# Developing Classification Criteria for Polymyalgia Rheumatica: Comparison of Views from an Expert Panel and Wider Survey

BHASKAR DASGUPTA, CARLO SALVARANI, MICHAEL SCHIRMER, CYNTHIA S. CROWSON, HILAL MARADIT-KREMERS, ANDREW HUTCHINGS, ERIC L. MATTESON, and members of the American College of Rheumatology Work Group for Development of Classification Criteria for PMR

***ABSTRACT.*** ***Objective.*** This report summarizes the findings from a consensus process to identify potential classification criteria for polymyalgia rheumatica (PMR).

***Methods.*** A 3-stage hybrid consensus approach was used to develop potential PMR classification criteria. The first stage consisted of a facilitated meeting of 27 international experts who anonymously rated the importance of 68 potential criteria. The second stage involved a meeting of the experts, who were provided with the results of the first round of ratings and were then asked to re-rate the criteria. In the third stage, the wider acceptance of the 43 criteria that received > 50% support at round 2 was evaluated using an extended mailed survey of 111 rheumatologists and 53 nonrheumatologists in the United States, Canada, and Northern and Western Europe.

***Results.*** A total of 68 and 50 criteria were identified and rated in round 1 and round 2, respectively. In round 2, 43 of the 50 items achieved at least 50% support, including 10 core criteria achieving 100% support. In round 3, over 70% of survey respondents agreed on the importance of 7 core criteria. These were age ≥ 50 years, duration ≥ 2 weeks, bilateral shoulder and/or pelvic girdle aching, duration of morning stiffness > 45 min, elevated erythrocyte sedimentation rate, elevated C-reactive protein, and rapid steroid response (> 75% global response within 1 wk to prednisolone/prednisone 15–20 mg daily). Among physical signs, more than 70% of survey respondents agreed on the importance of assessing pain and limitation of shoulder (84%) and/or hip (76%) on motion, but agreement was low for peripheral signs like carpal tunnel, tenosynovitis, and peripheral arthritis.

***Conclusion.*** There are differences in opinion as to what PMR is and how it should be treated. These findings make it important to develop classification criteria for PMR. The next step is to perform an international prospective study to evaluate the utility of candidate classification criteria for PMR in patients presenting with the polymyalgic syndrome. (First Release Nov 15 2007; J Rheumatol 2008;35:270–7)

*Key Indexing Terms:*
POLYMYALGIA RHEUMATICA CLASSIFICATION CRITERIA
DIAGNOSIS TREATMENT CLINICAL TRIALS

*From the Department of Rheumatology, Southend Hospital, Westcliff; Health Services Research Unit, London School of Hygiene and Tropical Medicine, London, UK; Department of Rheumatology, Arcispedale Santa Maria Nuova, Reggio Emilia, Italy; Department of Internal Medicine and Rheumatology, General Hospital of the Elizabethenians, Klagenfurt, Austria; and Department of Health Sciences Research and Department of Internal Medicine, Division of Rheumatology, Mayo Clinic College of Medicine, Rochester, Minnesota, USA.*

*Supported in part by grants from the American College of Rheumatology and by the Mayo Foundation.*

*B. Dasgupta, MD, FRCP, Department of Rheumatology, Southend Hospital; C. Salvarani, MD, Department of Rheumatology, Arcispedale Santa Maria Nuova; M. Schirmer, MD, Department of Internal Medicine and Rheumatology, General Hospital of the Elizabethenians; C.S. Crowson, MS; H. Maradit-Kremers, MD, MSc, Department of Health Sciences Research, Mayo Clinic College of Medicine; A. Hutchings, MSc, Health Services Research Unit, London School of Hygiene and Tropical Medicine; E.L. Matteson, MD, Department of Internal Medicine, Division of Rheumatology, Mayo Clinic College of Medicine.*

*Address reprint requests to Dr. B. Dasgupta, Department of Rheumatology, Southend University Hospital, Prittlewell Chase, Westcliff, Essex SS0 0RY, UK. E-mail: bhaskar.dasgupta@southend.nhs.uk*

*Accepted for publication August 20, 2007.*

Polymyalgia rheumatica (PMR) is a common disease in the elderly. It is conventionally treated with longterm oral steroids and is one of the most common indications for longterm steroid use in the community[1]. The treatment can be prolonged and numerous steroid side effects have been reported[2]. In the United Kingdom, age-adjusted incidence of diagnosed PMR was reported to have increased by 35% between 1990 and 2001 (from 6.9 to 9.3 per 10,000 person-years)[3]. It is not clear whether this indicates a true increase, increased recognition, or overdiagnosis of PMR.

There is considerable uncertainty related to diagnosis and outcomes in patients presenting with the polymyalgic syndrome (proximal pain and stiffness)[4] and differences in the sensitivity of the various sets of diagnostic criteria in use[5] (Table 1). International researchers have, over the years, debated the issues of guidelines for the diagnosis, management, and disease response measures in PMR. A recent prospective study has highlighted the heterogeneity of its

*Table 1.* Summary of current diagnostic criteria for polymyalgia rheumatica.

| | Criteria | Hunder[26] | Healey[27] | Bird[29] | Jones[28] |
|---|---|---|---|---|---|
| 1 | Age ≥ 50 years | + | + | ≥ 65 years | + |
| 2 | Bilateral aching of neck, shoulders, pelvic girdle | + Any 2 | + Any | + Shoulder pain and stiffness | + Shoulder and pelvic girdle pain without weakness |
| 3 | Morning stiffness > 1 h | + | + | + | + |
| 4 | Duration of symptoms | ≥ 1 mo | ≥ 1 mo | < 2 wks | ≥ 2 mo unless treated |
| 5 | ESR > 40 mm/h | + | + | + | ESR > 30; CRP > 6 mg/l |
| 6 | Depression and/or loss of weight | – | – | + | – |
| 7 | Exclusion of other diagnosis | + | + | – | + |
| 8 | Rapid response to prednisolone (≤ 20 mg/day) | – | + | – | + |
| 9 | Others | – | – | Bilateral upper arm tenderness; depression and/or loss of weight | – |
| | Diagnosis | All criteria need to be fulfilled | All criteria need to be fulfilled | Any 3 or one plus positive temporal artery biopsy | All criteria need to be fulfilled |

* Onset of symptoms.

course, major influence on quality of life, uncertainty related to its diagnosis, and high incidence of adverse events[6]. These findings along with wide variations in practice in the management of this common disease suggest the need for guidelines for safe diagnosis, ongoing monitoring of disease, vigilance regarding an alternative diagnosis, and early referral of patients with atypical features and poor steroid response. This uncertainty and heterogeneity make it important to develop validated classification criteria for patients presenting with the polymyalgic syndrome. Classification criteria for PMR will facilitate differentiation of this clinical syndrome as a distinct disease entity (separate from conditions such as seronegative and seropositive inflammatory arthritis and manifold other conditions sharing similar clinical characteristics), and also, prediction of disease- and treatment-related outcomes.

Research evidence on the diagnosis and the effectiveness of different interventions for the treatment of PMR is limited. Studies conducted in primary care are rare. The few randomized controlled trials[7-12] that have been conducted in secondary care settings have been based on small samples and have had little effect on the conventional treatment of PMR with oral steroids.

The diagnosis of PMR presents many difficulties and different criteria have been used in studies of PMR[13]. Studies have also demonstrated alterations of PMR diagnoses with longterm followup[14,15]. It was noted that many patients with an initial PMR diagnosis were subsequently found to have conditions such as rheumatoid arthritis (RA), systemic lupus erythematosus, and spondyloarthropathies.

Despite oral steroids remaining the standard treatment for PMR, there is no evidence from randomized trials for the effectiveness of alternative initial doses or dose tapers. Observational studies have shown differences in steroid requirements in individual patients[16,17], that low maintenance doses were related to low initial doses[18], and that higher initial doses and rapid steroid tapering were associated with a higher frequency of relapses[19]. However, these observational studies may be confounded by more severely ill patients receiving higher initial doses.

Most observational studies recommend that steroid doses are reduced gradually to prevent relapse of symptoms, with studies reporting around half of patients having relapses and median duration of steroid treatment around 2–3 years[20]. Another study proposed 3 categories of disease course: a short duration of treatment following a rapid response to steroids and without significant relapse; a rapid response to steroids requiring extended treatment to control disease flares; and an incomplete resolution of symptoms requiring increased doses of steroids and extended treatment to control disease flares[21]. The benefits from treatment with steroids need to be balanced with the increased risk of adverse outcomes such as diabetes and fractures[2].

These uncertainties in the diagnosis and management of PMR led to a recognition for the development of classification criteria. We present the findings from a 3-stage consensus process, involving experts and a wider community of rheumatologists and nonrheumatologists, to identify potential PMR classification criteria.

## MATERIALS AND METHODS

The potential classification criteria were developed using a 3-stage hybrid consensus approach, drawing both on the benefits of convened meetings of experts and on a wider consultation using Delphi-type mailed surveys[22,23] (Figure 1).

The first stage consisted of a facilitated, convened meeting of an international panel of experts at The Third International Conference on PMR and Giant Cell Arteritis in July 2005. In the absence of any agreed definition for an "expert"[24], 2 authors (BD, ELM) and the conference organizing committee invited a purposive, nonexhaustive sample of individuals attending the conference to take part in the panel. The selection process aimed to create a panel comprising an international group of rheumatologists with an interest in PMR (as demonstrated by significant involvement in PMR research) as well as other rheumatologists, primary care physicians, methodologists, and statisticians. Invited panelists were also asked to suggest additional names for invi-

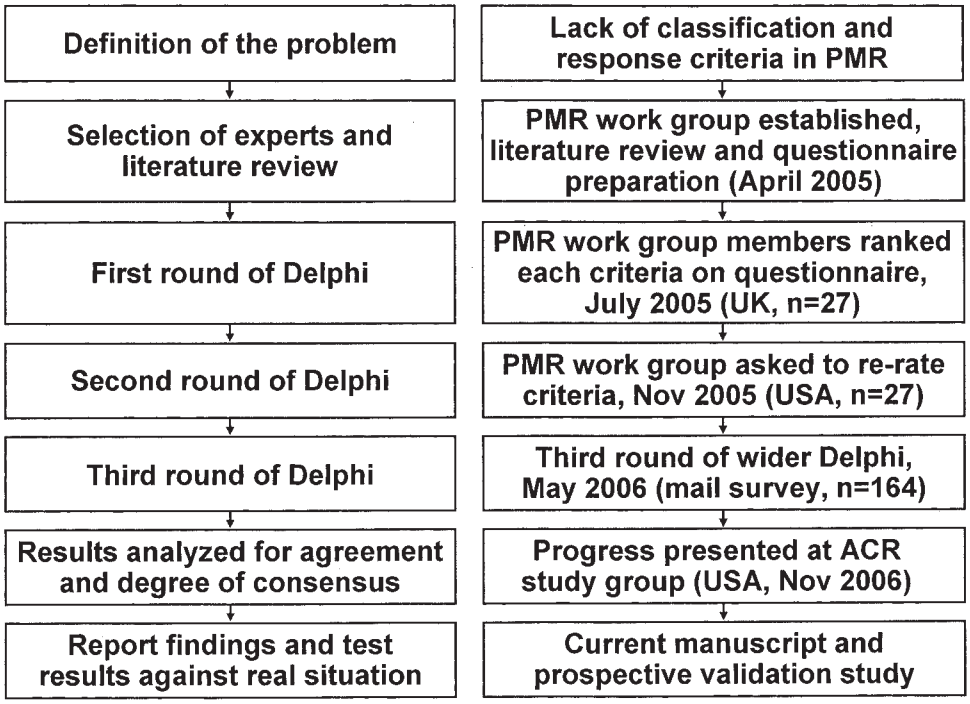


*Figure 1*. PMR classification criteria development project[24].

tation. All panelists were provided with a comprehensive literature review of studies of the diagnosis (including imaging methods such as ultrasonography) and treatment of PMR. The meeting was facilitated in order to identify a broad list of potential criteria that may be of use in the classification of PMR. Following the meeting, a questionnaire was developed and distributed so that panel members could anonymously rate the usefulness of the potential criteria. For example, panelists were asked to rate morning stiffness as a criterion for classification. For each item the degree of consensus was categorized as > 90%, > 80%, or > 50% support.

The second stage of the process involved another convened meeting of the panel of experts at the American College of Rheumatology (ACR) Annual Scientific Meeting in November 2005. At this meeting, panelists were provided with the results of the first round of ratings. All potential criteria and their ratings were evaluated during the facilitated meeting and panelists were then asked to re-rate items.

In the third stage, the wider acceptance of the items given > 50% support by the expert panel at round 2 was evaluated using a mailed survey of other rheumatologists and nonrheumatologists. Rheumatologists were randomly selected from membership lists of the ACR (including non-American members) and the British Society for Rheumatology. Nonrheumatologists were recruited by random selection from a list of primary care practitioners and ophthalmologists in Essex, England, and family practitioners and general internists in Minnesota, Wisconsin, and Iowa randomly selected from state physician directories. Items were regarded as achieving "perfect consensus" or "consensus" when 95% and 80%, respectively, of respondents supported the importance of a criterion.

In addition, a brief survey was conducted at the same time and this was the first expert panel on imaging techniques in the investigation of PMR. A questionnaire was sent to 25 rheumatologists from the PMR Work Group to assess their views on the importance (essential, less important, or not important) and availability (routinely available, not always available, or unavailable) of magnetic resonance imaging (MRI), skeletal ultrasound, and 18F-fluorodeoxyglucose positron emission tomography (FDGPET) for the evaluation of patients with PMR.

*Statistical methods*. Descriptive statistics were used to summarize the survey responses. For each item, the rate of agreement was estimated as the number of affirmative responses over the total number of responses. Missing values were treated as nonresponses and were excluded from calculations of agreement rates. Items that received > 95% agreement were considered as consensus items. Chi-square tests were used to compare the rate of agreement between work group members and rheumatologist and nonrheumatologist respondents.

## RESULTS

There were 27 participants in the expert panel for round 1, the majority being research-active rheumatologists and internists (Appendix). During the facilitated discussion, the expert panel agreed on 4 key features that should underpin the process for developing PMR classification criteria. First, the purpose of developing PMR classification criteria was to distinguish PMR from other conditions with a polymyalgic presentation (pain and stiffness). Second, there was agreement that PMR diagnosis is a stepped process, starting with the inclusion or exclusion of patients presenting with the polymyalgic syndrome based on clinical features, findings on examination, and laboratory investigations. Third, there was a recognition of the importance of the initial response to steroid therapy in establishing a PMR diagnosis. Finally, the panel agreed that any candidate criteria would need to be evaluated in a prospective study because of the lack of existing research evidence (Table 2). These principles and further discussion guided the development of the questionnaire to identify and assess the level of support for specific potential criteria for classifying PMR.

In round 1, a total of 68 potential criteria were identified and rated by members of the expert panel and 50 reached

*Table 2*. PMR Work Group consensus items from first Delphi exercise.

1. **The purpose of developing PMR classification criteria is to distinguish PMR from other conditions with a polymyalgic presentation**
2. **The diagnosis in PMR is a stepped process**
   Patients presenting with polymyalgic syndrome should be evaluated on the basis of inclusion and exclusion criteria. These criteria would be based on clinical features, findings on examination, and laboratory investigations
3. **The need to standardize initial response to steroid therapy in PMR**
   Several existing diagnostic criteria incorporate the steroid response as a criterion and many clinicians attribute it a pivotal role for the diagnosis of PMR. Yet no valid scientific evidence is available as to what that might be. The work group agreed (> 75% agreement) that this might be > 75% global response (clinical and laboratory measures) within 7 days to steroid challenge with oral 15 mg prednisone or prednisolone and subsequent resolution of inflammatory indices
4. **The need for a prospective study to evaluate the disease course from presentation in patients included on the basis of the mandatory "core" criteria of proximal pain and stiffness**
   The group agreed that the candidate criteria need to be validated in a prospective study and endorsed a detailed process of evaluation based on symptoms, examination findings, and investigations. A prospective study will also have the additional strength of a standardized steroid treatment and standardized evaluation at prespecified intervals over a 12-month period

PMR: polymyalgia rheumatica.

> 50% consensus. Criteria that received little consensus because of limited availability were cytokine measurements (i.e., interleukin 1, IL-2, IL-6) and PET scanning.

In round 2, the 27 participants in the expert panel met again for a facilitated discussion of the 50 criteria items from round 1 with > 50% support. After privately re-rating the items there were 43 items that achieved at least 50% support, including 10 achieving 100% support (Table 3).

In round 3, the extended survey, a questionnaire comprising these 43 potential classification criteria, was mailed to 190 rheumatologists and 85 nonrheumatologists. Responses were received from 111 (58.4%) rheumatologists, 49 from the United States and 62 from 15 European countries and Canada. Responses were received from 53 (62.4%) nonrheumatologists, 29 from the US and 24 from the UK.

Seven of the 10 items that had 100% support from the expert panel received at least 70% support from survey respondents (Table 3). The 3 items with little support were abrupt onset in < 1 week (25%), systemic signs/symptoms (38%), and neck aching (35%). Among physical signs, > 70% of respondents agreed with the experts on the importance of assessing pain and limitation of shoulder (84%) and/or hip (76%) on motion, but agreement was low for peripheral signs like carpal tunnel syndrome, tenosynovitis, and peripheral arthritis. In both groups, ≥ 75% agreed that a diagnosis of RA, lupus, vasculitis, inflammatory myopathy, septic arthritis, active neoplasia (active infection and cancer were core exclusions), active thyroid disease, and drug-related myalgia would exclude the PMR diagnosis in a classification criteria study of the polymyalgic syndrome.

There were some notable differences in perception of PMR between rheumatologists and nonrheumatologists. Of the 10 core items, there was little difference between the responses of rheumatologists and nonrheumatologists (Table 4). However, agreement was low on the value of morning stiffness, where 77% of rheumatologists and only 57% of nonrheumatologists considered it as an important criterion ($p = 0.016$). Nearly 100% of both groups agreed on the importance of rapid and complete response to low-dose steroids. Nonrheumatologists placed less importance on the value of anti-cyclic citrullinated peptide antibodies (40% vs 24%; $p = 0.09$). Among examination characteristics, nonrheumatologists placed less importance on distal extremity swelling (33% vs 17%; $p = 0.04$), tenosynovitis (36% vs 7%; $p < 0.001$), and peripheral arthritis (45% vs 17%; $p = 0.001$), and more importance on shoulder tenderness (58% vs 90%; $p < 0.001$) and hip tenderness (50% vs 82%; $p < 0.001$). Among exclusion diagnoses, rheumatologists and nonrheumatologists disagreed to some extent on the importance of excluding active thyroid diseases (80% vs 61%; $p = 0.015$) and Parkinson's disease (52% vs 36%; $p = 0.08$). Eighty percent or more of both groups agreed on the importance of excluding diagnoses of RA, lupus, vasculitis, inflammatory myopathy, septic arthritis, active neoplasia, and drug-related myalgia.

Results from the survey of imaging indicated that there was limited availability of MRI or FDGPET scans for the routine investigation of PMR, as reported by 86% and 70% of rheumatologists, respectively, and only 14% felt shoulder MRI was essential in evaluating PMR. In contrast, 65% of rheumatologists reported that musculoskeletal ultrasonography was routinely available.

## DISCUSSION

Our study has identified widespread support for some proposed classification criteria whereas others were considered to have little potential. Differences in the views of the expert panel and participants in the wider survey, and also between rheumatologists and nonrheumatologists, provide some

*Table 3*. Results of the work group experts and survey respondents (10 core items are shown in bold type).

| Variable | 2nd Consensus Ratings by Experts (n = 27), n (%) | 3rd Survey Respondents (n = 164), n (%) |
|---|---|---|
| Core Criteria | | |
| **Age ≥ 50 yrs** | Consensus | 139 (86) |
| **Onset abrupt < 1 wk** | Consensus | 37 (25) |
| **Duration ≥ 2 wks** | Consensus | 125 (81) |
| **Systemic sign/symptoms** | Consensus | 57 (38) |
| **Bilateral shoulder and/or pelvic girdle ache** | Consensus | 157 (98) |
| **Neck aching** | Consensus | 51 (35) |
| **Morning stiffness duration > 45 min** | Consensus | 109 (71) |
| **Erythrocyte sedimentation rate** | Consensus | 141 (90) |
| **C-reactive protein** | Consensus | 108 (71) |
| Laboratory tests | | |
| Thyroid-stimulating hormone | 21 (78) | 119 (77) |
| Alkaline phosphatase | 16 (59) | 81 (53) |
| Creatinine kinase | 21 (78) | 122 (79) |
| Complete blood count | 23 (85) | 150 (95) |
| Serum protein electrophoresis | 16 (59) | 84 (56) |
| Rheumatoid factor | 25 (93) | 103 (66) |
| Anti-CCP antibody | 19 (70) | 50 (36) |
| Physical examination | | |
| Shoulder tenderness | 25 (93) | 106 (68) |
| Shoulder pain on motion | 27 (100) | 133 (84) |
| Shoulder limitation | 23 (85) | 82 (53) |
| Hip tenderness | 24 (89) | 91 (60) |
| Hip pain on motion | 26 (96) | 120 (76) |
| Hip limitation | 23 (85) | 61 (43) |
| Neck | 26 (96) | 67 (45) |
| Carpal tunnel | 19 (70) | 16 (11) |
| Distal extremity swelling | 21 (78) | 42 (28) |
| Tenosynovitis | 22 (81) | 40 (27) |
| Peripheral arthritis | 17 (63) | 54 (36) |
| Response to therapy | | |
| **Steroid response** | Consensus | 157 (99) |
| Prednisone dose (mg/day) | | |
| 10 | 4 (15) | 21 (13) |
| 15 | 14 (52) | 59 (37) |
| 20 | 6 (22) | 65 (41) |
| 25 | 3 (11) | 5 (3) |
| > 25 | | 9 (6) |
| Rapid response | | |
| 1–3 days | 14 (52) | 91 (58) |
| 4–7 days | 12 (44) | 67 (42) |
| Improvement | | |
| > 50–74% | 6 (22) | 39 (24) |
| 75–90% | 13 (48) | 90 (56) |
| > 90% | 7 (26) | 31 (19) |
| Exclusion diagnoses | | |
| Rheumatoid arthritis/other inflammatory | 27 (100) | 150 (95) |
| Systemic lupus erythematosus | 27 (100) | 134 (86) |
| Vasculitis | 27 (100) | 124 (82) |
| Inflammatory myopathy | 27 (100) | 146 (95) |
| Osteoarthritis of hip | 3 (11) | 47 (31) |
| Osteoarthritis of shoulder | 4 (15) | 53 (34) |
| Septic arthritis or other infectious disease | 27 (100) | 124 (81) |
| Adhesive capsulitis | 15 (56) | 67 (44) |
| Active neoplasia | 26 (96) | 135 (86) |
| Fibromyalgia or other chronic pain syndrome | 18 (67) | 86 (57) |
| Active thyroid disease | 19 (70) | 111 (74) |
| Metabolic bone disesae | 16 (59) | 84 (58) |
| Parkinson's disesae | 18 (67) | 69 (47) |
| Drug related myalgia/arthralgias | 24 (89) | 130 (86) |

CCP: cyclic citrullinated peptide.

*Table 4*. Differences between rheumatologists and nonrheumatologists, third Delphi survey respondents.

| Variable | Rheumatologists (n = 111), n (%) | Non-rheumatologists (n = 53), n (%) | p |
|---|---|---|---|
| Core criteria | | | |
| Age ≥ 50 | 98 (89) | 41 (80) | 0.13 |
| Onset abrupt < 1 wk | 25 (24) | 12 (27) | 0.76 |
| Duration ≥ 2 wks | 83 (80) | 42 (84) | 0.53 |
| Systemic sign/symptoms | 38 (37) | 19 (40) | 0.65 |
| Bilateral shoulder and/or pelvic girdle ache | 108 (98) | 49 (96) | 0.43 |
| Neck aching | 36 (36) | 15 (34) | 0.86 |
| Morning stiffness duration > 45 min | 82 (77) | 27 (57) | 0.016 |
| Erythrocyte sedimentation rate | 95 (89) | 46 (92) | 0.54 |
| C-reactive protein | 73 (68) | 35 (76) | 0.33 |
| Laboratory tests | | | |
| Thyroid-stimulating hormone | 78 (74) | 41 (82) | 0.29 |
| Alkaline phosphatase | 54 (51) | 27 (57) | 0.49 |
| Creatinine kinase | 83 (78) | 39 (83) | 0.45 |
| Complete blood count | 100 (93) | 50 (98) | 0.22 |
| Serum protein electrophoresis | 64 (62) | 20 (44) | 0.05 |
| Rheumatoid factor | 68 (64) | 35 (71) | 0.37 |
| Anti-CCP antibody | 42 (40) | 8 (24) | 0.09 |
| Physical examination | | | |
| Shoulder tenderness | 61 (58) | 45 (90) | < 0.001 |
| Shoulder pain on motion | 93 (86) | 40 (80) | 0.33 |
| Shoulder limitation | 56 (53) | 26 (51) | 0.78 |
| Hip tenderness | 51 (50) | 40 (82) | < 0.001 |
| Hip pain on motion | 85 (79) | 35 (70) | 0.19 |
| Hip limitation | 41 (42) | 20 (43) | 0.89 |
| Neck | 44 (43) | 23 (50) | 0.41 |
| Carpal tunnel | 13 (13) | 3 (7) | 0.28 |
| Distal extremity swelling | 34 (33) | 8 (17) | 0.040 |
| Tenosynovitis | 37 (36) | 3 (7) | < 0.001 |
| Peripheral arthritis | 46 (45) | 8 (17) | 0.001 |
| Response to therapy | | | |
| Steroid response | 106 (98) | 51 (100) | 0.33 |
| Prednisone dose (mg/day) | | | 0.13 |
| 10 | 16 (15) | 5 (10) | |
| 15 | 43 (40) | 16 (31) | |
| 20 | 41 (38) | 24 (46) | |
| 25 | 4 (4) | 1 (2) | |
| > 25 | 3 (3) | 6 (12) | |
| Rapid response | | | 0.045 |
| 1–3 days | 68 (63) | 23 (46) | |
| 4–7 days | 40 (37) | 27 (54) | |
| Improvement | | | 0.91 |
| > 50–74% | 27 (25) | 12 (23) | |
| 75–90% | 61 (56) | 29 (56) | |
| > 90% | 20 (19) | 11 (21) | |
| Exclusion diagnoses | | | |
| Rheumatoid arthritis/other inflammatory | 101 (94) | 49 (98) | 0.23 |
| Systemic lupus erythematosus | 90 (86) | 44 (88) | 0.70 |
| Vasculitis | 85 (82) | 39 (83) | 0.85 |
| Inflammatory myopathy | 102 (95) | 44 (96) | 0.93 |
| Osteoarthritis of hip | 31 (30) | 16 (33) | 0.64 |
| Osteoarthritis of shoulder | 34 (32) | 19 (40) | 0.36 |
| Septic arthritis or other infectious disease | 85 (81) | 39 (80) | 0.84 |
| Adhesive capsulitis | 48 (45) | 19 (41) | 0.65 |
| Active neoplasia | 92 (84) | 43 (90) | 0.39 |
| Fibromyalgia or other chronic pain syndrome | 57 (54) | 29 (62) | 0.39 |
| Active thyroid disease | 83 (80) | 28 (61) | 0.015 |
| Metabolic bone disease | 53 (53) | 31 (69) | 0.07 |
| Parkinson's disease | 53 (52) | 16 (36) | 0.08 |
| Drug related myalgia/arthralgias | 92 (87) | 38 (84) | 0.70 |

insight into variation in the diagnosis and treatment of PMR in practice.

Classification criteria are not synonymous with diagnostic criteria[25], although in practice classification criteria are sometimes used for diagnosis and several sets of PMR "diagnostic" criteria are based on study eligibility criteria[26-28]. Given this overlap it is still useful to compare the results from our study with the criteria in Table 1. The larger number of criteria from this study is expected, given that these are potential criteria that will be evaluated in a prospective study. Perhaps the most surprising difference is the diminishing support for morning stiffness as a criterion from rheumatologists and nonrheumatologists in the survey despite its inclusion in all existing diagnostic criteria. This raises a fundamental question as to what PMR is and whether it exists in the absence of stiffness, something that will hopefully be resolved with the development of classification criteria. It also raises the problem of whether it is possible for patients and clinicians to reliably distinguish pain and stiffness, and additional challenges of defining these concepts in studies with international recruitment. Our results may also indicate the possibility of overdiagnosis rather than underdiagnosis of PMR, particularly by nonrheumatologists.

The abrupt onset of symptoms, which received full support from the expert panel, is featured only in the Bird criteria[29]. The difference between the expert panel and survey results may be a semantic difference because rheumatologists and nonrheumatologists in the survey may prefer a less strict definition of abrupt (perhaps < 2 weeks). Allowing a chronic onset of PMR has the inherent danger of misclassifying chronic mimicking illnesses including local degenerative conditions as PMR.

The lack of wider recognition of peripheral involvement in PMR suggests that differences between several diagnoses related to arthritis in the elderly, i.e., PMR, seronegative RA, remitting seronegative symmetrical synovitis with pitting edema (RS3PE), etc., may only be differences of terminology and perception. Only a prospective study will demonstrate whether there are indeed true differences of outcome. Lack of agreement on neck involvement is intuitively easier to understand since neck pain on its own (without other PMR features) would suggest other diagnoses.

There was a trend towards nonrheumatologists using higher doses that favors a misinterpretation of the ubiquitous nonspecific response to steroids in any inflammatory illness. Other primary care studies also suggest that general practitioners tend to use higher doses for the treatment of PMR (K. Barraclough, personal communication).

The main strengths of our study are the use of a transparent process to elicit opinions, and the ability of the expert panel to revise those opinions following discussion. The relatively large size of the expert panel allowed the participation of a range of acknowledged experts on PMR from many countries, but may have limited their involvement in more detailed discussion. The nonrheumatologists surveyed were limited to those based in the US and UK because the questionnaire was in English. It is possible that differences between the expert panel and the survey occurred because respondents to the survey were not exposed to the arguments put forward at the convened meeting. It has been recommended that the reasons for controversial decisions by convened groups should be provided to participants in later wider surveys, although this was not done in our study.

Our study suggests that, in the absence of a gold-standard diagnostic test, there are differences in opinion as to what PMR is as well as how it should be treated. These findings make it important to develop classification criteria for PMR. The next stage will be to perform an international prospective study to validate these candidate classification criteria for PMR in patients presenting with the polymyalgic syndrome.

## ACKNOWLEDGMENT

We thank the American College of Rheumatology for providing grant and intellectual support for this project. We also thank the organizers of the Third International Conference on PMR and GCA in Cambridge, England, for hosting the work group, and Paul Bacon for his excellent leadership in facilitating the work group meeting in Cambridge.

## APPENDIX

Members of the American College of Rheumatology Work Group for Development of Classification Criteria for PMR: K. Barraclough, Hoyland House General Practice, Painswick, UK; H. Bird, Department of Rheumatology, University of Leeds, Leeds, UK; K. Calamia, Division of Rheumatology, Mayo Clinic College of Medicine, Jacksonville, FL, USA; F. Cantini, Department of Rheumatology, 2nd Divisione de Medicina, Ospedale di Prato, Prato, Italy; M. Cid, Department of Internal Medicine, Hospital Clinic Provincial, Barcelona, Spain; M. Cimmino, Department of Internal Medicine, University of Genova, Genova, Italy; C. Dejaco, Department of Internal Medicine, Innsbruck Medical University, Innsbruck, Austria; W. Docken, Brigham Orthopedics and Arthritis Center, Chestnut Hill, MA, USA; L. Guillevin, Department of Medicine, Hopital Cochin, Paris, France; P. Duhaut, Department of Internal Medicine, CHU Nord, Amiens, France; B. Hazelman, Department of Rheumatology, Cambridge University, Cambridge, UK; G. Hoffman, Division of Rheumatology, Cleveland Clinic Foundation, Cleveland, OH, USA; G. Hunder, Division of Rheumatology, Mayo Clinic College of Medicine, Rochester, MN, USA; M-A. Gonzalez-Gay, Division of Rheumatology, Hospital Xeral-Calde, Lugo, Spain; C. Langford, Division of Rheumatology, Cleveland Clinic Foundation, Cleveland, OH, USA; B. Leeb, Lower Austrian Center for Rheumatology, Stockerau, Austria; V. Martinez-Taboada, Division of Rheumatology, Hospital Marques de Valdecilla, Santander, Spain; P.A. Merkel, Division of Rheumatology, Boston University, Boston, MA, USA; C. Michet, Division of Rheumatology, Mayo Clinic College of Medicine, Rochester, MN, USA; E. Nordborg, Institute of Rheumatology, Huddinge University Hospital, Stockholm, Sweden; C. Pease, Rheumatology and Rehabilitation Research Unit, University of Leeds, Leeds, UK; N. Pipitone, Department of Rheumatology, Arcispedale Santa Maria Nouva, Regio Emilia, Italy; W. Schmidt, Department of Rheumatology, Berlin-Buch, University of Berlin, Berlin, Germany; A. Wagner, Department of Rheumatology, University of Hannover, Hannover, Germany. The Consensus Conference was chaired by P. Bacon, University of Birmingham, Birmingham, UK.

## REFERENCES

1. Walsh LJ, Wong CA, Pringle M, Tattersfield AE. Use of oral corticosteroids in the community and the prevention of secondary osteoporosis: a cross sectional study. BMJ 1996;313:344-6.

2. Gabriel SE, Sunku J, Salvarani C, O'Fallon WM, Hunder GG. Adverse outcomes of anti-inflammatory therapy among patients with polymyalgia rheumatica. Arthritis Rheum 1997;40:1873-8.
3. Smeeth L, Cook C, Hall AJ. Incidence of diagnosed polymyalgia rheumatica and temporal arteritis in the United Kingdom, 1990 to 2001. Ann Rheum Dis 2006;65:1093-8.
4. Dasgupta B, Hutchings A, Matteson EL. Polymyalgia rheumatica: the mess we are now in and what we need to do about it. Arthritis Rheum 2006;55:518-20.
5. Bird HA, Leeb BF, Montecucco CM, et al. A comparison of the sensitivity of diagnostic criteria for polymyalgia rheumatica. Ann Rheum Dis 2005;64:626-9.
6. Hutchings A, Hollywood J, Lamping D, et al. Clinical outcomes, quality of life, and diagnostic uncertainty in the first year of polymyalgia rheumatica. Arthritis Rheum 2007;57:803-9.
7. Caporali R, Cimmino MA, Ferraccioli G, et al. Prednisone plus methotrexate for polymyalgia rheumatica: a randomized, double-blind, placebo-controlled trial. Ann Intern Med 2004;141:493-500.
8. Dasgupta B, Dolan AL, Panayi GS, Fernandes L. An initially double-blind controlled 96 week trial of depot methylprednisolone against oral prednisolone in the treatment of polymyalgia rheumatica. Br J Rheumatol 1998;37:189-95.
9. Krall PL, Mazanec DJ, Wilke WS. Methotrexate for corticosteroid-resistant polymyalgia rheumatica and giant cell arteritis. Cleve Clin J Med 1989;56:253-7.
10. Ferraccioli G, Salaffi F, De Vita S, Casatta L, Bartoli E. Methotrexate in polymyalgia rheumatica: preliminary results of an open, randomized study. J Rheumatol 1996;23:624-8.
11. van der Veen MJ, Dinant HJ, van Booma-Frankfort C, van Albada-Kuipers GA, Bijlsma JW. Can methotrexate be used as a steroid sparing agent in the treatment of polymyalgia rheumatica and giant cell arteritis? Ann Rheum Dis 1996;55:218-23.
12. Wagener P. Methotrexate therapy of polymyalgia rheumatica [German]. Z Rheumatol 1995;54:413-6.
13. Brooks RC, McGee SR. Diagnostic dilemmas in polymyalgia rheumatica. Arch Intern Med 1997;157:162-8.
14. Caporali R, Montecucco C, Epis O, Bobbio-Pallavicini F, Maio T, Cimmino MA. Presenting features of polymyalgia rheumatica (PMR) and rheumatoid arthritis with PMR-like onset: a prospective study. Ann Rheum Dis 2001;60:1021-4.
15. Gonzalez-Gay MA, Garcia-Porrua C, Salvarani C, Olivieri I, Hunder GG. The spectrum of conditions mimicking polymyalgia rheumatica in Northwestern Spain. J Rheumatol 2000;27:2179-84.
16. Behn AR, Perera T, Myles AB. Polymyalgia rheumatica and corticosteroids: how much for how long? Ann Rheum Dis 1983;42:374-8.
17. Ayoub WT, Franklin CM, Torretti D. Polymyalgia rheumatica. Duration of therapy and long-term outcome. Am J Med 1985;79:309-15.
18. Myklebust G, Gran JT. Prednisolone maintenance dose in relation to starting dose in the treatment of polymyalgia rheumatica and temporal arteritis. A prospective two-year study in 273 patients. Scand J Rheumatol 2001;30:260-7.
19. Maradit-Kremers HM, Reinalda MS, Crowson CS, Zinsmeister AR, Hunder GG, Gabriel SE. Relapse in a population based cohort of patients with polymyalgia rheumatica. J Rheumatol 2005;32:65-73.
20. Myklebust G, Gran JT. A prospective study of 287 patients with polymyalgia rheumatica and temporal arteritis: clinical and laboratory manifestations at onset of disease and at the time of diagnosis. Br J Rheumatol 1996;35:1161-8.
21. Weyand CM, Fulbright JW, Evans JM, Hunder GG, Goronzy JJ. Corticosteroid requirements in polymyalgia rheumatica. Arch Intern Med 1999;159:577-84.
22. Hutchings A, Raine R, Sanderson C, Black N. A comparison of formal consensus methods used for developing clinical guidelines. J Health Serv Res Policy 2006;11:218-24.
23. Raine R, Sanderson C, Black N. Developing clinical guidelines: a challenge to current methods. BMJ 2005;331:631-3.
24. Jones J, Hunter D. Consensus methods for medical and health services research. BMJ 1995;311:376-80.
25. Singh JA, Solomon DH, Dougados M, et al. Development of classification and response criteria for rheumatic diseases. Arthritis Rheum 2006;55:348-52.
26. Chuang TY, Hunder GG, Ilstrup DM, Kurland LT. Polymyalgia rheumatica. A 10-year epidemiologic and clinical study. Ann Intern Med 1982;97:672-80.
27. Healey LA. Long-term follow-up of polymyalgia rheumatica: evidence for synovitis. Semin Arthritis Rheum 1984;13:322-8.
28. Jones JG, Hazleman BL. Prognosis and management of polymyalgia rheumatica. Ann Rheum Dis 1981;40:1-5.
29. Bird HA, Esselinckx W, Dixon AS, Mowat AG, Wood PH. An evaluation of criteria for polymyalgia rheumatica. Ann Rheum Dis 1979;38:434-9.