CLINICAL SEVERITY INSTRUMENTS

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In the development and assessment of new therapeutic modalities, a clear definition of a patient's psoriasis severity is of crucial importance. The impact of a given therapy can then be evaluated, based on the changes of the severity score during and after treatment.

There are several physical measures to define psoriasis severity: Body Surface Area (BSA), Psoriasis Area and Severity Index (PASI), Psoriasis Global Assessment (PGA), Lattice System Physician's Global Assessment (LS-PGA), Salford Psoriasis Index (SPI), Nail Psoriasis Severity Index (NAPSI), Self-Administered PASI (SAPASI). Moreover the American College of Rheumatology (ACR) and Disease Activity Score (DAS) are other important instruments for assessing psoriatic arthritis. However psoriasis scoring systems which are currently available have several limitations; for that reason it is imperative to incorporate psychosocial measures when determining baseline severity or utility of treatments.

The most used psoriasis scoring systems are presented below.

Body surface area. Psoriatic Body Surface Area (BSA) refers to the percentage of area affected by psoriasis. BSA is, in daily practice, calculated using the rule of nine and the palmar side of the patient's hand as equivalent to 1% of the BSA. In general, a BSA under 5% indicates mild psoriasis, moderate is between 5% and 10%, and over 10% is considered severe. The erythema may be evaluated using a chromometer, the infiltration using ultrasound, and the BSA involved using a computer image analysis of photographs.

A study into the interobserver validity of BSA showed that the percentages given vary widely, and that there is a general overestimation of BSA involved, when compared to computer image analysis.[1]

However a patient may believe that a given treatment is beneficial, despite minimal changes in BSA, if there is any associated reduction in the itching or scaling; therefore, BSA alone is not an acceptable efficacy measure.

Psoriasis Area and Severity Index. Psoriasis Area and Severity Index (PASI) scale is the clinical scoring system most commonly used to assess the disease severity in clinical trials. Fredriksson and Petterson created the PASI in 1978 as a method to evaluate the clinical efficacy of a new treatment for psoriasis.[2]

Typically, PASI would be calculated before, during, and after a treatment period in order to determine how well psoriasis responds to the treatment.

To evaluate PASI score the body is divided into four sections. Each of these areas is scored by itself, and then the four scores are combined into the final PASI. The four areas are: legs (40%); trunk (30%); arms (20%); and head (10%).

For each skin section, the amount of skin involved is measured as a percentage of that part of the body. To the percentage calculated a score from 0 to 6 (0=1%; 1=<10%; 2=10-29%; 3=30-49%; 4= 50-69%; 5=70-89%; 6=90-100%) is then assigned.

Severity is measured by three different parameters: erythema (E), infiltration (I) and desquamation (D). Again, each of these is used separately for each skin section. These are evaluated on a scale of 0 to 4, from none to 'very severe' (None=0; Some=1; Moderate=2; Severe=3; Very Severe =4). For each skin section, the four severity scores are added, the total is multiplied by the area score, and the result multiplied then by the percentage of skin in that section, as follows:

- Head: $(I_{head}+E_{head}+D_{head}) \times A_{head} \times 0.1 = Total_{head}$
- Arms: $(I_{arms}+E_{arms}+D_{arms}) \times A_{arms} \times 0.2 = Total_{arms}$
- Body: $(I_{body}+E_{body}+D_{body}) \times A_{body} \times 0.3 = Total_{body}$
- Legs: $(I_{legs}+E_{legs}+D_{legs}) \times A_{legs} \times 0.4 = Total_{legs}$

PASI score can vary from 0 to 72, with higher scores indicating more severe conditions. In chronic plaque psoriasis, a PASI under 8 is designated as mild, between 8 to 12 is moderate, and over 12 is considered severe. (Fig. 12.1 and 12.2) In clinical trials involving the evaluation of treatment modalities, efficacy is often expressed as percentages of patients reaching PASI reductions of 90%, 75%, and 50%.[3,4,5] For example, a very effective treatment would have a PASI 75 of 80% after 12 weeks of active therapy, indicating that 80% of patients have a PASI reduction of 75% after this period of treatment. PASI 90, PASI 75, PASI 50, and sometimes also PASI 60 and PASI 25, are now routinely used in the development of new therapies for psoriasis. A 75% reduction in the PASI score is the current benchmark of primary endpoints for most clinical trials on psoriasis. Carlin et al hypothesized that a 50% reduction in the PASI score represents a meaningful change in a person's life and thus should be considered a better primary endpoint; they confirmed this hypothesis analyzing PASI and Quality of life data in a clinical trial.[4] Revisions of PASI score such as SAPASI, TOPASI, SPASI ans PPPASI have been reported.

Topical PASI (TOPASI) may be used for individual lesions (indicator lesions).

More recently Louden et al. Purposed a simplified PASI (SPASI), that provides a pratical estimate of the disease severity requiring four, rather than sixteen, independent variables.[5]

Moreover, when psoriasis is associated with PPP (Palmoplantar Pustular Psoriasis) may be helpful to use PPPASI (Palmoplantar Pustular Psoriasis Area and Severity Index).[6]

PPP disease is a disabling condition underestimated by the PASI score. PPPASI evaluates severity of erythema, pustules and desquamation of the palmoplantar lesions (see Table 1).

Table 1. *Calculation of Palmoplantar Pustular Psoriasis Area and Severity Index (PPPASI)*

SCORE	**0**	**1**	**2**	**3**	**4**	**5**	**6**
Erythema (E)	None	Slight	Moderate	Severe	Very severe		
Pustules (P)	None	Slight	Moderate	Severe	Very severe		
Desquamation (D)	None	Slight	Moderate	Severe	Very severe		
Area affected (%)	0	10	10<30	30<50	50<70	70<90	90-100

PPPASI= (E+P+D) Area x 0.2 (right palm) + (E+P+D) Area x 0.2 (left palm) + (E+P+D) Area x 0.3 (right sole) + (E+P+D) Area x 0.3 (left sole)

Fig. 12.1. PASI 5*. Less than 10% of the body is affected. Erythematous plaques involve only a limited area of the legs.*

Fig. 12.2. PASI 58: *More than 75% of the body is involved, with erythema, thick plaque and desquamation.*

As with body surface area, PASI scores only measure the severity of the skin but disregard patient's burden of their disease, which is determined not only by the percentage of its involvement but also by the impact that psoriasis has on the quality of life.

Dispite the limitations, the PASI score remains the most accepted and the widely used measure in clinical trials.[7]

Psoriasis Global Assessment. Beside PASI, Psoriasis Global Assessment (PGA) is the system most often employed in clinical trials to measure psoriasis severity. PGA has the investigator assign as a single estimate of the patient's overall severity of disease ; typically, a 7-point scale from clear to severe is used, although many variations have been employed.[1]

Possible scores are "Cleared" (100% improvement), no sign of psoriasis (postinflammatory hyperpigmentation may be present); "Almost clear" (75%–99% improvement), intermediate between cleared and mild; "Mild" (50% – 74% improvement), slight plaque elevation, scaling, and/or erythema; "Mild to moderate" (25% – 49% improvement), intermediate between moderate and mild; "Moderate" (1% – 24% improvement), moderate plaque elevation, scaling, and/or erythema; "Moderate to severe", marked plaque elevation, scaling and/or erythema; and "Severe", very marked plaque elevation, scaling, and/or erythema. All these groups can be utilized with different descriptions and scores; even if the individual elements of psoriasis plaque morphology or degree of body surface area involvement are not quantified.[8]

Overall lesion severity scale. Overall lesion severity (OLS) scale, or static physician's global assessment (sPGA), is a physician global rating of psoriasis severity, that focuses on plaque, scaling

and erythema, at a given time (eg, on the day of observation). It comprises a six-category scale ranging from 0 ('clear') to 5 ('very severe').[9]

Lattice System Physician's Global Assessment. Lattice System Physician's Global Assessment (LS-PGA) is a physician's global assessment for quantifying psoriasis severity.

This new measure is similar in result to PGA but it takes a quantitative approach to global assessment of psoriasis severity by integrating ranges of the percent of the body surface area involved and the overall plaque morphology.

LS-PGA is composed of two steps: in the first one, the percentage of body surface involved is assessed using a 7-point scale, in the second one, average plaque qualities of thickness, erythema, and scale are assessed using a 4-point scale. Then scores for percentage of body surface and average plaque qualities are combined in a lattice to determine a final rating from clear to very severe. The lattice portion is typically performed by computerized algorithm. (experimental version 3.0).[7]

LS-PGA is a good measure to quantify the relative variation of psoriasis. In fact besides being easy it meets all requirements for evaluating psoriasis: standardization with clear definitions, static and objective measurement, reliable and reproducible results (even for physicians who have not participated in many trials), and a clinically relevant final result.

Salford Psoriasis Index. SPI (Salford Psoriasis Index) is derived from combining a score of current severity of psoriasis based on PASI, a score indicating psychosocial disability, and a score based on historical information. The resultant three-figure SPI (Signs, Psychosocial Disability, Interventions) is a similar paradigm to TNM (tumour, nodes, metastasis) classification used for cancer staging. The first figure or "signs" score is derived from the PASI that is calculated by a standard method. SPI changes PASI into a number from 0 to 10, with each number corresponding to a band of PASI values. The second figure is a validated visual analogue, the "psychosocial disability" score, a derived score of the psychosocial disability due to psoriasis. Patients are asked to mark on a visual analogue scale (VAS) the extent to which they perceive that their psoriasis is affecting their day-to-day life at the time of the assessment.[10] The third figure, the "interventions" score reflects historical therapy and it is calculated according to the amount of patients past systemic or hospital-based therapy (1 point for each individual systemic treatment including PUVA, 1 extra point for each treatment received for >1 year, 1 extra point if patient has received >1000 J/cm^2 of PUVA, 1 point for every 5 hospital admissions for treatment of psoriasis, 1 point for every episode of erythroderma).[11]

SPI has recently been suggested that an index of quality of life or psychosocial distress secondary to psoriasis is more useful than an index of the clinical extent of psoriasis for the assessement of severity in the context of clinical trials and third-party reimbursement.[12]

Self-administered Psoriasis Area Severity Index. Self-administered Psoriasis Area Severity Index (SAPASI) is a clinical instrument used to measure the extent of psoriasis on the surface of the body.[13] Although this index is usually filled by a clinician, it has been validated for completion by patients themselves. It is a structured, validated instrument,[14] which consists of two silhouettes representing the front and back of an individual. Respondents are required to shade in the affected areas. The erythema, thickness and scaliness of an average lesion are rated on VAS. This method is an independent evaluation of the percentage of area in each four body regions: head, trunk and upper and lower extremities. Lesion ratings are obtained using the tree VAS scales. Finally, the scores are entered into a formula to produce an overall severity score.

The range and interpretation of SAPASI scores are the same of those of PASI.

Nail Psoriasis Severity Index. PASI scale is the major score for assessment of psoriasis of the skin. However, it does not specifically address nail involvement. Before treating nail psoriasis, physicians must take into account the severity of the disease and whether it is limited to the nail or extends to the skin. A scale for the assessment of nail psoriasis is therefore necessary.[15] Nail Psoriasis Severity Index (NAPSI) is a simple tool used to evaluate nail psoriasis, giving a score to each nail for nail bed and nail matrix psoriasis.

The nail plate is divided into quadrants by imaginary longitudinal and horizontal lines.

The nail plate is assessed by considering the presence of the following features of nail matrix psoriasis, in each quadrant of the nail: nail pitting, leukonychia, red spots in the lunula, and crumbling. Nail bed psoriasis is assessed by considering the presence of the following features of nail bed psoriasis, in each quadrant of the nail: onycholysis, oil drop (salmon patch) dyschromia, splinter hemorrhages, and nail bed hyperkeratosis.

The score is 0 if the findings are not present, 1 if they are present in 1 quadrant of the nail, 2 if present in 2 quadrants of a nail, 3 if present in 3 quadrants of a nail, and 4 if present in 4 quadrants of a nail. Therefore each nail has a matrix score (0-4) and a nail bed score (0-4), and the total nail score is the sum of those 2 (0-8). The sum of the total score of all involved fingernails is the total NAPSI score for that patient at that time. If a more sensitive scale is needed, the nail can be given a separate score for all 8 features in each quadrant. The resulting is a 0 to 32 scale for the nail.[16] (Fig. 12.3 and 12.4)

Fig. 12.3. *An example of mild nail psoriasis. Nail bed score is* ***2*** *and nail matrix is* ***1****. Total NAPSI score is* ***3****.*

Fig. 12.4. *An example of scoring with the NAPSI scale of a moderate nail matrix psoriasis. The nail is divided in two quadrants and each quadrant is evaluated for nail matrix and nail bed psoriasis. In this case, nail bed score is* ***4****, while nail matrix is* ***1****. Total NAPSI score is* ***5****.*

It is important to emphasize the significance of nail psoriasis evaluation. In fact, this localization could determinate either a functional disability, especially in severe nail involvement, and a psychological distress which interfere both with patient's emotional and professional life.

Scoring of psoriatic arthritis. Rheumatologists have developed the scoring systems for assessing psoriatic arthritis, mainly derived from systems applied in rheumatoid arthritis. American College of Rheumatology (ACR) is a complex score, including the number of joints affected, the patient's assessment of the disease activity, disability and pain, the physician's global assessment, and laboratory variables such as Erythrocyte Sedimentation Rate and C-Reactive Protein.[17]

A simpler score is the Disease Activity Score (DAS or DAS28), which includes counting the swollen and tender joints (maximum of 28), C-Reactive Protein, and PGA visual analogue score. Improvements in ACR or DAS of 20% are already considered as significant and relevant. This is the result of irreversible damage in arthritis patients. The efficacy of a given therapy will thus not easily lead to improvements of 75%, such as in cutaneous involvement.[3]

It is essential that the physicians know how to use the before mentionated instruments for a clear definition of the patient's psoriasis severity.

The variability of physicians' evaluations of psoriasis is an important role for clinical research and for the development and assessment of new therapeutical modalities.

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