

## Localized hyperhidrosis treated with aluminum chloride in a salicylic acid gel base

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A total of 238 patients with a clinical diagnosis of localized hyperhidrosis (HH) were treated on 332 anatomic sites (axillae, feet, hands, and groin). The purpose of the study was to evaluate the effectiveness of aluminum chloride hexahydrate (AC), in a salicylic acid gel base (SAGB) containing 4% salicylic acid (SA), for the treatment of localized HH. The SAGB was similar to a keratolytic gel,<sup>1</sup> Keralyt® (Westwood Squibb). Because SAGB and anhydrous alcohol (AA), the standard vehicle for AC, have different consistencies, double blinding was not possible. Bromhidrosis (BH) was documented when present, whether of apocrine (axillae and groin) or eccrine (feet) origin. For the sake of uniformity, AC in SAGB was compounded by the same pharmacist. The concentration of AC varied from 10 to 40%, depending on the site to be treated. The improvement of HH was subjectively assessed through a questionnaire as follows: nil = no improvement; poor = <25%; fair = 25–50%; good = 50–75%; and excellent = >75%.

*Armpits:* 20% AC was used to control axillary HH. When 20% AC failed to control HH, its concentration was gradually increased to 25% and, rarely, to 30%. When irritation occurred, the concentration of AC was decreased to 15 or 10%, and 1% hydrocortisone (HC) was added to the preparation. Patients were instructed to apply the medication initially 2–3 nights per week, gradually decreasing the frequency as required. When possible, only the active focal area of HH was treated.<sup>2</sup> As with AC in AA, the medication was applied at bedtime. Patients were instructed to avoid rubbing and the application of the medication on recently shaved skin.

*Hands and feet:* for these areas, the concentration of AC was 30% initially, but could be increased up to 40% if necessary.<sup>3</sup> Application was daily at bedtime, and later at gradually longer intervals. Occlusion was never used.

### Results

The results are shown in Fig. 1. *Axillae:* excellent, 94 (67.7%); good, 36 (25.9%); fair, 5 (3.6%); nil, 4 (2.9%). *Hands:* excellent, 19 (39.6%); good, 10 (20.8%); fair, 9 (18.8%); poor, 4 (8.3%); nil, 4 (2.9%). *Feet:* excellent, 71 (51.1%); good, 45 (32.4%); fair, 14 (10.1%); nil, 9 (6.5%). *Groin:* excellent, 3 (50%); good, 3 (50%).

Within the study group, 29 cases were found to be former aluminum chloride hexahydrate (AC) in anhydrous alcohol (AA) failures. They were treated on 44 anatomic sites. The self-evaluation results are illustrated in Fig. 2. *Axillae:* excellent, 10 (47.6%); good, 8 (38.1%); fair, 1 (4.8%); nil, 2 (9.5%). *Hands:* excellent, 4 (44.4%); good, 1 (11.1%); fair, 2 (22.2%); nil, 2 (22.2%). *Feet:* excellent, 6 (46%); good, 5 (38.5%); fair, 1 (7.7%). *Groin:* excellent, 1 (100%).

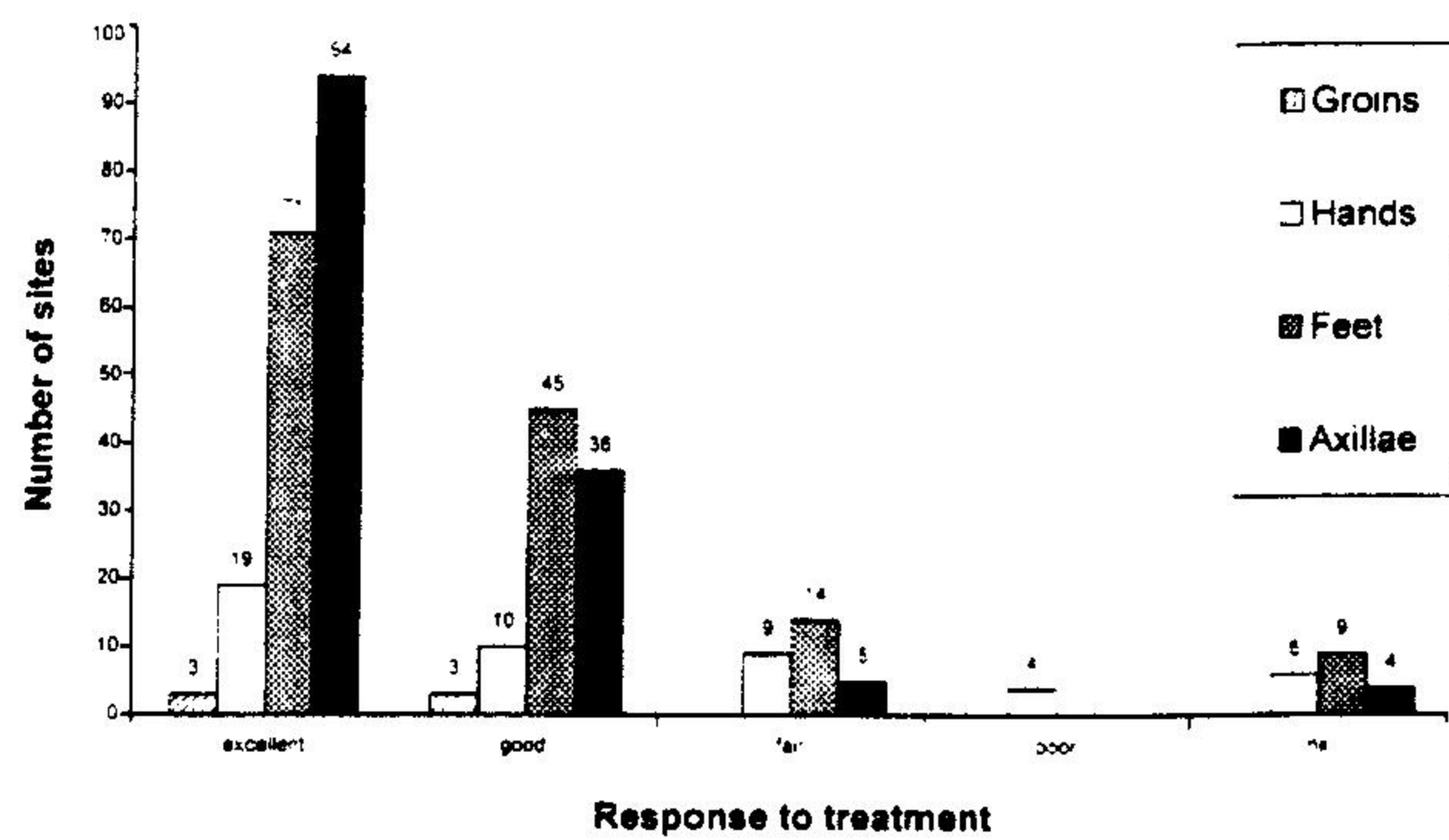
Bromhidrosis (BH) was documented in 116 patients. There were 35 cases of apocrine BH (29 axillary and 6 inguinal) and 81 cases of eccrine (plantar) BH; 100% of the patients were relieved from their BH regardless of the type.

### Discussion

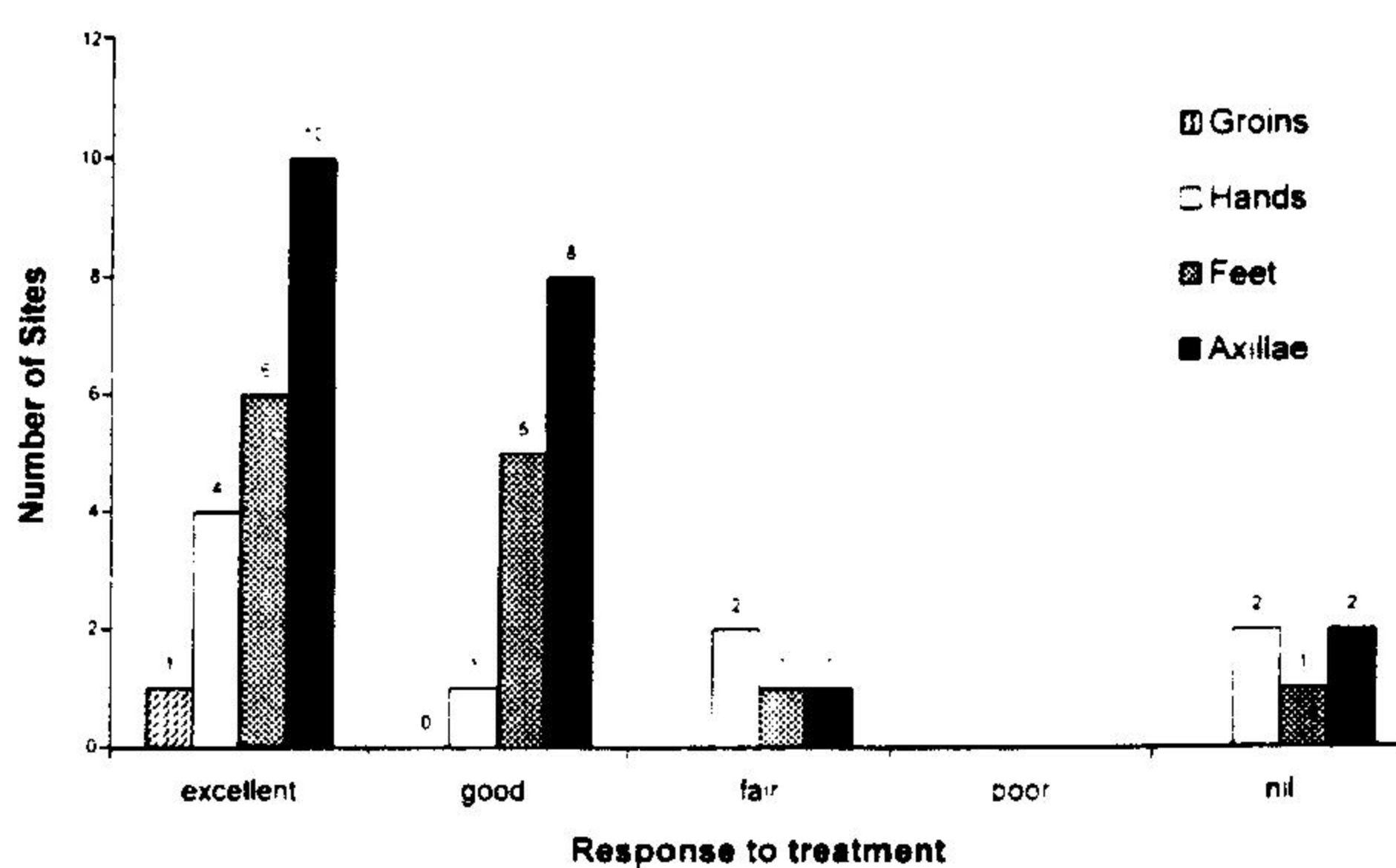
Hyperhidrosis (HH) is a socially embarrassing and occupationally disabling disorder<sup>4</sup> that affects 0.6–1% of the population.<sup>5</sup> Localized HH affects mainly the axillae, the feet, and the hands. Moreover, it may predispose individuals to a number of cutaneous problems, such as trench foot, ingrown nails, pitted keratolysis, and even frostbite in cold weather due to moisture accumulation in the shoes.<sup>6</sup>

Patients suffering from plantar HH can also develop

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**Figure 1** Response rate of AC in SAGB. Self-evaluation data of 238 patients treated on 332 sites



**Figure 2** Response rate of AC in SAGB in the former AC in AA failure group. Self-evaluation data of 29 patients, treated on 44 sites. Axillae, 21; feet, 13; hands, 9; groin, 1

mycotic, bacterial, and viral lesions at an increased rate secondary to excessive sweating of the feet. Plantar HH is frequently associated with plantar BH.

Salicylic acid gel base (SAGB) as a vehicle for AC<sup>7,8</sup> was first used in 1978. The rationale behind the choice of this vehicle was threefold: (i) salicylic acid (SA) may enhance the percutaneous absorption of AC, helping it to become more effective; this would be particularly important in hyperkeratotic skin, such as the palmar and plantar regions; (ii) SA, having antiperspirant properties of its own,<sup>9</sup> could, with AC, act as an adjuvant in providing a stronger antiperspirant effect; and (iii) the hydroalcoholic gel may be a more appropriate vehicle than AA solution, because the alcoholic gel may mitigate or eliminate the drying effect of AA and, by maintaining normal skin hydration levels, may promote the percutaneous absorption of AC.<sup>10</sup>

Double blinding was unfortunately not possible, because the two vehicles, i.e. alcoholic gel and alcoholic solution, possess different consistencies. Instead, we were able to prove that patients who previously failed to respond to AC in AA, or did not tolerate it, were improved with our

formulation. Overall, the data clearly indicate that AC in SAGB is more effective and better tolerated than AC in AA by most patients. Plantar HH and, to a lesser extent, palmar HH also responded favorably in the AC in AA failure group. Damage to fabrics was not reported in our study group.

It is also worthwhile noting that BH, whether of apocrine or eccrine origin, drastically responded to AC in SAGB during the course of treatment of HH. We can explain this by the fact that, each of the ingredients (AC, SA, and propylene glycol<sup>11</sup>) has antibacterial and antifungal properties of its own. In our experience, plantar HH is frequently associated with plantar BH (of eccrine origin), while axillary BH (of apocrine origin) is rarely associated with axillary HH. We have also successfully controlled cases of apocrine BH, unaccompanied by HH, with 20% AC in SAGB applied on the axillae.

## Conclusions

We have attempted to improve the quality of life of patients suffering from localized HH by offering a different formulation that combines AC and SA in a hydroalcoholic gel. Surgery has been avoided by the use of this formulation in some cases of axillary HH. Plantar HH responded better to this formulation than palmar HH. Isolated or concomitant axillary and plantar BH were eliminated when present. Although some degree of efficacy was expected with the AC in SAGB formulation, due to the combination of two antiperspirant agents, we also noticed a better patient tolerance with the SAGB vehicle. To our knowledge, this is the first time that such a combination has been used to treat localized HH. Although an objective evaluation was not possible at this time, patients were satisfied with the treatment. Further studies are warranted using sudorometry for objective analysis.

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## Clinical trial

# A comparison of the efficacy of oral fluconazole, 150 mg/week versus 50 mg/day, in the treatment of tinea corporis, tinea cruris, tinea pedis, and cutaneous candidosis

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### Drug name

fluconazole: Diflucan

Two hundred and forty five patients with dermatophytoses and cutaneous candidosis were enrolled in the study; 122 were randomized to the once-weekly regimen and 123 to the once-daily regimen. Subjects included both men and women: the average age was 42 years. There were no statistically significant differences between the two groups with regard to age, sex, race, and body weight distributions.

In the group receiving once-weekly fluconazole, there were 58 tinea pedis infections and 77 nonpedis infections (tinea corporis, tinea cruris, and cutaneous candidosis). In the group receiving once-daily fluconazole, there were 56 tinea pedis infections and 76 nonpedis infections. The duration of infection and total score of signs and symptoms did not differ significantly between the two groups.

Patients received treatment until clinically cured or up to a maximum of 6 weeks for tinea pedis and 4 weeks for tinea corporis, tinea cruris, or cutaneous candidosis. Medical history, physical and laboratory examinations, and the clinical diagnosis were recorded. Clinical and mycologic examinations and laboratory testing were performed at baseline and 2 weeks after treatment initiation, and then weekly until clinically cured or the maximum duration of treatment allowed was reached. Safety analysis was performed for all patients. Follow-up clinical and mycologic examinations were performed 1 month after the therapy ended.

The clinical efficacy was based on *cure* (disappearance of all baseline signs and symptoms of infection), *marked improvement*, *moderate improvement*, *failure* (no change or worsening of the signs and symptoms), or *unevaluable* (most commonly due to protocol evaluations or the absence of an identified pathogen). Mycologic efficacy was based on *eradication* (absence of pathogen on microscopy and/or culture), *persistence* (presence of pathogen on microscopy and/or culture), *superinfection* (absence of pathogen, but with a different fungal pathogen on microscopy and culture associated with clinical disease), or *unevaluable*. Long-term follow-up evaluation included the category *relapse*, defined as the absence of pathogen at the end of treatment, with the reappearance of that pathogen on microscopy and/or culture at follow-up visit. The culture result determined the efficacy where discrepancies between microscopy and culture findings occurred.