, the severity of atopic dermatitis and/or the load of the tar treatment caused a substantial impairment of daily life in a significant number of patients treated at the intensive treatment unit of the out-patient facility.

References