



Basic Therapeutic Approach for Patients with Plaque Psoriasis: Korean Expert Consensus Using the Modified Delphi Method

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Background: Currently, there is no consensus on the treatment of psoriasis in Korean patients.

Objective: This study aimed to establish a consensus on the basic therapeutic principles for Korean patients with plaque psoriasis.

Methods: Using the modified Delphi method, a steering committee proposed 53 statements for the first Delphi round, which covered five subjects: (1) the goal of treatment and evaluation of disease severity, (2) topical therapy, (3) phototherapy, (4) conventional systemic therapy, and (5) biologic therapy. The panel of dermatologists scored the level of agreement for each statement on a ten-point scale with scores ranging from 1 (strongly disagree) to 10 (strongly agree). After discussing the results of the first round, the committee reformulated 41 statements. Finally, consensus was defined as more than 70% of the second round scores being ≥ 7 .

Results: The panel participants strongly agreed that the ideal treatment goals for Korean patients with plaque psoriasis should include complete skin clearance and high dermatological quality of life. A strong consensus was also reached on the use of topical agents for psoriasis of any severity, the consideration of phototherapy before biologics therapy, the conventional systemic agents for moderate-to-severe psoriasis, and the recommendation of biologic for retractable psoriasis to conventional systemic therapy and phototherapy.

Conclusion: This modified Delphi panel established an expert consensus on the therapeutic approach for Korean patients with plaque psoriasis. This consensus may improve the treatment outcomes for psoriasis in Korea.

Keywords: Consensus, Korea, Psoriasis, Therapeutics, Treatment

INTRODUCTION

Psoriasis is a chronic skin disease with a high disease burden^{1,2}. Patients with psoriasis usually develop skin lesions at a young age and suffer for the rest of their lives. Since psoriasis significantly affects patients' quality of life, its management should address both the psychosocial and physical impact

of the disease. Moreover, many studies have identified that psoriasis as a systemic inflammatory disease beyond the skin, which can be accompanied by various comorbidities, such as inflammatory arthritis and cardiovascular disease including hypertension, diabetes mellitus, and hyperlipidemia³⁻⁵. Therefore, a holistic approach is necessary for appropriate management of patients with psoriasis.



In Korea, various topical and systemic agents are used to treat psoriasis. Various topical corticosteroids, calcineurin inhibitors, and combinations of corticosteroids and vitamin D analogs are readily available⁶. Phototherapy using narrow-band ultraviolet B radiation is widely used in both private dermatologic clinics and hospitals. Acitretin, cyclosporine, and methotrexate have been approved as systemic agents for psoriasis in Korea. Recently, biologics such as tumor necrosis factor-alpha inhibitors, interleukin (IL)-12/23 inhibitor, IL-17 inhibitors, and IL-23 inhibitors were approved, which improved the treatment outcomes for psoriasis⁷⁻¹⁰.

In the last decade, the clinical situation for treating patients with psoriasis in Korea has changed substantially. However, no clinical consensus exists among experienced dermatologists regarding the therapeutic approach for psoriasis. Therefore, this study aimed to establish a consensus on the basic principles of a therapeutic approach for Korean patients with plaque psoriasis. Based on the experience of Korean experts in psoriasis, we used the modified Delphi consensus method.

MATERIALS AND METHODS

Steering committee and proposed statements

In February 2022, a steering committee of seven Korean dermatologists belonging to the Korean Society for Psoriasis convened to reach a treatment consensus for Korean patients with psoriasis. At the first meeting, the steering committee discussed the unmet treatment needs in Korean patients with psoriasis and selected five subjects about (1) the goal of treatment and evaluation of disease severity, (2) topical therapy, (3) phototherapy, (4) conventional systemic therapy, and (5) biologic therapy. Five sub-committees, comprising of five to seven dermatologists, were established for each subject. Each sub-committee drafted statements regarding each issue between March and April 2022, which the steering committee reviewed, subsequently proposing refined statements in May 2022 (Supplementary Fig. 1).

Delphi panel

The steering committee invited 61 dermatologists specializing in psoriasis treatment, based on their experience, knowledge, and involvement in academic and research projects on psoriasis. Most panel participants were dermatologists with hospital- and university-based activities. At their convenience, they

participated in two Delphi rounds in person or via a website link. The panel characteristics are presented in Table 1.

Voting and consensus

The consensus on the statements was confirmed by the panel participants through two Delphi rounds. The first voting round was held in June 2022. Fifty-four of the 61 panel members participated and scored their level of agreement for each statement using a ten-point scale ranging from 1 to 10 (1~3, disagree; 4~6, neutral; 7~10; agree). The participants provided queries and comments in free text as feedback in the first round. The steering committee and sub-committees then discussed the results of the first round several times in July 2022. The committee members then revised the statements for clearer and more formal wording. Statements that were ambiguous, less important, or without a consensus were discarded. Forty-one statements were formulated for voting in the second Delphi round.

Sixty panel members voted in the second round, held in August 2022. They scored their level of agreement for each final statement in the same manner as in the first round. The mean score of agreement for each statement and the percent-

Table 1. Characteristics of the Delphi panel

	Delphi panel (n=61)
Sex	
Female	24 (39.3)
Male	37 (60.7)
Years of practice as a specialist (yr)	
<5	2 (3.3)
5 to <10	10 (16.4)
10 to <15	14 (23.0)
15 to <20	12 (19.7)
20 to <25	9 (14.8)
25 to <30	4 (6.6)
30 to <35	5 (8.2)
≥35	5 (8.2)
Type of practice	
Private clinic-based practice	2 (3.3)
Hospital-based practice	59 (96.7)
Belonging to the Korean Society for Psoriasis	
Member	45 (73.8)
Non-member	16 (26.2)

Values are presented as number (%).

age distribution of the scores were calculated. When more than 70% of the scores for a specific statement were ≥ 7 , it was considered as reaching a consensus¹¹. A strong consensus was reached when $>80\%$ of scores for a statement were ≥ 7 .

RESULTS

In the first round, 53 statements were voted on by the panel participants, six of which did not reach a consensus (Supplementary Fig. 2). After discussing the results of the first round, the steering committee reformulated the final 41 statements for the second round. Through the second round, the final agreement rate for each statement was confirmed (Table 2~6).

Goal of treatment and evaluation of the disease severity (Table 2)

Korean experts strongly agreed that the ideal treatment goals for Korean patients with plaque psoriasis should include complete skin clearance as well as high dermatological quality of life; however, they should be set considering the characteristics of each individual and the state of the disease.

A strong consensus was reached that the Physician Global Assessment (PGA), body surface area (BSA), and Psoriasis Area and Severity Index (PASI) scoring systems are useful for

evaluating the severity of psoriasis and assessing treatment response in clinical practice. However, the Dermatology Life Quality Index (DLQI) has failed to reach a consensus on the usefulness of evaluating disease severity in clinical practice.

A strong consensus supported that categorizing the severity of psoriasis into mild versus moderate-to-severe psoriasis is clinically useful. The latter is defined as BSA $>10\%$ and PASI scores >10 , PGA score >3 , or DLQI score >10 .

Therapeutic approach with topical agents (Table 3)

A strong consensus indicated topical medications in patients with plaque psoriasis, regardless of the skin lesion severity.

All panel participants agreed that topical agents can be combined in patients receiving systemic therapy or phototherapy.

Statements regarding the choice of topical agents obtained strong consensus; that is, the formulation of topical agents as well as the characteristics of psoriasis lesions and the involved body parts should be considered.

A strong consensus supported the necessity of adherence assessment for patients with unacceptable responses. Additionally, experts generally agreed to administer maintenance therapy to prevent relapse.

Table 2. Consensus on the goal of treatment and evaluation of the disease severity

	Statement	Mean score of agreement	Agreement rate (≥ 7 points)
1	Treatment goals for psoriasis should be individualized and adapted to the characteristics of the disease and each patient.	9.2	98.3%
2	The ideal treatment goal is to achieve complete skin clearance for a long period of time.	8.8	98.3%
3	The ideal treatment goals should include maintaining a high dermatological quality of life for a long period of time.	9.0	100.0%
4	The PGA score is useful for evaluating the severity of psoriasis and assessing the treatment response in clinical practice.	8.3	95.0%
5	The BSA score is useful for evaluating the severity of psoriasis and assessing the treatment response in clinical practice.	8.1	86.7%
6	The PASI score is useful for evaluating the severity of psoriasis and assessing the treatment response in clinical practice.	8.0	90.0%
7	The DLQI score is useful for evaluating the severity of psoriasis and assessing the treatment response in clinical practice.	7.0	68.3%
8	Classification of severity into two main categories (mild vs. moderate-to-severe) is useful for the treatment of psoriasis in clinical practice.	8.0	88.3%
9	Moderate-to-severe psoriasis is defined by BSA $>10\%$ and PASI scores >10 , PGA score >3 , or DLQI score >10 .	8.0	88.3%

PGA: Physician Global Assessment, BSA: body surface area, PASI: Psoriasis Area and Severity Index, DLQI: Dermatology Life Quality Index.

Therapeutic approach with phototherapy (Table 4)

A strong consensus supported phototherapy for patients with moderate-to-severe psoriasis, the effectiveness of the fixed-dose protocol, and the PASI 75 response as the goal of phototherapy. The experts generally agreed on the duration of one year or less for maintenance phototherapy.

A strong consensus supported excimer laser therapy for localized psoriasis.

A strong consensus supported the combination of phototherapy with acitretin for greater efficacy.

Therapeutic approach with conventional systemic agents (Table 5)

A strong consensus supported conventional systemic agents for patients with moderate-to-severe psoriasis and the necessity of laboratory evaluation before and regularly during the treatment course. All panel participants agreed on considering the contraindications of each agent before initiating treatment.

The panel participants preferred methotrexate for patients with psoriatic arthritis, cyclosporine for patients who require rapid intervention, and acitretin for those with pustular psoriasis. They strongly agreed on folic acid supplementation during the methotrexate administration.

Regarding the duration of contraception, the experts

Table 3. Consensus on the therapeutic approach with topical agents

	Statement	Mean score of agreement	Agreement rate (≥7 points)
10	Topical treatment is recommended for patients with plaque psoriasis of any severity.	9.2	98.3%
11	Topical treatment can be combined with systemic therapy and phototherapy in patients with moderate-to-severe psoriasis.	9.3	100.0%
12	Topical agents should be selected based on the sites, extents, and characteristics of the psoriatic lesions.	9.4	98.3%
13	The formulation of products should be considered when selecting topical agents.	8.9	98.3%
14	The topical fixed-dose combination of corticosteroids and vitamin D analogs is recommended for psoriatic lesions on the trunk and extremities.	9.0	98.3%
15	Topical calcineurin inhibitors are recommended for psoriatic lesions in facial and intertriginous areas.	8.7	98.3%
16	Adherence should be assessed after four weeks of topical treatment if the response is not acceptable.	7.9	91.7%
17	Maintenance of topical treatment is recommended to prevent relapse.	7.3	75.0%

Table 4. Consensus on the therapeutic approach with phototherapy

	Statement	Mean score of agreement	Agreement rate (≥7 points)
18	Phototherapy can be considered prior to biologic treatment in patients with moderate-to-severe psoriasis.	7.8	85.0%
19	Phototherapy, starting with a fixed initial dose, is effective for psoriasis.	8.1	90.0%
20	The goal of phototherapy is to achieve a PASI 75 response within three months.	7.3	80.0%
21	Discontinuation of phototherapy may be considered if the maintenance period is longer than one year.	7.5	73.3%
22	Excimer laser therapy is recommended over phototherapy for localized psoriasis.	8.3	90.0%
23	Phototherapy can be combined with acitretin to achieve greater efficacy.	8.4	93.3%

PASI: Psoriasis Area and Severity Index.

strongly agreed that both female and male patients could conceive at least three months after the discontinuation of methotrexate, and that female patients could conceive at least three years after the discontinuation of acitretin.

Therapeutic approach with biologic therapy (Table 6)

A strong consensus supported biologics when conventional systemic treatment and phototherapy are inadequate, contraindicated, or not tolerated. The experts also agreed on the use

Table 5. Consensus on the therapeutic approach with conventional systemic agents

	Statement	Mean score of agreement	Agreement rate (≥7 points)
24	Conventional systemic agents are recommended for patients with moderate-to-severe plaque psoriasis.	8.9	95.0%
25	Baseline laboratory evaluation is recommended before beginning conventional systemic therapy.	9.5	100.0%
26	Regular laboratory monitoring is recommended during conventional systemic therapy.	9.2	98.3%
27	Absolute and relative contraindications for each conventional systemic agent should be considered before initiation.	9.3	100.0%
28	Methotrexate is the preferred conventional systemic agent for patients with psoriatic arthritis.	8.8	98.3%
29	Folic acid supplementation is recommended during methotrexate administration.	8.2	88.3%
30	Both female and male patients are recommended to wait for at least three months after the discontinuation of methotrexate before attempting to conceive.	8.8	93.3%
31	Cyclosporine is the preferred conventional systemic agent for patients requiring rapid intervention.	8.6	95.0%
32	Acitretin is the preferred conventional systemic agent for patients with pustular psoriasis.	8.4	93.3%
33	Female patients are recommended to wait for at least three years after the discontinuation of acitretin before attempting to conceive.	9.2	98.3%

Table 6. Consensus on the therapeutic approach with biologic treatment

	Statement	Mean score of agreement	Agreement rate (≥7 points)
34	Biologics are recommended if conventional systemic therapies and phototherapy are inadequate, contraindicated, or not tolerated.	9.3	96.7%
35	Biologics can be used to treat localized psoriatic lesions associated with significant functional impairment and high levels of distress (e.g., lesions in the scalp, face, nails, and genitalia).	8.3	90.0%
36	Patients treated with biologics should be periodically evaluated for treatment responses.	9.1	96.7%
37	Patients treated with biologics should be monitored for infection and malignancy.	8.0	85.0%
38	Treatment failure with biologics is defined as <PASI 75.	8.2	86.7%
39	A washout period is not required when switching biologics because of treatment failure.	8.7	98.3%
40	Interclass switching of biologics is recommended rather than intraclass switching in cases of primary failure.	8.0	85.0%
41	Biologics should be used after carefully weighing the risks and benefits of serious infections, surgery, and pregnancy.	8.2	90.0%

PASI: Psoriasis Area and Severity Index.

of biologics to treat localized psoriatic lesions, which can significantly impair a patient's quality of life.

A strong consensus supported periodic evaluation of treatment response and monitoring for possible infection and malignancy during the biologic therapy.

The experts agreed to define treatment failure with biologics as <PASI 75 and to consider switching biologics without a washout period in case of treatment failure. They also agreed that interclass switching is better than intraclass switching in cases of primary failure, that is, treatment failure due to lack of initial efficacy.

A strong consensus supported that in cases of medical issues, such as serious infections, surgery, and pregnancy, the risks and benefits of biologics treatment should be carefully evaluated.

DISCUSSION

The treatment goal is the most important factor when determining the approach to managing a disease. Many clinical guidelines or expert consensus have proposed that the ideal goal in treating psoriasis is to achieve clearance with a good quality of life and maintain it in the long term¹²⁻¹⁵, which is consistent with the current Korean experts consensus. However, this is unrealistic, and physicians have thus differentiated the "goals" from the "targets" of treatment. Targets are the specific and measurable aspects of disease improvement¹⁶. For psoriasis, PGA, BSA, PASI, and DLQI are useful tools for measuring disease severity and evaluating the response to treatment. These tools are considered too complicated, time-consuming, and prone to inter-observer variation for use in daily practice, although they are widely used in clinical trials^{17,18}. However, Korean experts reached a consensus that PGA, BSA, and PASI are also useful in clinical practice, except for DLQI. This may be attributed to the experience of Korean dermatologists with these tools because of the insurance regulation that defines patients with severe psoriasis using BSA and PASI.

Almost 75% to 85% of psoriasis patients have limited area involvement^{19,20}, and topical products are the mainstay of therapy for mild to moderate psoriasis²¹. Because they are frequently used as adjunctive therapies for patients on other systemic therapies¹², Korean experts reached a consensus that topical agents can be used for plaque psoriasis of any severity.

Topical corticosteroids remain the mainstay therapy for

psoriasis being highly efficacious and highly recommended by international guidelines^{12,20}. Considering the efficacy and long-term safety of a fixed-dose combination of corticosteroid and vitamin D analogs, it is the preferred topical medication for the treatment of truncal lesions of psoriasis in Korea²². Topical calcineurin inhibitors are especially recommended for thinner psoriatic lesions, such as lesions in facial and intertriginous areas²³.

"Proactive treatment" or "maintenance therapy" refers to the topical treatment of areas that are clinically quiescent but are usually involved in recurrence, a concept widely used in the management of atopic dermatitis¹². It typically means twice-weekly topical treatment on these clinically quiescent areas and can be implemented with any topical agents¹². Adherence to topical treatment is an important aspect of maintenance therapy. Although a general consensus exists regarding proactive treatment, Korean experts seem to consider the initial rapid control of plaques more important than maintenance treatment in the treatment of plaque psoriasis²⁴.

Phototherapy is usually recommended for patients with psoriasis who experience moderate-to-severe disease or topical therapy failure¹⁵. From the current consensus for phototherapy in the treatment of psoriasis, most experts recommend phototherapy prior to biologic treatment in patients who are candidates for the use of biologics. Phototherapy is effective in treating psoriasis, with 62% to 70% of patients achieving PASI 75 response after 20 sessions¹⁵. Moreover, phototherapy has synergistic therapeutic effects in combination with acitretin, which warrants consideration for combination therapy in moderate-to-severe psoriasis patients prior to biologics²⁵. Some reports support the combination of phototherapy with methotrexate or biologics, especially in patients with insufficient clinical efficacy after methotrexate or biologics monotherapy^{25,26}. However, our expert consensus does not strongly recommend these combination therapies, possibly due to the possible increased risk of malignancy secondary to immunosuppression during phototherapy. Although evidence is lacking on the cancer risk associated with the combination of phototherapy with immunosuppressive agents and biologics in Asian patients with psoriasis, including Koreans, the current consensus recommends a more conservative approach for combination treatment with phototherapy. Further evidence is needed to determine the efficacy and safety of the combination of phototherapy with immunosuppressive agents for

managing Korean patients with psoriasis.

The indications for conventional systemic agents for psoriasis are not clearly established^{14,15,27}. Korean experts strongly recommend that conventional systemic agents for patients with moderate-to-severe psoriasis. However, individual patient factors should be considered¹⁴. Baseline evaluation before initiating any conventional systemic agent and regular monitoring during the treatment course are necessary because each agent has contraindications, well-known adverse effects, and drug interactions.

Korean experts agree on statements regarding the specific advantages of each conventional systemic agent. They preferred methotrexate for patients with psoriatic arthritis based on clinical experience, although results regarding the efficacy of methotrexate in psoriatic arthritis have been inconsistent^{28,29}. Additionally, supplementation with folic acid is recommended to prevent the adverse effects of methotrexate, although the influence of folic acid has not been fully analyzed and folic acid may slightly decrease methotrexate efficacy in psoriasis patients^{30,31}. The consensus supports cyclosporine for patients who require rapid intervention because of its faster onset of action, while acitretin is preferred for patients with pustular psoriasis.

One critical concern is that methotrexate and acitretin require contraception during treatment and even after discontinuation. However, discrepancies exist between the guidelines on the duration of contraception^{13-15,32}. The Korean experts reached a consensus supporting at least three months of contraception for both female and male patients after the discontinuation of methotrexate, and at least three years for female patients after the discontinuation of acitretin.

Korean experts concluded that biologics should be used if conventional systemic therapies and phototherapy are inadequate, contraindicated, or not tolerated, which is consistent with the recommendations of other guidelines on the treatment of psoriasis^{14,33-37}. In real-world clinical settings, the use of biologics for Korean patients with psoriasis is usually limited to patients with severe psoriasis because the National Health Insurance Service of Korea only covers the cost of biologics for these patients. However, the panel participants achieved a strong consensus on the possible use of biologics for lesions on the scalp, face, nails, and genitalia, with significant functional impairment and high levels of distress. This consensus statement was in concordance with the international

recommendations that biologics can be used in patients with a limited extent of disease when there is significant impairment of quality of life^{15,33,34,37}.

The expert consensus on the monitoring of biologics was similar to the available literature^{14,34,36,38,39}. In the presence of medical issues, such as serious infection, surgery, and pregnancy, the risks and benefits of biologic treatment should be carefully weighed.

If the treatment response is insufficient, the treatment should be modified promptly⁴⁰. There was guidance based on the expert consensus that defined an inadequate response as <PASI 50⁴¹. Other guidelines and consensus have proposed similar criteria to define treatment failure of biologics^{15,34,35,42-44}. The advent of new biologics and their expanded use have dramatically improved the outcome of psoriasis treatment⁴⁵. The Korean experts reached a consensus to define the treatment failure of biologics as <PASI 75, which entailed realistic recommendations for the current clinical setting and reflects the raised expectations in biologic treatment. Limited data are available on the transition from one biologic to another in routine clinical practice. However, 85% of the panel participants recommended the interclass switching of biologics in case of a lack of initial efficacy.

Through two modified Delphi rounds, Korean experts successfully established an expert consensus on the basic principles of the therapeutic approach for Korean patients with plaque psoriasis. This consensus covered general and critical treatment-related issues, such as treatment goal and the evaluation of disease severity, topical therapy, phototherapy, conventional systemic therapy, and treatment with biologics. This consensus may be helpful for physicians in treating Korean patients with plaque psoriasis.

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SUPPLEMENTARY MATERIALS

Supplementary data can be found via <http://anndermatol.org/src/sm/ad-22-216-s001.pdf>.

CONFLICTS OF INTEREST

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DATA SHARING STATEMENT

The data that support the findings of this study are available from the first author upon reasonable request.

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