EPIDEMIOLOGY OF PSORIASIS AND PSORIATIC ARTHRITIS

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SUMMARY

Psoriasis is widely diffused in the World, with the exception of a few populations, such as the natives from Alaska and Australia, where it is unknown. Its average prevalence is about 3-4%. This is probably an underestimate, for it is mostly based on self-reports. In fact, on the one hand minimal psoriasis, e.g. nail disease, could remain undiagnosed; on the other, precise classification criteria for psoriatic arthritis (PsA) are lacking and the skin disease is often of elusive nature. The frequency of PsA may be higher than commonly believed, as suggested by recent studies reporting a prevalence of up to 0.42%. There are no major differences in the frequency of psoriasis between sexes, nor specific time trends. Indirect data suggest that PsA may be more frequent in the old than in the new World, a point that could be clarified only by standardized international studies. In practice, both psoriasis and PsA are relatively common conditions, with major impact on the patients' quality of life, and requiring appropriate intervention strategies. An important advance should be the adoption of univocal definitions of psoriasis and PsA, including guidelines for patterns of skin and joint involvement.

Key words: Epidemiology, psoriasis, psoriatic arthritis

INTRODUCTION

Psoriasis and psoriatic arthritis (PsA) are diseases the epidemiology of which has been only recently evaluated in properly designed studies. This fact may be ascribed to PsA being described as a separate entity only after the discovery of IgM rheumatoid factor in 1948 (1). In addition, the absence of precise classification criteria for PsA and the elusive nature of the skin disease have contributed to the lack of epidemiological information. This review is concerned with a reappraisal of the epidemiological data on these conditions.

EPIDEMIOLOGY OF PSORIASIS

Incidence

The first study on the incidence of psoriasis was performed in Olmsted County, Minnesota, in 1980 (2). The crude average annual incidence rate was 54.4/100.000 for men and 60.2/100.000 for women. The incidence of psoriasis increased with age for men, whereas the highest incidence for women occurred in the 60-69 year age group. In Norway (3), incidence was calculated between birth and the age of 31 years in a twin study. The highest incidence rates were observed for men in the 24-27 age group (300/100.000) and for women in the 16-19 age group (290/100.000). The six-fold difference between the two studies is likely to be due to the diverging design adopted by the Norwegian authors.

Prevalence

Prevalence of psoriasis is usually set as 2%, although only rarely have studies been performed on reliable samples of the general population (4). The published figures vary between 0% in the Samoa Islands and 11.8% in a population from the Arctic (5). Additional figures, cited in the pivotal review by Faber and Nall (5), are reported in table I. In general terms, psoriasis is more frequent at northern latitudes and among Caucasians. In contrast with what has been observed in other immune-mediated conditions, its prevalence is similar in men and women and has not varied in the last five decades. These considerations indicate that "modern" environmental factors are probably irrelevant for this disease. Case definition and identification

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are likely to be important variables because psoriatic skin lesions may be confused with other forms of dermatitis. It may not be noted by the patient or by the atttending general practitioner because of limited extend or ill-accessible location. Therefore, the ideal epidemiological study should rely on ad hoc evaluation of a random population. An example is Lomholst's survey in the Faroe Islands (6), where he visited a total of 1915 homes including 2341 families (one third of the total population). He showed that 2.8% of the subjects examined were affected. Prevalence data found in different epidemiological studies adopting correct methodologies are reported in table II.

Table I - Prevalences of psoriasis in different countries and populations. Figures, which are derived from references 4 and 5, must be interpreted with caution because most studies are not population-based. In particular, the denominator of several studies are patients with the whole spectrum of skin diseases.

Area	*Prevalence*	*Comments*
Samoa Islands	0%	
USA	0%	natives
Alaska	0%	natives
Australia	0%	aborigens
Mali	0.05%	
Nigeria	0.08%-0.4%	
Angola	0.3%	
Japan	0.3%-1.2%	
China	0.4%	Henan district
Nigeria	0.7%	
India	0.7%	
USA	0.7%	African-American
East-Africa	0.7%	
Brazil	1.3%	
Norway	1.4%	
Croatia	1.55%	
UK	1.6%	
Former USSR	2%	
Venezuela	2%	
Australia	2.6%	caucasian
Uganda	2.8%	
Egypt	3%	
Mexico	3%	
Tanzania	3%	
Kuwait	3.1%	
Kenia	3.5%	
Spain	3.7%	
Malaysia	4%-5.5%	
Paraguay	4.2%	
South Africa	4.5%	
USA	4.6%	
Canada	4.7%	
Scotland	4.8%	
Ireland	5.5%	
Caribbean	6%	
Germany	6.5%	
Arctic Kasach'ye	11.8%	

EPIDEMIOLOGY OF PSORIATIC ARTHRITIS

Prevalence of arthritis in patients with psoriasis

The prevalence of arthritis among patients with psoriasis depends heavily on the criteria used for the definition of PsA. PsA in epidemiological studies has been mainly diagnosed according to the Moll and Wright criteria (7), the ESSG criteria (8), and Amor's criteria (9). Recently, new criteria have been proposed by the CASPAR study group (10), which could be applied in survey studies. They include arthritis plus a minimum score of 3, calculated on the presence of psoriasis (2 points), history of psoriasis, family history of psoriasis, dactylitis, juxtaarticular new bone formation, rheumatoid factor negativity, and nail dystrophy (1 point each). These new criteria were compared with those cited above and three others, including those formulated by Vasey and Espinoza (11), McGonagle (12), and Gladman (13). They were less sensitive but more specific than the Vasey and Espinoza criteria, with all the others being less efficient.

Keeping in mind these limitations, the frequency of arthritis among psoriatic patients was 11% in a population-based research from the US where people were interviewed by phone (14). It amounted to 7.7% among Italian patients hospitalised for psoriasis, whose arthritis was diagnosed by a dermatologist according to the ESSG criteria (15). The corresponding figure reported in Croatia was 15.3% (16). This last study is subject to criticism because of the small number of patients and the fact that they were selected also in rheumatology departments. The recent data from the USA (14) are consistent with those of another population based study conducted in Olmsted County in the eighties, where a prevalence of 12.9% was found (2).

A crucial point is how to judge isolated enthesitis. Many experts believe that a seronegative psoriatic patients with enthesitis, such as Achilles' tendon inflammation, should be considered affected by PsA. The inclusion or not of these patients can easily

Table II - Summary of the studies on the prevalence of psoriasis in different world areas (n.a. = not available).

Area	*Year*	*Age band*	*Number at denominator*	*Method*	*Case definition*	*Prevalence (95%CI)*	*Men (95%CI)*	*Women (95%CI)*	*Ref*
US	2001	≥18	27.220	telephone interview	physician diagnosed	Caucasian 2.5% (2.2-2.7) African American 1.3% (.7-1.8)	n.a.	n.a.	39
Norway	1998	19-31	12.701	postal questionnaire	self-report	4.2% (3.7-4.6)	3.7% (3.2-4.5)	4.5% (3.9-5.1)	3
Spain	1998	n.a.	12.938	telephone interview	self-report	1.43%	1.46%	1.43%	40
Faroe	1962	n.a.	2.341	direct visit	dermatologist's evaluation	2.8%	n.a.	n.a.	6
Denmark	1980	≥16	3.892	direct interview	self-report	n.a.	3.2%	2.5%	41

modify the results of epidemiological studies. The adjusted frequency of peripheral arthritis in psoriatic patients was 28% in another study, but increased to 39% when enthesitis and undifferentiated spondyloarthritides were added (17). A high figure of 36% was also found by Salvarani et al. in Italy among 205 unselected psoriatic patients when the diagnosis was based on the experience of a rheumatologist (18). The percentage of PsA patients identified by adopting Moll and Wright's criteria (22%) and the Amor's and ESSG criteria (24%) was much lower. Another Italian study (19) showed a prevalence of PsA of 34.4% in the Naples area. As expected, rheumatologists find more arthritis than dermatologists and this seems to be the strongest factor influencing the results of this type of study. An exception is the study by Zachariae, a dermatologist who showed a prevalence of 30% among 5,795 patients from the Nordic Psoriasis Association (20). The prevalence of arthritis among psoriatic patients may depend also from age, which is associated with duration of psoriasis. In young patients whose psoriasis had an onset between age 10 and 20 years, the incidence of PsA was only 1% (21). This observation was made in the same Naples area of Italy with the high prevalence in adults cited above.

Incidence

The incidence of psoriatic arthritis is 3/100.000 in Greece (95% CI 1.6-4.5) (22) and 6.59/100.000 (95% CI, 4.99-8.19) in the US (23). The American study was based on the Rochester Epidemiology Project computerized medical record system, where all records of Olmsted County, Minnesota, residents with any diagnosis consistent with psoriasis and/or PsA made between January 1, 1982 and December 31, 1991 were screened. PsA was defined as inflammatory arthritis associated with a definite diagnosis of psoriasis. The incidence rate was highest between the ages of 40 and 59 years in women, and 20 to 39 years in men. A possible limitation of the study was that only those cases of psoriasis the diagnosis of which was confirmed by a dermatologist were included. The design of the study could have lowered the incidence because patients with minimal psoriasis and arthritis, who did not seek medical attention, were not diagnosed. This point is confirmed by the fact that, of the 1,844 medical records of patients with a diagnosis of psoriasis, only 1056 (57.3%) were confirmed by a dermatologist. Nethertheless, the incidence of psoriasis calculated from this study was 107.7/100.000 and therefore higher than that of the previous Rochester study (2). Two Nordic studies evaluating the incidence of inflammatory joint conditions also considered PsA. Its incidence was 8/100.000 (95% CI 4-15) in Kronoberg county, Sweden (24), and 23/100.000 in Kuopio, Finland (25). In the first study, incidence was higher for women [12/100.000 (95% CI 5-24)] than for men [5/100.000 (95% CI 1-13)].

Prevalence

A study in Western Norway considering patients seen in four rheumatological facilities covering the whole area showed a prevalence of 0.2% (26). There was no sex-related difference in prevalence and the most affected age band was 40-59 years. In Greece (22), a low prevalence of 0.06% was described in the Northwest provinces. Data were not population-based, for they were obtained by examining diagnoses among rheumatology hospitals

Table III - Summary of the studies on the prevalence of psoriatic arthritis in different world areas (n.a. = not available).

Area	*Year*	*Age*	*Method*	*Case definition*	*Prevalence (95%CI)*	*Men (95%CI)*	*Women (95%CI)*	*ref*
Northwestern Greece	1982-2001	≥16	clinics	ESSG	0.06% (0.05-0.06)	0.05%	0.06%	22
Greece	2003	≥19	population	ESSG	0.17% (0.10-0.24)	0.29%	0.06%	27
USA	2001	≥18	population	self report	0.25% (0.18-0.31)	n.a.	n.a.	14
Norway	1999-2002	≥20	clinics	ICD-10	0.20% (0.18-0.21)	0.21%	0.18%	26
Italy	2004	≥18	population	skin+arthritis	0.42% (0.31-0.61)	n.a.	n.a.	28
Minnesota, USA	1992	>0	population	skin+arthritis	0.1% (0.81-1.21)	n.a.	n.a.	23

Table IV - Different patterns of arthritis observed in epidemiological studies (n.m. = not mentioned).

Area	*asymmetrical polyarthritis*	*symmetrical poliarthritis*	*oligo arthritis*	*mono arthritis*	*DIP involvement*	*axial involvement*	*mutilating arthritis*	*ref*
Northwestern Greece	71%	8.1%	n.m.	n.m.	10.4%	10.4%	0%	22
Greece	n.m.	25.4%	40.6%	n.m.	29.6%	n.m.	n.m.	27
Norway	68.6%		22.9%	5.8%	not seen alone	2.7%	0.6%	26
USA	3%		91%	n.m.	n.m.	6%	0%	23

and private rheumatologists. In another study evaluating, on a population base, the prevalence of seronegative spondyloarthropaties in different geographical areas of Greece, a prevalence of 0.17% was shown (27). The prevalence was higher in men and in the age class between 49 and 68 years.

In a recent study from the US, a sample of the general population was interviewed by phone (14). Out of 27,220 people contacted, 7 (0.25%) reported a diagnosis of psoriatic arthritis by a physician. However, this figure may be overestimated because only a small percentage (37%) answered to the phone call, and of them only 77% agreed to answer to the questionnaire. In the classical study by Shbeeb et al. (23), which was performed in Olmsted County, Minnesota, the prevalence of PsA on January 1, 1992, was 0.1% (95% CI 0.81-1.21). The prevalence of PsA in Italy (Marche region) was 0.42, the highest figure reported to date in epidemiological studies (28). In Italy, the prevalence of psoriatic arthritis was very similar to that of rheumatoid arthritis (RA). The pattern of arthritis observed in patients from several prevalence studies is summarized in table 4 which shows the great variability that exists between studies.

Are there differences in the epidemiology of PsA between Europe and the US?

The clinical impression of several European rheumatologists supports the view that the prevalence of PsA in Europe is higher than in the US, and probably similar to that of RA. This impression mirrors the scarce attention that, until recently, was devoted to PsA in the ACR meetings in comparison to the EULAR congresses. In a recent evaluation of the case-mix of patients with musculoskeletal conditions seen in Italian tertiary rheumatological centers (29), we noted that the patient rate between PsA and RA was 0.2. This figure is much higher than those of 0.04 and 0.02 observed in outpatients seen in private practices in the US (30) and in Mexico (31).

The figure reported for ambulatory care visits in the US was 0.09 (22). The hypothetical prevalence of PsA was calculated by considering the rate between patients with RA, whose prevalence figures are known for many countries, and those with PsA, after adaptation for the specific prevalence of RA. By this method, the "inferred prevalence" of PsA was 0.08% in Italy, in comparison with 0.18% in Germany (33), 0.16% in The Netherlands (34) and 0.11% in Belgium (35).

The first study on PsA prevalence from Olmsted County, Mn, US showed a much lower value of 0.1% (23). In contrast, the first European paper on the prevalence of PsA (28) showed a value of 0.42% in the Marche region of Italy, confirming the figures suggested by our study. These data, to-

gether with those of the prevalence studies summarized in the previous paragraph, indicate that the prevalence of PsA may be higher in Europe in comparison with America.

Risk factors for psoriatic arthritis

The main risk factor for arthritis is obviously psoriasis, since arthritis is between 2 and 10 times more frequent among patients with psoriasis than in the general population. In patients with psoriasis, the previous use of corticosteroids to treat the skin disease increases the risk of developing arthritis (OR 4.33, 95%CI 1.3-14) (36). In contrast, pregnancy in the 2 years antedating PsA can protect from the onset of arthritis (OR 0.19, 95% CI 0.04-0.95). Both factors can modulate the immune response. Trauma was not associated with the onset of PsA in this study, although several reports link the two events (37). This result may be due to the fact that only major trauma were considered in the study, whereas the injuries associated with initiation of PsA are often minor.

DISCUSSION

The interpretation and comparison of epidemiological studies is always difficult when the methods employed differ. The epidemiology of psoriasis and PsA is not an exception. There are only few studies in which the choice of the population at denominator and the identification of the condition allow comparison of results. Several considerations can be made, nevertheless, as conclusions of this review.

Psoriasis is widely diffused in the World, but there are a few populations where it has not been reported. Genetics plays an important role in disease onset, as suggested by the fact that psoriasis and PsA are more frequent in relatives. The pattern of inheritance is multifactorial, but the mode of transmission is still poorly understood (38). An association of psoriasis with class I HLA antigens (HLA-B13, HLA-B17, HLA-B57, HLA-Cw6) has been demonstrated and there are suggestions that the populations where psoriasis is rare or unknown have a lack of these alleles. The average prevalence of psoriasis is about 3%-4%, This is probably an underestimate, for it is mostly based on self-reports. In fact, on the one hand minimal psoriasis, e.g. nail disease, could remain undiagnosed; on the other, precise classification criteria for psoriatic arthritis (PsA) are lacking and the skin disease is often of elusive nature. There are no major differences in the frequency of psoriasis between sexes or specific time trends.

The prevalence of PsA may be higher than commonly believed, as suggested by the study of Salaffi et al. who reported a prevalence of 0.42% in Italy (28). This study is population-based and the diagnosis was made by rheumatologists visiting all subjects who reported to have or have had joint pain. On the contrary, the figures from other studies seem to be underestimated. If the average prevalence of psoriasis is about 3% and the percentage of psoriatic patients with arthritis varies between 15% and 30%, then the prevalence of PsA should be comprised between 0.5% and 1%. Another possible explanation is that PsA is more frequent in the old than in the new World, as discussed earlier. Only studies performed in different countries using the same design could clarify this point. Researchers should be encouraged to adopt an univocal definition of psoriasis and PsA, in particular of their patterns of joint and skin involvement.

In conclusion, epidemiological studies demonstrate that psoriasis and PsA are frequent conditions. This fact, in association with the impact of both diseases on quality of life, highlights their burden on the society and the need for appropriate intervention strategies.

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