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DIFFERENTIAL DIAGNOSTICS OF POLYMYALGIA RHEUMATICA IN A UNIVERSITY HOSPITAL IN FINLAND

Syventävien opintojen kirjallinen työ
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Polymyalgia rheumatica (PMR) is a common inflammatory disease that causes muscle pain and morning stiffness, almost exclusively affecting patients over the age of 50. PMR is most common in Scandinavian countries, which increases its clinical importance in northern Europe. The diagnosis of PMR is mainly clinical and based on symptoms and laboratory evidence of acute phase reaction, besides ruling out other conditions. Due to there being many other conditions that are presented with similar symptoms and findings, diagnosing PMR can be difficult. This study aimed to analyze how often the diagnosis of PMR changes during a follow-up period in a university hospital setting as well as determine the most common conditions misdiagnosed as polymyalgia rheumatica.

All patients diagnosed with polymyalgia rheumatica during the years 2016-2019 were identified from the Turku University Hospital discharge register. The diagnosis was confirmed if the patient fulfilled at least one of five classification criteria for PMR, the clinical follow-up of at least 12 months was compatible with polymyalgia rheumatica and no other diagnosis better explained the patient's condition.

Out of the 374 patients analyzed in this study, 65.5% were considered to have polymyalgia rheumatica after further evaluation and clinical follow-up. The most common conditions initially misdiagnosed as polymyalgia rheumatica were inflammatory arthritides (34.9%), musculoskeletal disorders due to repetitive strain or degeneration (13.2%), infections (9.3%), malignancy (9.3%), giant cell vasculitis (6.2%) and other vasculitis (6.2%). In conclusion, the diagnosis of polymyalgia rheumatica is challenging and it is essential to consider the differential diagnostics carefully.

Keywords: polymyalgia rheumatica, PMR, differential diagnostics

Differential diagnostics of polymyalgia rheumatica in a university hospital in Finland

Short title: Differential diagnostics of PMR

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Keywords

Polymyalgia rheumatica, differential diagnostics

Abstract

Objectives: Diagnosing polymyalgia rheumatica (PMR) can be difficult as many conditions present with similar symptoms and findings. This study aimed to analyse how often the diagnosis of PMR changes during follow-up in a university hospital setting and determine the most common clinical conditions initially misdiagnosed as PMR.

Methods: All patients with a new primary diagnosis of PMR on at least one visit during the years 2016–2019 were identified from the hospital discharge register of Turku University Hospital in Finland. Diagnosis of PMR was confirmed if the patient met at least one of the five classification criteria, if the complete clinical follow-up (median 34 months) was compatible with PMR and if no other diagnosis better explained the patients' condition.

Results: Of the patients initially diagnosed with PMR, 65.5% were considered to have PMR after further evaluation and clinical follow-up. The most common conditions initially diagnosed as PMR were inflammatory arthritides (34.9%), musculoskeletal disorders due to repetitive strain or degeneration (13.2%), infection (9.3%), malignancy (9.3%), giant cell vasculitis

(6.2%) and other vasculitis (6.2%), and a wide range of other less common diseases. Diagnosis of PMR remained in 81.3% of patients fulfilling the 2012 ACR/EULAR PMR classification criteria and in 45.5% of patients who did not.
Conclusions: Diagnosing PMR is challenging even in a university hospital. A third of the initial diagnoses of PMR changed during further evaluation and follow-up. There is a substantial risk of misdiagnosis, especially in patients with atypical presentation, and it is essential to consider the differential diagnostics of PMR carefully.

Introduction

Polymyalgia rheumatica (PMR) is a common inflammatory disease that causes muscle pain and morning stiffness, especially in the shoulders, upper arms and pelvic girdle. The condition usually and almost exclusively affects patients over the age of 50, with incidence increasing progressively with age. PMR is most common in Scandinavian countries, which increases the clinical importance of this disorder in northern Europe. (1–3)

The diagnosis of PMR is mainly clinical and based on symptoms and laboratory evidence of acute phase reaction, as well as ruling out other conditions with similar presentation. Other common symptoms include fatigue, weight loss and fever. PMR is treated with glucocorticoids and a fast, and sufficient response to the treatment is a characteristic of the disease and can be used as a sign of a correct diagnosis. (1–3)

Several sets of classification criteria for PMR have been created for research purposes. The most recent one is the ACR/EULAR collaborative initiative from 2012 (4). Other criteria include the Bird criteria from 1979 (5), the Jones and Hazleman criteria from 1981 (6), the Chuang and Hunder criteria from 1982 (7) and the Healey criteria from 1984 (8). (Supplementary data 1)

Diagnosing PMR can be difficult as many other conditions are presented with similar symptoms and findings. Different diagnoses to consider include a wide variety of disorders such as other rheumatic diseases, autoimmune disorders, infections and malignant diseases. Little research of the difficulties of diagnosing PMR has been done in recent years. The aim of this study was to analyse patients diagnosed with PMR in Turku University Hospital and

determine how often a competing diagnosis was found during a clinical follow-up, as well as find out the most common conditions misdiagnosed as PMR.

Methods

All patients with a new primary diagnosis of PMR (International Classification of Diseases – 10th revision [ICD-10] code M35.3) on at least one inpatient or outpatient visit during the years 2016–2019 were identified from the hospital discharge register of Turku University Hospital in Finland. Patient charts were systematically reviewed by JP and SS, and data was collected according to a standardised protocol. The PMR diagnosis was evaluated taking into account the full clinical follow-up (median 34 months). A true positive diagnosis of PMR was confirmed based on whether the patient met at least one of the five classification criteria (4–8), if the complete clinical follow-up was compatible with PMR and if no other diagnosis better explained the patients' condition. If some other diagnosis better explained the patient's condition after follow-up, the diagnosis of PMR was considered not correct, even if the PMR classification criteria were still met. If there was uncertainty or discrepancy between the reviewers about the diagnosis, the final decision was made by JP as a senior rheumatologist. It was examined how often the primary diagnosis of PMR changed after further diagnostic evaluation or during follow-up, as well as what the most common final diagnoses were.

Collected data included past and current comorbidities of the patients, current symptoms and clinical findings, laboratory and imaging results, maximum dosage of glucocorticoid used, the number of visits in the hospital with the diagnosis of PMR, and whether the diagnosis had been made at a rheumatology clinic or in another healthcare unit in the hospital. It was also recorded whether some other disease would better explain the patients' symptoms and findings during the follow-up. When evaluating the fulfilment of classification criteria, an item was counted as negative if it was not marked as positive in the patient charts, but the absence of RF and/or anti-CCP antibodies had to be confirmed with a negative test result. The fulfilment of ACR/EULAR classification criteria was evaluated without using ultrasound, because ultrasound was not routinely used by all clinicians in our hospital for PMR evaluation during study years, and negative findings might not have been reported. Morning stiffness was considered relevant if present, given that the duration of morning stiffness was rarely recorded. Other symptoms that were considered typical for PMR were pain and tenderness in the neck, shoulder, upper arm, hip and thigh areas.

For 73 patients, there was insufficient patient record data available for analysis, which resulted in the reviewer not being able to evaluate the correctness of the diagnosis. For eight patients, the diagnoses in the hospital register were a clear deviation from the physician's record and were considered incorrectly inputted. These 81 patients were excluded from the final analysis.

Turku University Hospital is a tertiary referral centre of the Hospital District of Southwest Finland, with a population of 480 000 in the catchment area. The patients come into the hospital either through the emergency department or with a referral from other healthcare units. In our study, the duration of symptoms was calculated from the beginning of the symptoms to the first visit with a recorded PMR diagnosis in the hospital, and the duration of follow-up onwards from this visit, even if the diagnosis may have already been set earlier in another healthcare unit.

Study data was collected and managed using REDCap electronic data capture tools hosted at the University of Turku (9, 10).

Statistics:

Statistical analyses were performed using R, version 3.6.2 with The R base, dplyr, stringr, ggfortify and survival packages. Continuous variables are expressed as medians with interquartile ranges, and categorical variables are described as counts with percentages. When comparing differences between different categories, the *P* values were analyzed using nonparametric Mann–Whitney U test for continuous variables, and with Pearson's Chi-squared test for categorical variables. Multivariable logistic regression analysis was performed to study which variables predict the change of PMR diagnosis. Six variables were selected for this analysis based on their clinical relevance, and these variables are often included in classification criteria. Two-sided *P* values <0.05 were considered statistically significant.

Ethical considerations and study permissions:

This was a noninterventional retrospective study without any direct patient contact, and according to Finnish legislation, no patient consent or ethical committee approval was needed. Permissions for the study were obtained from the hospital district of southwest Finland. The legal basis for processing personal data is public interest and scientific research

(EU General Data Protection Regulation 2016/679 (GDPR), Article 6(1)(e) and Article 9(2)(j); Data Protection Act, Sections 4 and 6).

Results

The inclusion and exclusion of the study patients is depicted in Figure 1. There were 374 patients in the final analysis. Demographic and clinical characteristics of the study population are presented in Table 1. 57.2 % of the patients were female, and the median age at diagnosis was 70 years. A majority of the patients were diagnosed (79.0%) and treated (81.0%) at a department of rheumatology. Median duration of follow-up was 34.0 months (IQR 21.0-50.0).

Of the 374 patients, upon follow-up, 245 (65.5%) were considered to have PMR, and for 129 patients (34.5%), the follow-up did not support the diagnosis of PMR.

The most common conditions initially diagnosed incorrectly as PMR were inflammatory arthritides 34.9% (45/129) and musculoskeletal disorders due to repetitive strain or degeneration 13.2% (17/129). Other diagnoses included infection 9.3% (12/129), malignancy 9.3% (12/129), giant cell vasculitis 6.2% (8/129) and other vasculitis 6.2% (8/129), other rheumatological disease 5.4% (7/129), fibromyalgia or other chronic pain syndrome 3.9% (5/129), gout or other crystal arthropathy 1.6% (2/129), endocrinological disease 1.6% (2/129) and other or unknown diagnosis 10.9% (14/129) (Figure 1).

Out of the malignancies, 33% (4/12) were carcinomas of the colon, 25% (3/12) were lymphomas, and the rest were individual cases of other malignancies: breast, uterus, kidney, peritoneal carcinosis, and chronic lymphocytic leukaemia. In 75% (9/12) of the patients with malignancies, the symptoms were considered paraneoplastic and not directly caused by the malignancy. Four of these nine patients received active treatment for their malignancy, and all became asymptomatic after treatment.

The patients had suffered from symptoms a median of 10.5 weeks before the first visit with PMR diagnosis in the university hospital. If the diagnosis changed during follow-up, 76.6% (95/124) of the diagnoses changed by six months, 86.3% (107/124) changed by one year and 94.3% (117/124) by two years of follow-up. For malignancies, a median time from PMR diagnosis to change of diagnosis was 8.5 weeks (IQR 1.0-16.0).

Diagnosis was considered correct in 81.3% (170/209) of patients fulfilling the 2012 ACR/EULAR PMR classification criteria and in 45.5% (75/165) of patients who did not (P <0.0001). Diagnosis was considered correct in 75.9% (208/274) for patients fulfilling 1979 Bird criteria, 88.9% (88/99) for 1981 Jones and Hazleman criteria, 80.5% (91/113) for 1982 Chuang and Hunder criteria and 79.8% (198/248) for 1984 Healey criteria. Figure 2.

Of the patients who did not meet the 2012 ACR/EULAR PMR classification criteria, 6.7% (11/165) had an infection and 3.0% (5/165) had a malignancy, meaning that 9.7% (16/165) of these patients had a disease that required a completely different treatment than PMR. Of the patients who met the 2012 ACR/EULAR PMR classification criteria, 0.5% (1/209) had an infection and 3.3% (7/209) had a malignancy, for a total of 3.0% (8/209).

The diagnosis set in a department of rheumatology was correct in 71.8% (211/294) of the patients, compared to 43.0% (34/79) of the patients for whom the diagnosis had been set in other departments.

Patients whose diagnosis did not change during follow-up, often had a longer symptom duration before diagnosis (P = 0.016), elevated CRP or ESR values (P <0.001), and glucocorticoid treatment had given a full response to symptoms (P <0.0001) and inflammatory values (P <0.0001) compared to those patients whose diagnosis changed during follow-up. These patients with true PMR diagnosis were also more often diagnosed in the department of rheumatology (P <0.0001) and had been followed for a longer period (P = 0.011). Table 1.

In a multivariable logistic regression analysis, a change of the PMR diagnosis was statistically significantly predicted if the patient had no morning stiffness (odds ratio (OR) of 1.75, 95% confidence interval (CI) 1.03–2.94), had none of the other typical symptoms of PMR (OR 7.45, 95% CI 2.65–24.53) and had less than full resolution of symptoms with glucocorticoid treatment (OR 3.01, 95% CI 1.83–5.00). If the patient had normal inflammatory values, OR for the change of diagnosis was 2.27 (95% CI 0.98–5.24). Gender and younger age at diagnosis were not statistically significant predictors of changing diagnosis. Table 2.

Discussion

PMR is an inflammatory disease that causes muscle pain and morning stiffness, especially in the shoulders and hips, with often elevated inflammatory markers (1–3). Diagnosing PMR can be difficult, as the diagnosis is mainly clinical without a gold standard to confirm the diagnosis, and many symptoms and findings of PMR may be present in other conditions (1–3, 11). In our study, 65.5% of the patients initially diagnosed with PMR were considered to have PMR after further evaluation and clinical follow-up.

The validity of PMR diagnoses in primary healthcare has previously shown to be 60% in a study in Sweden by Fors et al (12). In a hospital setting, persistence of PMR diagnoses at one-year follow-up has previously varied between 48% and 72% in Italy (13, 14) and was 94% in the United Kingdom for patients meeting the Jones and Hazleman criteria (15). Compared to these studies, the follow-up period of our study was markedly longer, median of 34 months, and 13.7% of the changed diagnoses happened after a one-year follow-up. Also, unlike these previous studies, the patients in our study were not pre-screened since the diagnosis of PMR was the only inclusion criteria. For diagnoses set in a department of rheumatology, a proportion of correct diagnoses has been 79.1% in Alaska (16), and 69.0% in the United Kingdom (17), which correspond to the 71.8% in our study. The proportion of correct diagnoses was higher in the department of rheumatology compared to other departments in the hospital. We have previously shown this result with rheumatoid arthritis and systemic sclerosis (18, 19).

In our study, with the PMR diagnosis changing during follow-up, the diseases that better explain the patient's condition were largely consistent with those described earlier (20, 21). Other inflammatory joint diseases were the most common mimics of PMR in 35% of changed diagnoses, with degenerative and stress-related musculoskeletal disorders in second place with 13%. In our study, of the patients for whom the diagnosis changed later, 9.3% had a malignancy, with the median of diagnostic delay being two months. Especially with malignancies, minimizing the diagnostic delay is important since delay may worsen a patient's prognosis.

The results of our study show that patients with atypical presentation of PMR were more at risk of initial misdiagnosis. In a multivariable logistic regression analysis, patients without typical shoulder and pelvic girdle pain, morning stiffness or complete glucocorticoid response were especially at a higher risk of misdiagnosis. The presence of atypical features of PMR is a warning sign that should lead to search for other conditions mimicking PMR, such as infections and malignancies (22). An imaging technique, such as PET/CT evaluation may be considered to identify possible underlying large-vessel vasculitis, especially in patients with marked involvement of the pelvic girdle or with inflammatory low back pain or bilateral diffuse pain in the lower extremities (23).

We also studied the usefulness of different PMR classification criteria in helping to identify patients in whom the risk of misdiagnosis is higher. Diagnosis was considered correct in 81.3% of patients fulfilling the 2012 ACR/EULAR PMR classification criteria and in 45.5% of patients who did not. It should be noted that one of the requirements of correct PMR diagnosis in our study was the fulfilment of at least one set of classification criteria, and that no other diagnosis explained the patient's condition better during the follow-up. The fulfilment of the classification criteria indicates a more typical presentation of PMR, and the diagnosis of PMR changed less often for these patients compared to the patients with atypical presentation. The classification criteria were also often positive on the patients that were later reclassified to have some other disease than PMR. This highlights the fact that classification criteria are not diagnostic criteria (24) and should be applied only to patients in whom an alternative diagnosis responsible for the symptoms has already been excluded with reasonable certainty.

As is often the case with retrospective study design, we were dependent on the clinician's records on the patient charts, and not all classification criteria items were available for all patients. When evaluating the fulfilment of classification criteria, an item was counted as negative if it was not marked as positive in the patient charts, but the absence of RF and/or anti-CCP antibodies had to be confirmed with a negative test result. We were also unable to group patients according to duration of the morning stiffness since the exact duration was not routinely recorded in the charts by the clinicians. However, we believe that if the clinician specifically mentioned morning stiffness, it was markedly prolonged in most of these patients.

In Finland, the majority of patients with polymyalgia rheumatica are treated in primary healthcare, and only those patients with diagnostic uncertainty or poor treatment response are referred to rheumatological consultation. Thus, the patient material in a university hospital and in a department of rheumatology is more complex compared to patients treated in primary healthcare, which may account for the relatively high proportion with normal ESR and CRP in this study. The results of our study are limited to a university hospital setting in Finland and are best generalizable to patients in large, centralized hospitals. Long follow-up periods and access to comprehensive medical records were strengths of our study.

Our study demonstrated the challenges of diagnosing PMR, especially when the presentation of PMR was atypical and the patient did not fulfil classification criteria. In this case, the diagnosis often changed during follow-up. Thorough consideration of differential diagnoses is always essential to minimise the risk of misdiagnosis, and this is particularly so with atypical presentation or suboptimal treatment response.

Conclusion

In a university hospital setting, a third of initial diagnoses of PMR were changed during further evaluation and follow-up. Our findings highlight that thorough consideration of differential diagnosis is essential when diagnosing PMR, especially in patients with atypical presentation where there is a substantial risk for misdiagnosis. Most common differential diagnoses were other inflammatory arthritides, degenerative or stress-related musculoskeletal disorders, infections and malignancies.

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Conflicts of interest

J.P. has been an investigator in a Lilly-funded clinical PsA drug study, is an investigator in clinical PsA drug studies funded by AbbVie, Bristol Myers Squibb and Pfizer, has received consulting and speaker fees from UCB and scientific meeting attendance support from Medac, Janssen-Cilag and UCB, which are all unrelated to this work.
S.S. has declared no conflicts of interest.
L.P. has received consulting fees from Novartis, UCB, Pfizer, Lilly, Roche, Sanofi, AbbVie, Bristol Myers Squibb, Janssen-Cilag, Celgene and MSD and scientific meeting attendance support from Roche, Bristol Myers Squibb, Pfizer, Sanofi, AbbVie and Generic and Biosimilar Initiative GaBI, which are all unrelated to this work.
A.P. has received consulting fees from Pfizer, AbbVie and Amgen, lecture fees from Boehringer-Ingelheim, Pfizer, and Sanofi, and travel expenses from Bristol Myers Squib and Novartis, which are all unrelated to this work.

Data availability

Due to Finnish national data protection legislation, the register data used in this study cannot be shared without permission from the Health and Social Data Permit Authority of Finland.

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Table 1

Demographic and clinical characteristics of the study sample.

	All	**PMR Dg supported**	**PMR Dg not supported**	***P*-value**
Number of patients	374	245 (65.5%)	129 (34.5%)	
Female (%)	214 (57.2%)	139 (56.7%)	75 (58.1%)	0.794
Age at diagnosis in years [IQR]	70.0 [64.0–77.0]	71.0 [64.0–78.0]	69.0 [62.0–77.0]	0.286
Year of first diagnosis [IQR]	2017 [2016–2018]	2017 [2016–2018]	2017 [2016–2018]	0.082
Diagnosed in rheumatology (%)	294 (79.0%)	211 (86.0%)	83 (65.0%)	<0.0001*
Treated in rheumatology (%)	304 (81.0%)	205 (84.0%)	99 (77.0%)	0.102
Number of visits [IQR]	6 [3–12]	7 [3–11]	6 [2–13]	0.489
Symptom duration in weeks [IQR]	10.5 [5.0–20.0]	12.0 [6.0–20.0]	7.0 [4.0–16.0]	0.016*
Elevated CRP or ESR (%)	334 (90.5%)	230 (94.3%)	104 (83.2%)	<0.001*
Full symptom response to GC (%)	195 (57.2%)	154 (66.4%)	41 (37.6%)	<0.0001*
Full inflammatory value response to GC (%)	190 (58.5%)	152 (67.9%)	38 (37.6%)	<0.0001*
Length of follow up in months [IQR]	34.0 [21.0–50.0]	33.0 [20.0–48.0]	36.0 [23.0–54.0]	0.011*
Bird criteria + (%)	274 (75.0%)	208 (84.9%)	66 (55.0%)	<0.0001*
Jones & Hazleman criteria + (%)	99 (27.1%)	88 (35.9%)	11 (9.2%)	<0.0001*
Chuang & Hunder criteria + (%)	113 (31.0%)	91 (37.1%)	22 (18.3%)	<0.001*
Healey criteria + (%)	248 (67.9%)	198 (80.8%)	50 (41.7%)	<0.0001*
ACR/EULAR criteria + (%)	209 (57.3%)	170 (69.4%)	39 (32.5%)	<0.0001*

Continuous variables are expressed as medians with interquartile ranges, and categorical variables are described as counts with percentages. PMR, polymyalgia rheumatic; IQR, interquartile range; GC, glucocorticoids; +, criteria fulfilled; *, statistically significant.

Table 2

Logistic regression analyses to predict the change of polymyalgia rheumatica diagnosis during follow-up.

	Univariate analyses	**Multivariable analysis**
	Odds ratio (95% CI)	**Odds ratio (95% CI)**
Female	0.94 (0.61–1.45)	1.06 (0.64–1.75)
Age at diagnosis under 65 years	1.42 (0.89–2.27)	1.38 (0.80–2.37)
Normal CRP and ESR values at diagnosis	**3.32 (1.64–6.92)**	2.27 (0.98–5.24)
No morning stiffness	**2.34 (1.51–3.69)**	**1.75 (1.03–2.94)**
Absence of typical symptoms of PMR*	**12.12 (4.90–36.60)**	**7.45 (2.65–24.53)**
Less than full symptom response to GC treatment	**3.27 (2.05–5.29)**	**3.01 (1.83–5.00)**

(95% CI), 95% confidence interval; GC, glucocorticoids; *Typical symptoms: pain and tenderness in the neck, shoulder, upper arm, hip and thigh areas. Statistically significant findings are shown as bold text.

Figure 1

Study flowchart, including final diagnosis for patients with a diagnosis of PMR

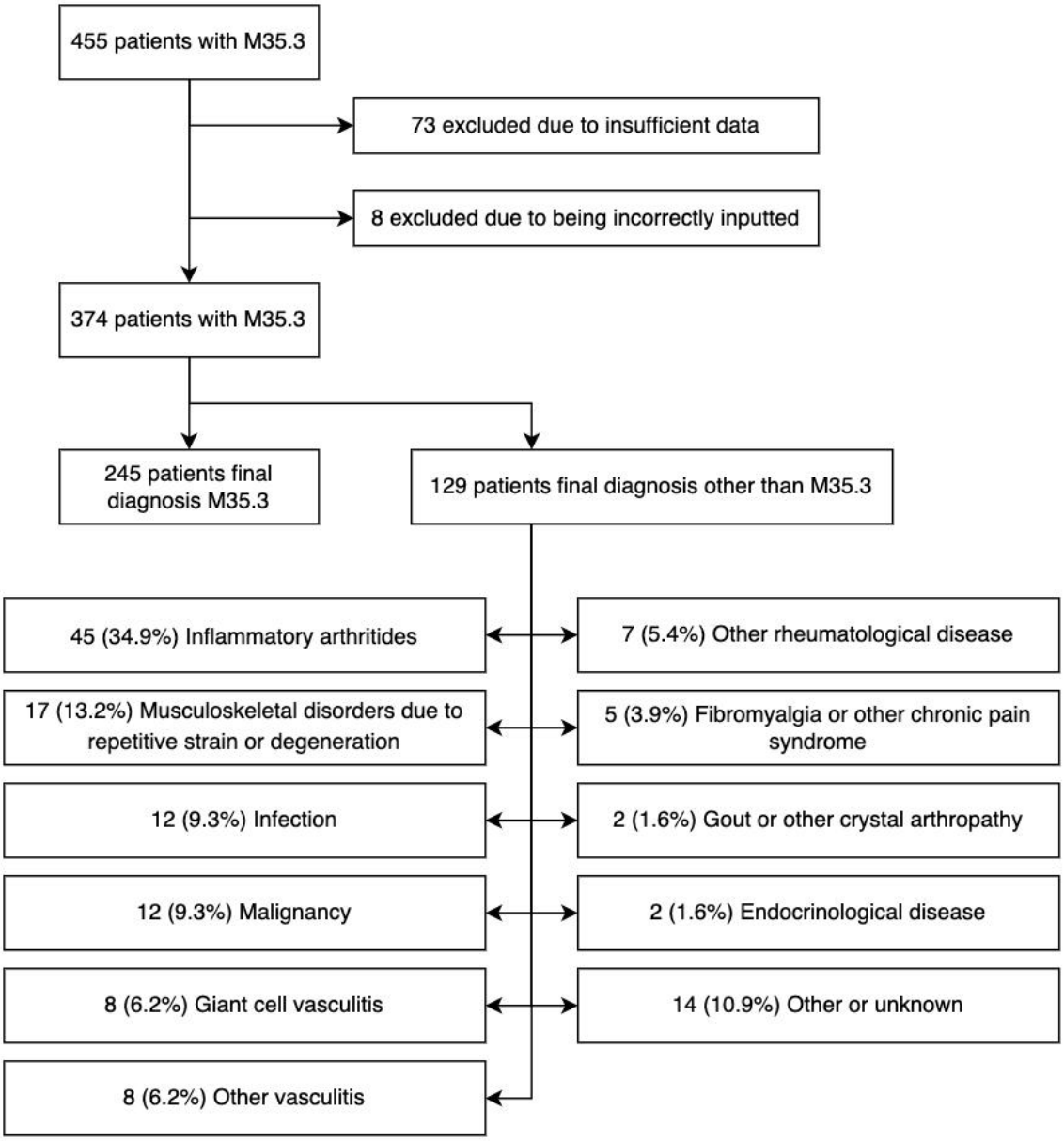
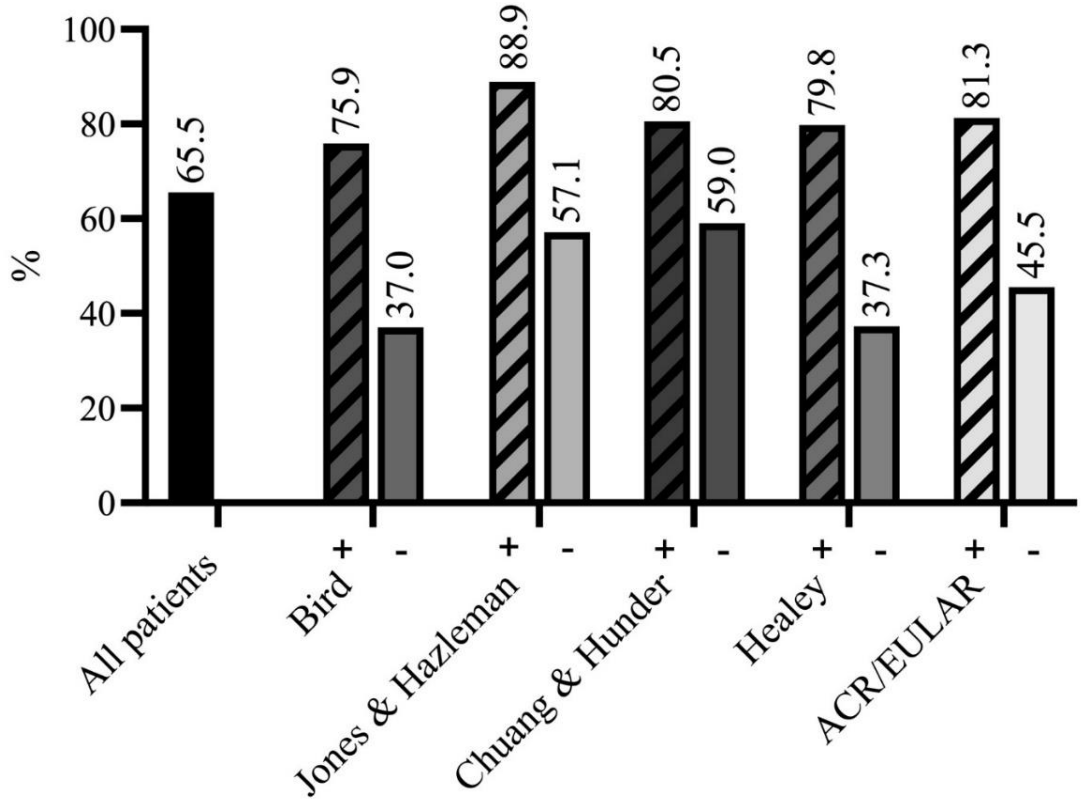


Figure 2

Proportion of patients with a correct diagnosis of PMR, among all patients and by fulfilment of classification criteria.



+, classification criteria fulfilled; -, classification criteria not fulfilled.

Supplementary Data S1

Classification criteria for polymyalgia rheumatica

Bird criteria from 1979

Diagnosis of probable PMR requires any three or more of the following criteria

- Shoulder pain and/or stiffness bilaterally
- Onset of illness of < 2 weeks duration
- Initial ESR ≥40mm/h
- Morning stiffness duration > 1h
- Age ≥ 65 years
- Depression and/or loss of weight
- Upper arm tenderness bilaterally

Bird HA, Esselinckx W, J Dixon AS, Mowat AG, Wood PH. An evaluation of criteria for polymyalgia rheumatica. Ann Rheum Dis. 1979;38(5):434–9.

Jones and Hazleman criteria from 1981

All the following criteria required for diagnosis of PMR

- Shoulder and pelvic girdle pain which is primarily muscular in the absence of true muscle weakness
- Morning stiffness
- Disease duration ≥ 2 months
- ESR >30 mm/h or CRP >6 mg/l
- Absence of inflammatory arthritis or malignant disease
- Absence of objective signs of muscle disease
- Fast and dramatic response to systemic glucocorticoids

Jones JG, Hazleman BL. Prognosis and management of polymyalgia rheumatica. Ann Rheum Dis. 1981;40(1)1–5.

Chuang and Hunder criteria from 1982

All the following criteria required for diagnosis of PMR

- Bilateral aching and stiffness ≥ 1 month in two of the following: neck or torso, shoulders or upper arms, hips or proximal thighs
- Age ≥ 50 years
- ESR >40 mm/h
- Exclusion of all other diagnoses except giant cell arteritis

Chuang TY, Hunder GG, Ilstrup DM, Kurland LT. Polymyalgia rheumatica: a 10-year epidemiologic and clinical study. Ann Intern Med. 1982;97(5):672–80.

Healey criteria from 1984

Diagnosis of PMR requires the age of ≥50 years and the fulfilment of at least three of the following criteria. A positive test for rheumatoid factor or antinuclear antibody excludes the diagnosis.

- Persistent pain ≥1 month in two of the following: neck, shoulders, pelvic girdle
- Morning stiffness >1 h
- ESR >40 mm/h
- Absence of other joint or musculoskeletal diseases
- Rapid response to prednisolone (≤20 mg/day)

Healey LA. Long-term follow-up of polymyalgia rheumatica: evidence for synovitis. Semin Arthritis Rheum. 1984;13(4):322–8

ACR/EULAR collaborative initiative from 2012

Diagnosis with PMR requires the age of ≥50 years, bilateral shoulder aching, abnormal CRP/ESR levels and at least four points (without ultrasonography)/at least five points (with ultrasonography)

- Morning stiffness >45 min (two points)
- Hip pain/limited range of motion (one point)
- Absence of peripheral joint pain (one point)
- Absence of RF and/or anti-CCP antibodies (two points)
- If ultrasonography available, ≥ one shoulder with subdeltoid bursitis and/or biceps tenosynovitis and/or glenohumeral synovitis (posterior/axillary); and ≥ hip with synovitis and/or trochanteric bursitis (one point)
- If ultrasonography available, both shoulders with subdeltoid bursitis, biceps tenosynovitis or glenohumeral synovitis (one point)

Dasgupta B, Cimmino MA, Kremers HM, Schmidt WA, Schirmer M, Salvarani C, et al. 2012 Provisional classification criteria for polymyalgia rheumatica: a European League Against Rheumatism/American College of Rheumatology collaborative initiative. Arthritis Rheum. 2012;64(4):943–54.