Contribution of the Polymyalgia Rheumatica Activity Score to Glucocorticoid Dosage Adjustment in Everyday Practice

CAROLINE CLEUZIOU, AYMERIC BINARD, MICHEL DE BANDT, JEAN-MARIE BERTHELOT, and ALAIN SARAUX

ABSTRACT. ***Objective.*** To evaluate the usefulness of the polymyalgia rheumatica (PMR) activity score (PMR-AS) in guiding adjustment of glucocorticoid (GC) dosage.

Methods. Rheumatologists prospectively included patients receiving GC therapy for PMR. At each visit, they assessed disease activity using a visual analog scale for physician's global assessment (VASph) and recorded whether a flare was diagnosed and/or the GC dosage was changed. In each patient, the PMR-AS was calculated using the formula of Leeb and Bird: C-reactive protein (mg/dl) + VAS pain score (0 to 10) + VASph (0 to 10) + (morning stiffness in min × 0.1) + elevation of upper limbs (0–3). We evaluated the correlation between PMR-AS and GC dosage changes in the group already treated with GC.

Results. We included 89 patients (mean age 74.6 ± 6.2 yrs; disease duration 1.6 ± 2.2 yrs), who had a total of 149 visits. PMR-AS was available for 137 visits. Of those, 124 involved patients already treated with GC, and 13 patients who started GC treatment. The Spearman correlation coefficient between PMR-AS values and GC dosage change was 0.58 ($p < 0.001$). In the group already treated with GC, when the PMR-AS was higher than 20, GC dosages were never decreased. When the PMR-AS was between 10 and 20, GC dosages were decreased in 4 patients, unchanged in 4, and increased by < 5 mg in 4 patients. When PMR-AS was < 10, GC dosages were generally decreased.

Conclusion. The PMR-AS is helpful for diagnosing flares of PMR and may also assist in everyday practice to decide how to change the GC dosage. (J Rheumatol First Release Dec 15 2011; doi:10.3899/jrheum.110866)

Key Indexing Terms:
DISEASE ACTIVITY SCORE PMR-AS POLYMYALGIA RHEUMATICA
DIAGNOSIS TREATMENT OUTCOME

Polymyalgia rheumatica (PMR) is a disease of older individuals characterized by pain and morning stiffness of the shoulder and pelvic girdles. The diagnosis is challenging because the clinical symptoms are often atypical and the range of differential diagnoses is broad[1]. The main symptoms are persistent bilateral inflammatory pain for > 1 month with morning stiffness in the neck, shoulders, and pelvic girdle, and laboratory evidence of systemic inflammation [erythrocyte sedimentation rate (ESR) > 40 mm/h][2,3]. Active, and often passive, range of motion limitation is common at the shoulders and hips. Other manifestations include asymmetric arthritis (knee and wrist), edema of the dorsum of the hands, and carpal tunnel syndrome[4,5].

The treatment of PMR rests on prednisone. Both the starting dosage (usually 10–20 mg/day) and the tapering schedule[6,7,8] vary widely across physicians and patients. The regimen suggested by the British Society of Rheumatology (BSR)[6] for gradual glucocorticoid (GC) tapering is daily prednisolone (or prednisone) 15 mg for 3 weeks, then 12.5 mg for 3 weeks, then 10 mg for 4–6 weeks, then reduction by 1 mg every 4–8 weeks. For the BSR, relapse is the recurrence of symptoms of PMR, justifying increasing GC to a previous higher dose.

Objective disease activity criteria would help to determine when remission has occurred and will probably be available in the near future[9]. However, there is also a need for objective criteria for tailoring the prednisone dosage to disease activity until remission is achieved.

In 2003, the European Collaborating Polymyalgia Group of the European League Against Rheumatism developed response criteria and an activity score (the PMR-AS) based on 5 items: morning stiffness (min), shoulder elevation (0, > 90°; 1, 90°; 2, < 90°; and 3, 0°), physician's global assessment on a

From the Rheumatology Unit, Brest Teaching Hospital, Brest; Rheumatology Unit, Robert Ballanger Hospital, Aulnay sous Bois; and the Rheumatology Unit, Nantes Teaching Hospital, Nantes, France.

C. Cleuziou, MD; A. Binard, MD, Rheumatology Unit, Brest Teaching Hospital; M. De Bandt, MD, PhD, Rheumatology Unit, Robert Ballanger Hospital; J-M. Berthelot, MD, Rheumatology Unit, Nantes Teaching Hospital; A. Saraux, MD, PhD, Rheumatology Unit, Brest Teaching Hospital.

Address correspondence to Prof. A. Saraux, Rheumatology Unit, Hôpital de la Cavale Blanche, BP 824, F29609 Brest cedex, France. E-mail: Alain.Saraux@chu-brest.fr

Accepted for publication September 20, 2011.

10-point visual analog scale (VASph), pain severity on a 10-point VAS (VASp), and C-reactive protein (CRP) level (mg/dl)[10,11]. The score generally ranges from 0 to 50. Scores > 7 indicate somewhat active disease, scores between 7 and 17 moderately active disease, and scores > 17 highly active disease.

The PMR-AS is well suited to everyday practice, and its usefulness has been improved by the determination of cutoffs for disease remission and relapse. Thus, PMR-AS values between 0 and 1.5 suggest disease remission[12] and values > 9.35 (in patients with previously controlled disease) or having increased by 6.6 or more between 2 visits suggest disease relapse[13]. Studies consistently found that the PMR-AS was easy to use and valid when determined by rheumatologists or general practitioners (GP)[12,13,14,15], despite considerable interobserver variability in the VASph score.

We recently reported that the PMR-AS may help both GP and rheumatologists to tailor the GC dosage to disease activity[15]. However, we did not evaluate whether changes in the GC dosage correlated with PMR-AS values.

If the range of prescription is variable, a guideline should help physicians to standardize the GC dosage. If the tapering or increase of corticosteroid dosage is proportional to PMR-AS level, rheumatologists and GP should use this tool for GC dosage. Here, our objectives were to investigate correlations between prednisone dosage changes made at the discretion of the clinicians without using the PMR-AS, and to find the mean change of prednisone dosage that should be recommended for various levels of PMR-AS values in everyday clinical practice.

MATERIALS AND METHODS

Study rheumatologists. The patients were recruited by 26 rheumatologists working with the Inflammatory Joint Disease Working Group of the French Society for Rheumatology (Club Rhumatismes et Inflammation). The rheumatologists recruited consecutive patients meeting the inclusion criteria.

Inclusion criteria. Patients were eligible if they were taking GC therapy for PMR. Because no specific diagnostic criteria are available, we defined PMR for our study as a diagnosis of PMR by a rheumatologist in the absence of other diseases that might mimic PMR.

Study questionnaire. Age and date of PMR diagnosis were recorded for each patient. At each visit, the rheumatologist recorded the PMR-AS items (VASp, VASph, morning stiffness, upper limb elevation, ESR, and CRP); whether the patient had synovitis, limb girdle pain, fever, nocturnal awakenings due to PMR, and/or weight loss; whether a flare was diagnosed; and whether the prednisone dosage was changed. By definition, a flare is a change from inactive to active disease. For our study, a flare was diagnosed if the patient experienced either the first bout of active disease (transition from health to symptomatic disease) or a transition from controlled to uncontrolled disease while on prednisone therapy, in the opinion of the rheumatologist.

PMR-AS. We calculated the PMR-AS as described by Leeb and Bird[10]:

PMR-AS = CRP (mg/dl) + VASp (0–10) + VASph (0–10) + (morning stiffness in min × 0.1) + upper limb elevation (0–3)

The rheumatologist neither calculated nor used the PMR-AS during our study.

Statistical analysis. We computed the Spearman correlation coefficient to evaluate the correlation between PMR-AS and the prednisone dosage change between 2 visits. To illustrate the prednisone dosage changes compared to PMR-AS values, we categorized prednisone dosages in increments of 5 mg/day and PMR-AS changes in increments of 5 points.

RESULTS

The 26 participating rheumatologists recruited 89 patients (mean age 74.6 ± 6.2 yrs, disease duration 1.6 ± 2.2 yrs), who had a total of 149 visits. On those visits, 137 had PMR-AS available, including 13 first visits and 124 followup visits.

Rheumatologists generally started the treatment at 15 mg but on occasion at higher or lower dosages, according to the disease activity. We found a good correlation between changes of prednisone dosage and PMR-AS score values in the whole group ($r = 0.58$; $p < 0.001$; Figure 1).

Table 1 shows changes of prednisone dosage according to PMR-AS values in the group of 124 patients. When the PMR-AS was not greater than 5 (71 visits), the prednisone dosage was usually decreased (59 visits) and was less often left unchanged (11 visits) or increased by < 5 mg/day (1 visit); it was never increased by > 5 mg/day. When the PMR-AS value was between 5 and 10 (30 visits), the prednisone dosage was either decreased (19 visits), unchanged (9 visits), or increased by < 5 mg/day (2 visits). When the PMR-AS value was between 10 and 20, the prednisone dosage was also decreased (4 visits), unchanged (4 visits), or increased (4 visits) by < 10 mg/day. When the PMR-AS was > 20 (11 visits), the prednisone dosage was usually increased by > 5 mg/day and less often left unchanged (3 visits including 2 with PMR-AS > 20). Both patients having PMR-AS higher than 20 for whom the

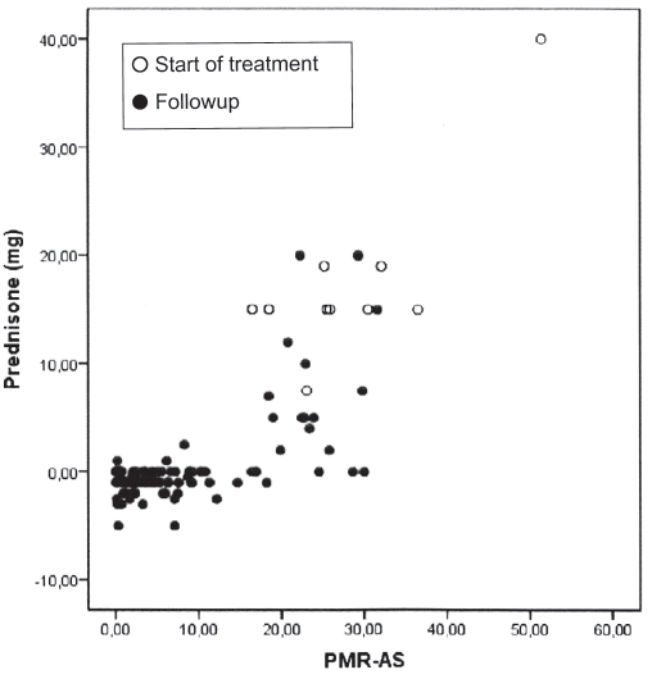

Figure 1. Correlation between polymyalgia rheumatica activity score (PMR-AS) and change of prednisone dosage (mg/day) when the treatment was started and during the followup.

Table 1. No. patients experiencing change of prednisone dosage (in steps of 5 mg/day) by change of PMR-AS.

PMR-AS	Prednisone Dosage Change						
	–5 to –1 mg	0 mg	1–4 mg	5–9 mg	10–14 mg	15–19 mg	> 20 mg
< 5	59	11	1	0	0	0	0
5–9.9	19	9	2	0	0	0	0
10–14.9	3	3	0	1	0	0	0
15–19.9	1	1	1	2	0	0	0
20–24.9	0	1	2	1	2	0	0
25–29.9	0	2	0	0	0	0	2
≥ 30	0	0	0	0	0	1	0
Total no. patients	82	27	6	4	2	1	2

PMR-AS: polymyalgia rheumatica activity score.

prednisone dosage was unchanged had a discordance between VASp (> 5) and VASph (< 5) and a normal CRP. Another pathology explained the pain, and so the discordance.

Table 2 shows the means of prednisone dosage changes in patients previously treated with GC, tapered below a score of 15 and increases of 2.6, 5, and 10 mg if PMR-AS was above 15, 20, and 25, respectively.

DISCUSSION

PMR affects older patients, who are at high risk for side effects of GC therapy. Accurate tailoring of the GC dosage to the needs of each patient may decrease the occurrence of diabetes mellitus, vertebral fractures, femoral neck fractures, hip fractures, and cardiovascular disorders[12,13].

In everyday practice, rheumatologists usually diagnose PMR and start prednisone therapy. Then the GP provides followup and tapers the prednisone dosage, in the absence of clear guidelines. A simple tool to help decide how and when to adjust the prednisone dosage to disease activity would be of considerable usefulness to both rheumatologists and GP. The effectiveness of the PMR-AS in diagnosing disease flares has been established in many studies[12,13]. We recently showed that the PMR-AS may help both rheumatologists and GP to tailor the prednisone dosage to disease activity[15]. However, we did not evaluate whether the prednisone dosage change correlated with the PMR-AS value. The correlation shown here between the prednisone dosage changes and the PMR values suggest that the PMR-AS may indeed help rheumatologists and GP determine exactly how much prednisone each patient needs at a given time.

Table 2. Means of prednisone dosage changes in patients previously treated with glucocorticoids.

PMR-AS	Mean Change	No. Visits	SD
0–4.9	–1	71	0.87
5–9.9	–0.72	30	1.20
10–14.9	–0.14	7	2.52
15–19.9	2.6	5	3.36
20–24.9	5.5	6	4.63
≥ 25	10	5	11.54

PMR-AS: polymyalgia rheumatica activity score.

According to the BSR, relapse is the recurrence of symptoms of PMR, justifying increasing GC to previous higher doses. In our study, the prednisone dosages used for each 5-point increase in PMR-AS values varied somewhat, albeit within a narrow range. Our results suggest that this BSR tapering schedule may be appropriate when the PMR-AS value is not > 10 but that a stable dosage may be in order for PMR-AS values of 10 to 15, and that increased dosage may be in order otherwise. The following increases may be appropriate: PMR-AS 15 to 20, 2.5 mg/day; PMR-AS 20 to 25, 5 mg/day; and PMR-AS > 25, 10 mg/day. However, because some patients having a PMR-AS > 20 had another pathology to explain why that rheumatologist did not increase the prednisone, GP should be encouraged to refer patients to rheumatologists in cases of doubt, peculiarly when CRP level is normal.

Our study has limitations. First, only patients in France were included, and they were evaluated by French rheumatologists. Second, the number of patients remains too low (particularly for the patients with PMR-AS > 10) to conclude that it is useful to tailor the GC dosage in everyday practice in this subgroup of patients. Third, the lack of longterm followup hinders evaluation of the effect of the variable dosages.

Our results suggest that the PMR-AS may help to tailor the GC dosage in patients with PMR who are seen in everyday practice. Using the PMR-AS during followup as described would improve practice uniformity. Dosage tapering as recommended by the BSR should be started again when the PMR-AS falls below 10. A cohort study would be welcome to investigate whether dosage adjustment based on the PMR-AS value at each visit significantly diminishes the cumulative prednisone dosage from diagnosis to full recovery.

ACKNOWLEDGMENT

We are indebted to the following physicians for their participation in the study: J.P. Benais, L. Beraneck, A. Besson, B. Boyer, D. Caplanne, J.P. Chabellard, P. Chicault, J.F. Debarge, A.E. Dumel, E. Gibert, P. Leca, V. Lemaire, P. Legros, B. Loze, F. Magnan, J. Marcou, J.C. Marquestaut, S. Melac-Ducamp, Q. Vuong Dang, E. Sornay-Rendu, J. Taillandier, and C. Visticot. We thank the following organizations for participating in our study:

Association des Rhumatologues Parisiens, Association des Rhumatologues de l'Essonne, Association des Rhumatologues du Val de Marne, Association des Rhumatologues du Finistère, Association des Rhumatologues du Val d'Oise, Club Rhumatismes et Inflammation, Fédération Française de Rhumatologie, and Société de Rhumatologie de l'Ouest.

REFERENCES

1. Brooks RC, McGee SR. Diagnostic dilemmas in polymyalgia rheumatica. Arch Intern Med 1997;157:162-8.
2. Bird HA, Esselinckx W, Dixon AS, Mowat AG, Wood PH. An evaluation of criteria for polymyalgia rheumatica. Ann Rheum Dis 1979;38:434-9.
3. Soubrier M, Dubost JJ, Ristori JM. Polymyalgia rheumatica: diagnosis and treatment. Joint Bone Spine 2006;73:599-605.
4. Salvarini C, Cantini F, Macchioni P, Olivieri I, Niccoli L, Padula A, et al. Distal musculoskeletal manifestations in polymyalgia rheumatica. Arthritis Rheum 1998;41:1221-6.
5. Salvarani C, Cantini F, Boiardi L, Hunder GG. Polymyalgia rheumatica. Best Pract Res Clin Rheumatol 2004;18:705-22.
6. Dasgupta B, Borg FA, Hassan N, Barraclough K, Bourke B, Fulcher J, et al. BSR and BHPR guidelines for the management of polymyalgia rheumatica. Rheumatology 2010;49:186-90.
7. Hoes JN, Jacobs JW, Boers M, Boumpas D, Buttgereit F, Caeyers N, et al. EULAR evidence-based recommendations on the management of systemic glucocorticoid therapy in rheumatic diseases. Ann Rheum Dis 2007;66:1560-7.
8. Hernandez-Rodriguez J, Cid MC, Lopez-Soto A, Espigol-Frigolé G, Bosch X. Treatment of polymyalgia rheumatica: A systematic review. Arch Intern Med 2009;169:1839-50.
9. Dejaco C, Duftner C, Cimmino MA, Dasgupta B, Salvarani C, Crowson CS, et al; International Work Group for PMR and GCA. Definition of remission and relapse in polymyalgia rheumatica: Data from a literature search compared with a Delphi-based expert consensus. Ann Rheum Dis 2011;70:447-53.
10. Leeb BF, Bird HA. A disease activity score for polymyalgia rheumatica. Ann Rheum Dis 2004;63:1279-83.
11. Leeb BF, Bird HA, Nesher G, Andel I, Hueber W, Logar D, et al. EULAR response criteria for polymyalgia rheumatica, results of an initiative of the European Collaborating Polymyalgia Rheumatica Group (subcommittee of ESCISIT). Ann Rheum Dis 2003;62:1189-94.
12. Leeb BF, Rintelen B, Sautner J, Fassl C, Bird HA. The polymyalgia rheumatica activity score in daily use: Proposal for a definition of remission. Arthritis Rheum 2007;57:810-5.
13. Binard A, De Bandt M, Berthelot JM, Saraux A. Performance of the polymyalgia rheumatica activity score for diagnosing disease flares. Arthritis Rheum 2008;59:263-9.
14. Binard A, De Bandt M, Berthelot JM, Saraux A. Usefulness of the disease activity scores for polymyalgia rheumatica for predicting steroid dosage changes: A study of 243 scenarios. Arthritis Rheum 2007;29,481-6.
15. Binard A, Lefebvre B, De Bandt M, Berthelot JM, Saraux A. Validity of the polymyalgia rheumatica activity score in primary care practice. Ann Rheum Dis 2009;68:541-5.