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CONFERENCE REPORT

Scalp psoriasis: European consensus on grading and treatment algorithm

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Abstract

The scalp is a common site of involvement of psoriasis and, for many patients, is a challenging aspect of their disease. This can be attributed not only to the scaling, itching and cosmetic embarrassment that go with scalp psoriasis, but also to the fact that the scalp skin is relatively inaccessible, making topical therapies difficult to apply. The proximity of sensitive facial skin can also limit the use of potentially irritating topical treatments. Nevertheless, the specific challenges of scalp psoriasis are often neglected by treatment guidelines. This paper summarizes the discussions that took place at an international conference of experts convened in Geneva, Switzerland, in March 2008. The objective of the meeting was to review the available treatments for scalp psoriasis in terms of efficacy, safety, convenience, and the implications for patient compliance with treatment. In addition, definitions of mild, moderate and severe scalp psoriasis were agreed. This paper presents a treatment algorithm that includes recommendations for patients in all three categories. It considers the role of potent topical corticosteroids, vitamin D3 derivatives, salicylic acid preparations, and photo- and radiotherapy, as well as systemic therapies, including newer biological agents, for patients with widespread psoriasis with scalp involvement. Data from clinical trials indicate that a potent topical corticosteroid in a short-contact formulation is the most appropriate treatment for most patients with scalp psoriasis.
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Keywords

consensus, management, scalp psoriasis

Conflicts of interest

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Introduction

The scalp is the most common, and frequently the first, site of disease involvement for patients with psoriasis. The estimated population prevalence of scalp psoriasis in Western Europe is 2%.[1,2] However, up to 80% of patients with psoriasis report some degree of scalp involvement, and four out of five patients with scalp psoriasis report that it has a negative impact on their quality of life.[3] Moreover, scalp psoriasis is often the most challenging element of psoriasis to treat. Practical challenges specific to this form of psoriasis include access to the scalp itself (for obvious reasons) and the visibility of the site, which often makes patients self-conscious about treatment. Despite the fairly wide range of therapies available, historically the options for long-term management have been unsatisfactory, often because of safety concerns associated with ongoing use.[4]

Nevertheless, guidelines often include few or no recommendations for scalp psoriasis in particular.[5,6] There is, however, some consistency in those recommendations that are available. US guidelines published in 2000 recommend treatment with a topical corticosteroid and/or topical calcipotriol solution, together with daily use of a tar shampoo,[7] as do Finnish guidelines.[8] More recent guidelines published by the British Association of Dermatologists note that scalp psoriasis can be challenging to manage, and recommend a tar-based shampoo as the first line of treatment,

potentially combined with either a 2–5% salicylic acid preparation, a coconut oil/tar/salicylic acid combination ointment, a potent topical corticosteroid preparation such as 0.1% betamethasone valerate, or calcipotriol scalp application.[9] To date, only one guideline specific to scalp psoriasis has been published; it emphasizes the importance of topical corticosteroids as the mainstay of treatment, with vitamin D3 derivatives as an alternative.[1] However, this guideline was published 8 years ago: other shampoo-like treatment options, specifically formulated for the scalp, are now available. Moreover, there is no consensus in existing guidelines as to how the severity of scalp psoriasis should be determined, and how variation in severity may affect treatment.

The present paper reports the discussions of an expert board convened in Geneva, Switzerland, on 10 March 2008. A systematic literature review was carried out in advance of the meeting. PubMed searches were used to identify all published trials relating to the treatment of scalp psoriasis. The results of this search were discussed by the experts at the meeting. The present manuscript includes a review of the data for the efficacy, safety, and convenience of currently available treatments for scalp psoriasis (including the implications for patient compliance), incorporating studies published since the meeting took place, and recommends a treatment algorithm capable of accounting for patients with mild, moderate, and severe scalp psoriasis.

Current treatments for scalp psoriasis

Many therapies have been used to treat scalp psoriasis over the past 40 years, which in itself suggests the unsatisfactory nature of many of the available options. The current mainstay of treatment is topical preparations that consist of an active ingredient within a formulation, such as a solution, lotion, gel, foam, emulsion, cream or shampoo. Both the overall formulation and its active components can affect the efficacy, safety and convenience of a treatment.

The most important active ingredients available for scalp psoriasis are corticosteroids, such as betamethasone dipropionate, betamethasone valerate, and clobetasol propionate. Other active ingredients commonly used in topical preparations include vitamin D3 derivatives, and coal tar or its derivatives. There are also photo- and radiotherapies available for scalp psoriasis (ultraviolet B light, psoralen + ultraviolet A, excimer laser and grenz rays), and emerging data support the efficacy of systemic biological agents such as infliximab[10] and alefacept.[11] The use of biological agents is currently limited to patients with widespread psoriasis [> 10% body surface area affected, or Psoriasis Area Severity Index (PASI) > 10], based on the available data and the cost of these therapies.

Few well-designed trials have assessed the efficacy and safety of treatment; the strongest evidence is available for topical corticosteroids and vitamin D3 analogues. One meta-analysis identified only 42 well-designed, placebo-controlled trials of topical agents for the treatment of psoriasis, with only 7 focusing specifically on scalp psoriasis.[12] Most trials only cover short-term treatment. This section briefly reviews the efficacy, safety, and convenience of the most significant available topical treatments, and comments on the quality of evidence.

Efficacy

Table 1 summarizes available efficacy data for the most common scalp psoriasis treatments. The strongest evidence of efficacy is available for topical clobetasol propionate. In a randomized, double-blind, placebo-controlled evaluation of clobetasol propionate foam that enrolled 279 patients with scalp psoriasis, patient and physician global assessment scores improved significantly after 2 weeks (both $P < 0.0001$).[31] This result is supported by the findings of a randomized, single-blind comparison between clobetasol propionate foam 0.05% and clobetasol propionate solution 0.05% in 32 patients with scalp psoriasis. The study concluded that after 2 weeks, a significantly greater absolute reduction in psoriasis severity was seen in the group using the foam ($P = 0.03$).[23] In addition, an open-label study of clobetasol propionate foam 0.05% in 12 patients with scalp psoriasis found that after 2 weeks, 8 patients had experienced an improvement in PASI score of at least 50%.[26]

The efficacy of clobetasol propionate shampoo 0.05% has been examined in four randomized, controlled studies. A vehicle-controlled, 4-week study in 142 patients with scalp psoriasis confirmed that the treatment was significantly more effective at reducing patients' total severity score (TSS) than vehicle alone ($P < 0.001$).[21] Active comparator trials have also found that clobetasol propionate shampoo is significantly more effective than calcipotriol solution ($P = 0.016$),[24] and tar-blend shampoo 1% ($P < 0.001$). More recently, the Canada Long Exposure PSOriasis (CALEPSO) study assessed the effect of twice-weekly maintenance treatment with clobetasol propionate shampoo 0.05% on moderate scalp psoriasis [defined as global severity score (GSS) = 3]. In this randomized, vehicle-controlled study, after an initial 4-week phase, patients with a GSS ≤ 2 were enrolled in a 6-month maintenance phase ($n = 136$, 81% of the original patient group). GSS was reassessed every 4 weeks. If relapse occurred at any time (GSS > 2), patients were returned to a 4-week daily treatment with clobetasol propionate shampoo 0.05%. Over the full 6-month period, 73.1% of patients treated with clobetasol propionate shampoo 0.05% had no or only 1 relapse, compared to 34.8% of patients in the vehicle group. The primary efficacy endpoint was the median time to first relapse, which was significantly higher for the active treatment than for the vehicle alone (141 vs. 30.5 days, $P < 0.0001$).[32]

The other main corticosteroid agents are betamethasone valerate and betamethasone dipropionate. A 2-week, randomized, parallel-group trial that compared betamethasone dipropionate lotion 0.05% and clobetasol propionate solution 0.05% in the treatment of 197 patients with moderate-to-severe scalp psoriasis found that patients receiving the lotion had a significantly greater mean percentage improvement in total sign/symptom scores at 3 days, 1 week, and 2 weeks ($P \leq 0.015$).[18] A double-blind comparison of betamethasone dipropionate solution 0.05% and clobetasol

Table 1 Summary of key trials of topical agents in scalp psoriasis, in publication order

Study	Treatments	Population	Design	Result
Lassus 1976[13]	Clobetasol propionate solution 0.05% vs. betamethasone dipropionate solution 0.05%	Moderate to severe scalp psoriasis, $n = 40$	Double-blind, 2 weeks	Clobetasol propionate solution was superior in terms of improved scaling, induration, erythema and itching
Hovding 1981[14]	Betamethasone dipropionate 0.05% lotion with 2% salicylic acid	Unspecified scalp psoriasis, $n = 38$	Open, 4 weeks	Symptom relief at 1 week, clinical improvement at 2 weeks; patient and physician evaluations were positive and agreed
Langner *et al.* 1983[15]	Coal tar gel vs. coal tar shampoo	Unspecified scalp psoriasis, $n = 112$	Open, observational	Clear or marked improvement in 83% of patients receiving coal tar gel; median remission time was 8 months
Green *et al.* 1994[16]	Calcipotriol solution 50 μg/mL vs. placebo	All scalp psoriasis, $n = 49$	Randomized, multicentre, double-blind, parallel-group, 4 weeks	Calcipotriol solution was significantly superior in both investigator and patient evaluation of response ($P < 0.001$); significantly greater decrease in TSS ($P = 0.005$)
Klaber *et al.* 1994[17]	Calcipotriol solution (50 μg/mL) vs. betamethasone valerate solution (1 mg/mL)	All scalp psoriasis, $n = 474$	Randomized, multicentre, double-blind, parallel-group, 4 weeks	Significantly more betamethasone valerate patients 'cleared' or 'markedly improved' at 4 weeks ($P < 0.001$); significantly greater decrease in TSS in the same group ($P < 0.001$)
Katz *et al.* 1995[18]	Betamethasone dipropionate 0.05% lotion vs. clobetasol propionate 0.05% solution	Moderate to severe scalp psoriasis, $n = 197$	Randomized, multicentre, investigator-blinded, parallel-group, 2 weeks	Betamethasone dipropionate lotion superior TSS at all visits ($P \leq 0.015$) and achieved a faster response (better mean global clinical response score at days 4 and 8 ($P \leq 0.017$)). Only mild disease present in both groups at the end of the study
Duweb *et al.* 2000[19]	Calcipotriol solution (50 μg/mL) vs. betamethasone valerate lotion 1%	All scalp psoriasis, $n = 42$	Randomized, 6 weeks	Marked improvement and clearance in 72.8% of the calcipotriol group and 72% of the betamethasone group. Mean TSS decreased from 5.1 to 2.1 in the calcipotriol solution group, and from 5.4 to 1.49 in the betamethasone valerate lotion group (NS)
Thaci *et al.* 2001[20]	Calcipotriol solution 50 μg/mL	All scalp psoriasis, $n = 3396$	Prospective, observational, multicentre, 8 weeks	Significant decrease in PSSI score ($P < 0.001$); 80% of patients showed good or very good clinical improvement
Jarratt *et al.* 2004[21]	Clobetasol propionate shampoo, 0.05% vs. its corresponding vehicle	Moderate to severe scalp psoriasis, $n = 142$	Multicentre, randomized, vehicle-controlled, double-masked and parallel-group, 4 weeks	Clobetasol propionate shampoo was superior as assessed by GSS ($P < 0.001$); erythema; plaque thickening; pruritus (all $P \leq 0.002$)
Andreassi *et al.* 2003[22]	Betamethasone valerate foam 0.12% vs. standard therapies (55% topical corticosteroids, 45% calcipotriol lotion)	Moderate to severe scalp psoriasis, $n = 241$	Randomized, open, investigator-blinded, multicentre, cross-over, 4 weeks	Betamethasone valerate foam produced significantly greater reduction in TSS ($P < 0.001$); significantly more patients saw complete or nearly complete resolution of scaling ($P < 0.001$)
Bergstrom *et al.* 2003[23]	Clobetasol foam 0.05% to the skin and scalp vs. combination clobetasol cream 0.05% to the skin and clobetasol solution 0.05% to the scalp	All psoriasis including scalp psoriasis, $n = 32$	Randomized, single-blind, 2 weeks	Among scalp psoriasis patients, greater absolute improvement in PASI with foam ($P = 0.03$)
Reygagne *et al.* 2005[24]	Clobetasol propionate shampoo 0.05% vs. calcipotriol solution 0.005%	Moderate to severe scalp psoriasis, $n = 151$	Multicentre, randomized, investigator-masked, parallel group, 4 weeks	Clobetasol propionate shampoo was superior as assessed by TSS ($P = 0.028$) and GSS ($P = 0.016$)
Griffiths *et al.* 2006[25]	Clobetasol propionate 0.05% shampoo vs. a currently marketed tar-blend 1% shampoo	Moderate to severe psoriasis, $n = 162$	Multicentre, randomized, parallel-group, investigator-masked, 4 weeks	Clobetasol propionate shampoo was superior to tar-blend shampoo as assessed by GSS; erythema; plaque thickening; pruritus; total scalp area involved; subject's global assessment of clinical improvement (all $P < 0.001$)
Mazzotta *et al.* 2007[26]	Clobetasol propionate foam 0.05%	Patients with plaque ($n = 12$) and scalp ($n = 12$) psoriasis	Open-label, 4 weeks	At week 2, 75% of patients with scalp psoriasis improved PASI ≥ 50% from baseline; at week 4 this had increased to 100%, with 58.3% of patients achieving ≥ 75% decrease in PASI from baseline
Buckley *et al.* 2008[27]	Calcipotriol plus betamethasone dipropionate scalp formulation vs. betamethasone dipropionate scalp formulation	Unspecified scalp psoriasis, $n = 218$	Randomized, 8 weeks	Significantly greater improvement in TSS with the compound at 2 weeks ($P = 0.005$) and at the end of treatment ($P = 0.042$)
Jemec *et al.* 2008[28]	Calcipotriene plus betamethasone dipropionate vs. calcipotriene or betamethasone or scalp formulation alone	Unspecified scalp psoriasis, $n = 1505$	Randomized, 8 weeks	Significantly greater achievement of 'absent' or 'very mild' disease with two-compound formulation vs. all others ($P < 0.05$)
Luger *et al.* 2008[29]	Calcipotriol plus betamethasone dipropionate scalp formulation vs. calcipotriol	Moderate to severe scalp psoriasis, $n = 869$	Randomized, double-blind, 8 weeks	Significantly more patient rating of disease control as 'satisfactory' than 'not satisfactory' with two-compound formulation ($P < 0.001$). Significantly fewer adverse events reported with two-compound formulation ($P < 0.001$)
van de Kerkhof *et al.* 2009[30]	Calcipotriol plus betamethasone dipropionate scalp formulation vs. calcipotriol vs. betamethasone dipropionate	Adults with scalp psoriasis, $n = 1417$	Randomized, double-blind, 8 weeks	Significantly more 'absence of disease' or 'very mild disease' in two-compound group than calcipotriol ($P < 0.001$) or betamethasone dipropionate ($P = 0.079$) groups

GSS, Global Severity Score; PASI, Psoriasis Area and Severity Index; PSSI, Psoriasis Scalp Severity Index; TSS, Total Severity Score.

propionate solution 0.05%, however, found that the latter treatment was superior.[13] Randomized trials have also investigated the efficacy of betamethasone valerate solution, foam, and lotion. In a double-blind comparison of betamethasone valerate solution and calcipotriol solution used to treat 474 patients with scalp psoriasis, the proportion of patients who were 'cleared' or 'markedly improved' was statistically significantly greater in the betamethasone group (75%) than in the calcipotriol group (58%) ($P < 0.001$).[17] Similar results were seen in a comparison of betamethasone valerate lotion 1% and calcipotriol 50 μg/mL solution.[19] More recently, betamethasone valerate foam 0.12% was evaluated in comparison to corticosteroids or calcipotriol in an open, investigator-blinded, multicentre study. After 4 weeks of treatment, the betamethasone valerate foam was significantly superior to other treatments in terms of reducing severity scores ($P < 0.001$), and in terms of the percentage of patients who achieved complete resolution of scaling ($P < 0.001$).[22]

Topical preparations of vitamin D derivatives have been available for the treatment of psoriasis since 1992. The best established is calcipotriol, which is primarily available as a solution. A placebo-controlled comparison of calcipotriol solution confirmed that calcipotriol significantly reduces the symptoms of scalp psoriasis after 4 weeks of treatment, according to both investigator and patient assessments ($P < 0.001$ for both).[16] More recently, in a large prospective, observational study ($n = 3396$) of scalp psoriasis patients treated with calcipotriol solution for 8 weeks, 80% of patients showed 'good' or 'very good' clinical improvement.[20] However, as noted above, in two comparisons with betamethasone valerate (solution, $n = 474$; and lotion, $n = 42$), the corticosteroid proved more efficacious.[17,19] Moreover, in the comparison of calcipotriol solution with clobetasol propionate shampoo noted above, the corticosteroid was again superior.[24]

Combinations of some treatments have also been studied. A two-compound scalp formulation containing calcipotriol 50 μg/g and betamethasone dipropionate 0.5 mg/g has recently been examined in two randomized, controlled trials. In the first, 869 patients with moderate-to-severe scalp psoriasis were randomized to either the two-compound formulation, or calcipotriol alone; 92.3% of patients in the former group rated the product's disease control as 'satisfactory' (rather than 'not satisfactory') after 52 weeks, compared to 80.0% of patients in the latter group ($P < 0.001$). There were also fewer adverse drug reactions reported in the two-compound group ($P < 0.001$).[29] In the second study, 1417 patients with > 10% scalp psoriasis involvement were randomized to either the two-compound formulation, or calcipotriol alone, or betamethasone dipropionate alone. At week 8, control of disease was significantly better in the two-compound group than in either of the other groups ($P = 0.0079$ vs. betamethasone dipropionate, $P < 0.001$ vs. calcipotriol).[33] These support the results of earlier, smaller studies.[27,33] Separately, in a recent 8-week, randomized, vehicle-controlled study, a scalp formulation of calcipotriene plus betamethasone dipropionate was compared to the individual components in the same vehicle and the vehicle alone. At the end of the study, more patients had achieved 'absent' or 'very mild' disease with the two-compound scalp formulation (71.2%) compared with betamethasone dipropionate in the same vehicle (64.0%, $P = 0.011$), calcipotriene in the same vehicle (36.8%, $P < 0.0001$), or the vehicle alone (22.8%, $P < 0.0001$).[28]

Tar-based products were among the first topical preparations to be evaluated as treatments for scalp psoriasis. The crude coal tar used to treat psoriasis at other sites is unsuitable as a treatment for scalp psoriasis for cosmetic reasons, but tar shampoos extend the remission time of patients with scalp psoriasis, compared to standard therapies. In an uncontrolled study of 112 patients, 30% of patients were still in remission 13 months after the end of therapy.[15] Tar-based treatments may not, however, be as effective as more recently developed corticosteroid shampoos.[25]

Safety

The most common safety issues associated with treatments for scalp psoriasis are outlined in Table 2, while specific studies are discussed below.

In a 2-week, randomized comparison of betamethasone dipropionate lotion 0.05% and clobetasol propionate solution 0.05%, there was no significant difference in the incidence of adverse events (34.0% vs. 36.4%).[18] However, in a double-blind comparison of clobetasol propionate 0.05% solution and betamethasone dipropionate 0.05% solution, folliculitis was more common among patients receiving the latter treatment.[13]

The most common side effect of treatment with calcipotriol solution is irritation; however, in a large observational study that recruited over 3000 patients with scalp psoriasis, after 8 weeks of treatment with calcipotriol solution, side effects were reported by only 2.4% of the patients.[20] A randomized, double-blind comparison of betamethasone valerate solution with calcipotriol solution found that adverse events were significantly lower with the former treatment ($P < 0.001$): 15 patients (6%) in the calcipotriol group, but only 4 (1%) in the betamethasone group, withdrew from the study because of adverse events or unacceptable treatment response ($P = 0.017$).[17] A comparison of calcipotriol with betamethasone valerate lotion 1% found no significant differences between the two treatments in the incidence of adverse events.[19]

The safety of topical corticosteroid treatments depends not only on the corticosteroid, but also on the formulation used. In particular, the short contact time associated with a shampoo formulation may help to minimize the incidence of both drug-specific and systemic adverse effects. A randomized, double-blind study confirmed that clobetasol propionate shampoo 0.05% has a similar safety profile to the vehicle alone; the most commonly reported adverse event was skin discomfort.[21] In the CALEPSO study, patients were treated with clobetasol propionate shampoo 0.05% for 60–79 days. No effect on HPA (hypothalamic–pituitary–adrenal) axis function was detected. A small number of cases of mild skin atrophy (1 patient) and mild telangiectasia (3 patients)

Table 2 Summary of safety issues relevant to available treatments for scalp psoriasis

	Topical corticosteroids	Topical vitamin D analogues	Salicylic acid	Tar	Selenium disulfide	Ketoconazole
Drug-specific adverse reactions	Erythema, telangiectasia, skin atrophy	Irritancy, effect on calcium metabolism	None	Phototoxicity, pustular reactions	Dryness of hair and scalp, discoloration	None
Systemic exposure toxicities	HPA axis suppression, iatrogenic Cushing's syndrome, glaucoma	Hypercalcaemia	Salicylism	Dermal uptake of polycyclic aromatic hydrocarbons comparable to values in coke-oven workers, carcinogenicity	No significant absorption through intact scalp	None
Irritation	Moderate; erythema, peeling/scaling, stinging/burning, pruritus	Frequent; erythema, pruritus, stinging/burning, dry skin	Some; stinging/burning, dry skin, peeling/scaling	Mild stinging	Mild to moderate	Irritation, itching, stinging
Allergic reaction	Rare	Very rare	Yes, if inhaled or ingested	Patients sensitive to other tars may also be sensitive to coal tar	None	Yes; may cause rash or difficulty breathing
Hair growth	Hypertrichosis	None	None	None	Antimitotic effect may cause hair loss	Changes in hair texture, colour and quantity possible
Suitable for pregnant patients?	FDA category C (risk cannot be ruled out)	FDA category C	Oral salsalate is category C	FDA category C	FDA category C	FDA category C
References	Andres *et al.* 2006; Gottlieb *et al.* 2003; Katz *et al.* 1995; Mazzotta *et al.* 2007; Menter 2007; Reygagne *et al.* 2007[18,26,31,34–36]	Reygagne *et al.* 2005; Ruzicka & Trompke 2004; Thaci *et al.* 2001[20,24,37]	Going *et al.* 1986[38]	Fysh *et al.* 1980; Griffiths *et al.* 2006; Merk *et al.* 1987[25,39,40]	Danby *et al.* 1993[41]	Farr *et al.* 1985; Reygagne *et al.* 2007; Rosenberg & Belew 1982[35,43,42]

were reported, and in all instances were either present at baseline or transient. The active treatment had a safety profile comparable to that of the vehicle alone.[32] In a randomized, parallel-group comparison of clobetasol propionate shampoo 0.05% and calcipotriol solution 0.05%, adverse events were more common in the calcipotriol group than in the clobetasol propionate shampoo group.[24] A single-centre, randomized study in 26 patients with scalp psoriasis confirmed that unlike clobetasol propionate gel, clobetasol propionate shampoo 0.05% does not lead to HPA axis suppression, is not atrophogenic, and does not have any effect on ocular safety.[34] The use of clobetasol propionate foam 0.05% is also associated with few adverse events, limited to mild and transient burning, or other application-site reactions.[31]

The polycyclic aromatic hydrocarbons found in tar-based preparations are potentially carcinogenic.[44] Significant levels of immunological and chromosomal abnormalities have been found after treatment of non-scalp psoriasis with tar-based preparations[45]; similar risks may attend the treatment of scalp psoriasis, although only a few cases of cancer resulting from the therapeutic use of tar have been reported.[39,40,46]

Convenience

Existing scalp psoriasis treatments are inconvenient for many patients. The relative convenience of scalp psoriasis treatments is affected by the formulation, the duration of treatment, and the duration of application. In turn, the convenience of a treatment affects patients' quality of life and the likelihood that they will comply with treatment.[47]

A quantitative assessment of preferences regarding different formulations among 20 patients with scalp psoriasis found that patients were significantly more likely to prefer foams and solutions to gels and ointments ($P = 0.01$).[48] In a randomized, double-blind, placebo-controlled evaluation of clobetasol propionate foam 0.05%, patients ranked the foam as superior to other topical medications they had received, based on a quality-of-life assessment.[31] In a randomized comparison, patients spent significantly less time applying a foam-based corticosteroid treatment medication than they did applying their previous topical medications ($P < 0.001$); a similar trend was not observed for patients applying cream or solution-based corticosteroid treatment.[23] Similarly, a comparison of betamethasone valerate foam 0.12% with other corticosteroid or calcipotriol formulations found that the foam was considered easier and more convenient ($P < 0.01$).[22]

Foam formulations are known to be convenient for patients, but can have disadvantages as a treatment for scalp psoriasis: they have to be applied twice a day; they contain up to 60% alcohol, which may cause stinging; and they are only indicated for a 2-week treatment period. An alternative may be shampoo formulations, which are applied once a day, for a short-contact period, contain only about 10% alcohol, and are indicated for up to 4 weeks of treatment. In a randomized, double-blind comparison of clobetasol propionate shampoo 0.05% and tar-blend shampoo 1%, a majority

of patients indicated that they found the former treatment more cosmetically acceptable.[25] In the CALEPSO study, more than 90% of patients were satisfied with the cosmetic properties of the shampoo, while 91.7% of patients were satisfied with its overall performance.[49] More generally, these results indicate that it is possible to provide patients with more convenient treatment options without sacrificing efficacy.

Patient compliance

Poor patient compliance can and does severely limit the effectiveness of scalp psoriasis treatment. An anonymous postal survey sent to consecutive patients with psoriasis attending a specialist clinic, including patients with scalp psoriasis, found that 39% did not comply with their recommended treatment.[50] Non-compliant patients were more likely to be younger and have a higher self-rating of disease severity, but compliance is also affected by the efficacy, safety and convenience of the treatment prescribed. The main reasons that patients do not comply with treatment are forgetfulness, lack of time, lack of visible effect, unclear instructions, and physical difficulties in applying treatment.[50] Many of these reasons are less significant with foams or shampoos than with creams, gels, or ointments,[31] and less significant with corticosteroids than with tar-blend products.[25] In an evaluation of clobetasol propionate foam 0.05%, patients indicated that they would be more likely to comply with a course of treatment than with a course of other topical therapies, because of its convenience and lower impact on quality of life.[31] When choosing a treatment option, it is essential that patient preference be taken into account. This may require some initial patient education, such as discussing realistic goals for therapy. In the CALEPSO study, patients were asked to compare the shampoo with previous treatments they had used (most commonly based on tar, steroid or vitamin D derivatives). In total, 80.7% of patients preferred clobetasol propionate shampoo 0.05% to their previous treatment(s).[49]

Defining scalp psoriasis severity

Measurement of the severity, and changes in severity, of scalp psoriasis is challenging. The area covered by psoriatic plaques is only one aspect of the disease; assessment must also consider the number of lesions, their thickness, whether or not there is involvement of the face, and the presence of other signs or symptoms, in particular pruritus. The most common assessment of psoriasis is the PASI, developed in 1978,[51] but it is also the most complex measure, and unsuitable for use in daily clinical practice. Variants of the PASI have been developed in an attempt to overcome some of its limitations: most notably the Self-Administered PASI[52] for patients, and the Simplified PASI.[53] A modified PASI is also routinely used to assess the severity of scalp psoriasis specifically. Other tools for measuring the severity of psoriasis do not consider scalp psoriasis separately, including the Psoriasis Global Assessment[54] and the National Psoriasis Foundation Psoriasis Score,[55] or have been developed to assess the effect of systemic agents such as efalizumab and infliximab on scalp psoriasis (the Psoriasis Scalp Severity Index,[56] and a regional PASI[10]). The major weakness of all available psoriasis evaluation scales, specific to scalp psoriasis or otherwise, is that they require the physician to differentiate between (for example) mild and moderate severity, with little consistency in how differing severities are defined. The criteria used in the development of the present algorithm are shown in Table 3, with illustrative photographs to provide additional guidance.

Treatment algorithm for patients with mild, moderate, or severe scalp psoriasis

The treatment algorithm is shown diagrammatically in Fig. 1. The severity of a patient's scalp psoriasis increases from left to right, while treatment options that can be considered are arranged from top to bottom. Thus, the suitability of a given treatment for a given patient can be easily obtained by cross-referencing the severity of scalp psoriasis with the phase of treatment. The recommendations for patients with mild, moderate, or severe scalp psoriasis can be summarized as follows.

In patients with mild scalp psoriasis, topical treatment with vitamin D3 analogues and/or corticosteroids is recommended. The most potent (class IV) corticosteroids may not be appropriate in patients with only mild scalp psoriasis. A short-contact formulation, such as a shampoo, is preferred; other vehicles (solution, lotion, foam, gel) are also appropriate. Following induction, either intermittent or continuous treatment with a short-contact formulation of a corticosteroid can be used.

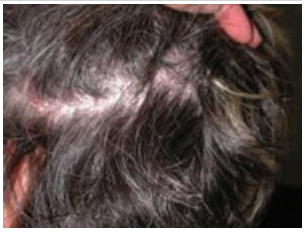
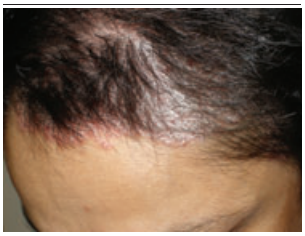
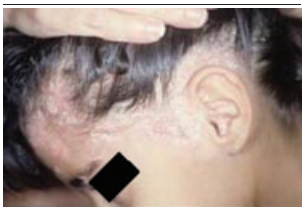
In patients with moderate scalp psoriasis, descaling with salicylic acid may be necessary before treatment. Short-contact formulation corticosteroid and/or vitamin D-based treatments are most appropriate. Topical corticosteroids in lotion, foam or gel form, as well as more occlusive formulations (e.g. cream, ointment), can be considered, as can phototherapy, if available. Following induction, either intermittent or continuous treatment with a short-contact formulation of a corticosteroid should be preferred.

In patients with severe scalp psoriasis, descaling with salicylic acid is likely to be necessary before induction treatment. Very potent corticosteroids should be the first topical treatment used. Short-contact formulations may be preferred for reasons of convenience, but long-contact occlusive formulations may be necessary in some patients. Phototherapy and radiotherapy should also be considered in some cases, while systemic therapies, such as ciclosporin, methotrexate, retinoids, the newer biological agents, may be useful in patients with widespread disease including scalp involvement. Following induction, either intermittent or continuous treatment with a short-contact formulation of a corticosteroid should be preferred.

Guidance for using the algorithm

The treatment algorithm outlined above is necessarily broad in its categorization. Several additional important factors should be

Table 3 Recommendations for the definition of mild, moderate and severe scalp psoriasis, including photographs as diagnostic guidance

Severity	Area	Indicated by the presence of one or more of:	Example
Mild	Affects < 50% of the scalp	Mild erythema Mild scaling Minimal thickness (barely detectable or no infiltration) Mild pruritus	
Moderate	Affects < 50% of the scalp	Moderate erythema Moderate scaling Moderate thickness (some infiltration) Mild to moderate pruritus	
Severe	Affects > 50% of the scalp	Severe erythema Severe scaling Very thick (extensive infiltration) Moderate to severe pruritus Evidence of hair loss with scarring Lesions not limited to the scalp (e.g. hairline or forehead involvement)	

taken into consideration when making treatment decisions, as no algorithm can fully reflect the complexity of the clinical situation. In particular, the following points should be borne in mind.

Determining the severity of scalp psoriasis will always be a qualitative decision, taking into account not only the affected body surface area and the signs and symptoms of psoriasis, but also factors such as quality of life, symptom localization, and response to previous treatment. The effect of a treatment on quality of life should not be underestimated. For example, treatment may be time-consuming, cosmetically embarrassing, or associated with adverse events, and patient compliance may be reduced as a result of these factors. In situations where multiple treatment options are available, it may be appropriate to prescribe the option that is more convenient for the patient, meaning that shampoo and foam formulations may often be preferred.

This algorithm does not account for variations in treatment availability or preference in different countries. There are significant regional variations even across Europe: for example, tar-based products are used extensively in the UK, but are not used at all in either Italy or France. In such cases, the most appropriate available treatment should be used.

Although the algorithm takes into account the potential need for descaling treatment, it does not account for other add-on therapies. In particular, it does not account for the use of antifungal agents, such as ketoconazole. These may be required in immunocompromised patients, or to combat *Malassezia* yeast infection, and there is some evidence that they can have a beneficial effect on scalp conditions.[35,40–42] The safety profile of ketoconazole is summarized in Table 2.

Although phototherapy (ultraviolet B, psoralen + ultraviolet A treatment) is included in the algorithm, it should be noted that in many regions, this option is unlikely to be available in primary care. Nevertheless, it remains a valuable option for treatment-refractory patients. Similarly, although few studies are currently available on the use of systemic biological therapies in the treatment of scalp psoriasis, and the use of these agents may be limited by their high cost, early data appear promising.[10,11,56] The combination of systemic therapy and topical therapy may be useful in some cases.

Conclusions

Treatment guidelines for psoriasis have often failed to take into account the specific challenges involved in treating scalp psoriasis. Based on current evidence, the mainstay of treatment for mild, moderate, or severe scalp psoriasis should be topical corticosteroids. The characteristics of the formulation chosen should be adapted to disease severity, and take into account patient preferences. Vitamin D analogues are an additional choice for topical treatment, but existing formulations have had limited success in scalp psoriasis. Further direct comparisons of the efficacy and safety of

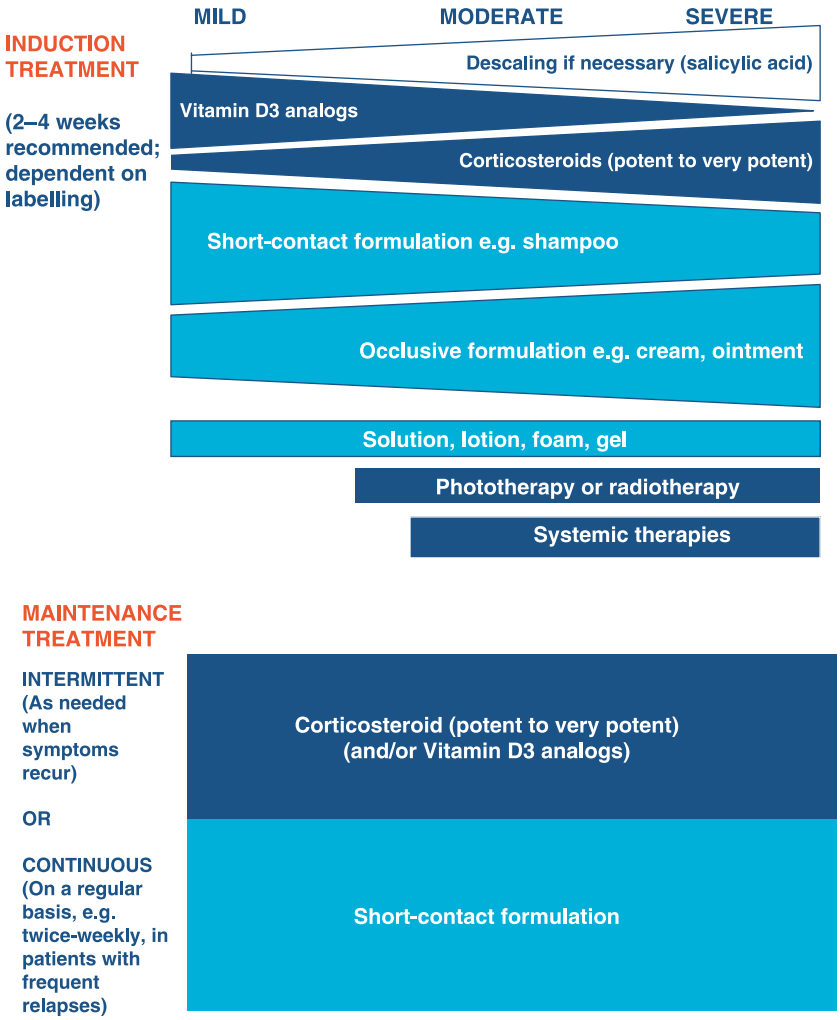


Figure 1 A treatment algorithm for patients with mild, moderate or severe scalp psoriasis. Recommended treatment options are shown in white text on a dark blue background; recommended treatment vehicles are shown by white text on an aquamarine background. For example, vitamin D3 analogues are recommended in patients with mild scalp psoriasis, while corticosteroids are recommended in patients with moderate to severe scalp psoriasis. Physicians should use their judgement to determine the severity of scalp psoriasis, following the recommendations in Table 3.

the available treatments are needed to strengthen our understanding of which treatments are most appropriate for which patients. Because of regional variations in treatment availability, and heterogeneity in clinical presentations, physicians may sometimes have to substitute the most appropriate treatment available, rather than that recommended by the algorithm.

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