

# Medical History, Drug Exposure and the Risk of Psoriasis

## Evidence from an Italian Case-Control Study

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### Key Words

Psoriasis, comorbidity · Drug exposure · Risk factors · Case-control study

### Abstract

**Background/Aims:** To evaluate the association of psoriasis with selected medical conditions and a number of drugs used before diagnosis. **Methods:** Multicenter case-control study involving outpatient services of 20 general and teaching hospitals. Entry criteria for cases were a first diagnosis of psoriasis made by a dermatologist and a history of skin manifestations of no more than 2 years after the reported onset of the disease. Controls were the first eligible dermatological patients observed on randomly selected days in the same centers as cases. A total of 560 cases and 690 controls were recruited. **Results:** The odds ratio (OR) of psoriasis was 0.8 (95% confidence interval, CI, 0.5–1.3) in hypertensive subjects, 1.1 (95% CI 0.6–2.0) in diabetics and 1.1 (95% CI 0.7–1.7)

in hyperlipidemic subjects. Histamine 2 receptor antagonist exposure was negatively associated with psoriasis: OR 0.3 (95% CI 0.1–0.8). **Conclusion:** Our study rules out a strong association of psoriasis at its first ever diagnosis with common chronic conditions. The reported associations of psoriasis with relatively common conditions such as diabetes mellitus, hypertension and hyperlipidemia may represent a late effect of well-known risk factors for psoriasis such as smoking and overweight or reflect factors related to the long course of psoriasis itself.

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Psoriasis has been associated with a number of other pathological conditions such as diabetes mellitus and hypertension [1–5]. However, these associations have been mostly suggested from studies of psoriatic patients with a long-lasting history of their condition.

Several drugs, such as lithium salts, diuretics,  $\beta$ -blockers, nonsteroidal anti-inflammatory drugs (NSAIDs) or calcium channel blockers, have been associated with the onset or exacerbation of psoriasis, but data allowing estimates of relative risk are scanty [6–11]. These data may be useful to better plan treatments of psoriasis and associated conditions.

In a case-control study of psoriasis conducted in Italy on newly diagnosed cases, we assessed the role of several risk factors for the disease [12–15]. In this paper we report data on the association of psoriasis with selected medical conditions and a number of drugs used before the first ever diagnosis of the dermatosis.

## Materials and Methods

The methods of the study have been published [12–15].

Briefly, the study was conducted in the outpatient services of 10 teaching and 10 general Italian hospitals. Entry criteria for psoriatic cases were a first ever diagnosis of psoriasis made by a dermatologist and a history of skin manifestations of no longer than 2 years after the reported onset of the disease (i.e. the date an individual first became aware of the clinical manifestations of psoriasis). The definition of onset was guided by a thorough inquiry into the timing of relevant signs and symptoms. For inclusion, at least 1 typical plaque of psoriasis was required, i.e. a fixed, well-demarcated erythematous scaly patch. Cases of guttate and pustular psoriasis were excluded if they were not associated with a typical psoriatic plaque. Erythrodermic psoriasis was not considered because of its rarity and the diagnostic difficulties. Eligible patients who were seen consecutively during the study periods were invited to participate.

As controls, we selected subjects with newly diagnosed dermatological conditions other than psoriasis who were seen in the same outpatient services as cases. Controls were the first eligible dermatological patients observed on randomly selected days in the 2 weeks after the selection of a case. One to 2 subjects per case were recruited according to the availability of suitable controls in the selected days. Subjects were not eligible as controls if they were being seen for drug reactions, cutaneous signs of systemic disorders (e.g. icterus), disease regularly associated with liver disorders (e.g. porphyria cutanea tarda) or if they had a history of psoriasis. About 1% of candidates were excluded because of these conditions. Controls were age matched to cases in decades, and all patients and controls were less than 70 years old. Oral informed consent was obtained from each subject, and fewer than 2% of the eligible subjects refused to participate.

The study was conducted during 3 periods: from January 1988 to August 1990; from January to December 1993, and from April 1996 to December 1997. There were 215 eligible cases and 267 controls during the first study period, 180 cases and 207 controls during the second study period, and 165 eligible cases and 216 controls during the third study period. Analyses were conducted at prespecified time points, and more focused hypotheses were formulated for the subsequent study phases. These hypotheses involved amending the questionnaire and adding in new items. The

psoriasis cases were classified as ordinary chronic plaque psoriasis (415, 79.1%), guttate psoriasis associated with chronic plaque psoriasis (98, 17.5%), pustular psoriasis, mostly represented by so-called psoriasis with pustules (32, 5.7%), and mainly flexural psoriasis (15, 2.7%). Diagnoses in the controls included eczema (26%), skin cancers (14%), urticaria (15%), skin infections (14%), pityriasis rosea (10%) and various other skin diseases (21%).

Information was obtained regarding sociodemographic factors, smoking habits, alcohol consumption, coffee and tea consumption, consumption of selected dietary factors, family history of psoriasis in first-degree relatives (parents and siblings) and personal medical history by trained investigators using a structured questionnaire. Anthropometric measures, including height and weight, were also recorded. History of selected pathological conditions and prolonged drug use (more than 2 weeks) was obtained from cases and controls starting from the date of diagnosis and going back up to 3 years before the diagnosis. The following medications were investigated: histamine 2 receptor antagonists, diuretics,  $\beta$ -blockers, NSAIDs, systemic corticosteroids, lithium salts, oral antidiabetics, any systemic antibiotics, calcium antagonists, tranquilizers and antidepressants. Information regarding antibiotics, calcium antagonists and antidepressants was collected in 382 cases and 520 controls during the first, second and early third study phases. Data on tranquilizers were collected in 178 cases and 170 controls during the second study phase. Subjects were considered to have diabetes, hypertension, hyperlipidemia or anemia if they said that the condition had been diagnosed by a physician or if they reported the adoption of dietetic or pharmacological measures for the condition. Whenever useful, information concerning medical history was checked with relevant medical records.

### Analysis of Data

Two sets of analyses were conducted. In a first set, we considered the exposures preceding the diagnosis of the diseases. In a second set, we considered the exposure preceding the appearance of the first reported cutaneous signs of the examined conditions. The average median time from first reported sign or symptom to clinical diagnosis was 3 months in cases and 1 month in the control group. Since no relevant difference was observed, only the first set of analyses is reported. For each variable, we computed the odds ratios (ORs) of psoriasis as estimates of relative risks and the corresponding 95% confidence interval (CI).

To account for the effects of potential confounding factors, unconditional multiple logistic regression analysis with maximum likelihood fitting was used [16]. The terms included in the regression equations are indicated in the footnotes of the tables.

Because of the small number of drug-exposed people, most drugs were grouped according to chemical/therapeutic subgroups in the ATC classification. Overall, the study had enough statistical power ( $\alpha = 0.05$ ,  $\beta = 0.8$ ) to reliably document a doubling of risk for exposures with a prevalence rate of about 5% in the control group.

## Results

Table 1 shows the distribution of cases and controls according to age, sex and selected demographic factors and personal habits. The risk of psoriasis was increased

**Table 1.** Distribution of 560 cases of psoriasis and 690 controls and OR estimates according to age, sex, marital status, family history of psoriasis, body mass index, smoking habits and alcohol consumption, Italy, 1988–1997

	Cases		Controls		OR <sup>a</sup>
	n	%	n	%	
Age group					
≤29 years	188	33.6	236	34.2	–
30–45 years	166	29.6	222	32.2	–
≥46 years	206	36.8	232	33.6	–
Sex					
Males	318	56.8	345	50.0	–
Females	242	43.2	345	50.0	–
Marital status					
Ever married	340	60.7	421	61.0	1 <sup>b</sup>
Never married	220	39.3	269	39.0	1.1 (0.8–1.5)
Family history of psoriasis in first-degree relatives					
No	471	84.3	674	98.0	1 <sup>b</sup>
Yes	88	15.7	14	2.0	5.4 (3.7–7.8)
Body mass index					
≤25	325	59.1	483	70.5	1 <sup>b</sup>
26–29	154	28.0	145	21.2	1.6 (1.1–2.2)
≥30	71	12.9	57	8.3	1.7 (1.1–2.6)
χ <sup>2</sup> for trend					11.8, p < 0.001
Smoking habits					
Never smokers	203	36.3	340	49.3	1 <sup>b</sup>
Ever smokers	357	63.7	350	50.7	1.8 (1.3–2.7)
Alcohol drinking					
Never drinkers	127	22.7	185	26.8	1 <sup>b</sup>
Ever drinkers	433	78.3	505	73.2	1.1 (0.8–1.4)

Data may not reach the total because of some missing values. Figures in parentheses indicate 95% CI.

<sup>a</sup> Multiple logistic regression estimates, including terms for age, calendar year at interview, education, body mass index, smoking and alcohol habits.

<sup>b</sup> Reference category.

in subjects reporting a family history for the condition (OR 5.4, 95% CI 3.7–7.8), smokers (OR 1.8, 95% CI 1.3–2.7) and overweight (OR body mass index, ≥30 vs. ≤25, 1.7, 95% CI 1.1–2.6).

Table 2 lists the pathological conditions reported in the anamnestic inquiry together with the values of OR for psoriasis. No statistically significant association emerged. In particular the OR of psoriasis was 0.8 (95% CI 0.5–1.3) in hypertensive subjects, 1.1 (95% CI 0.6–2.0) in diabetics and 1.1 (95% CI 0.7–1.7) in hyperlipidemic subjects.

Table 3 gives the distribution of cases and controls according to specific drug use and the corresponding ORs. Exposure to histamine 2 receptor antagonists was negatively associated with psoriasis (OR 0.3, 95% CI 0.1–0.8).

**Table 2.** Distribution of 560 cases of psoriasis and 690 controls and OR estimates according to history of selected diseases, Italy, 1988–1997

	Cases		Controls		OR <sup>a</sup>
	n	%	n	%	
Anemia					
Never	524	94.2	649	95.4	1 <sup>b</sup>
Ever	32	5.8	31	4.6	1.5 (0.9–2.6)
Thyroid diseases					
Never	549	98.0	668	96.8	1 <sup>b</sup>
Ever	11	2.0	22	3.2	0.6 (0.3–1.3)
Diabetes mellitus					
Never	539	96.3	668	96.8	1 <sup>b</sup>
Ever	21	3.8	22	3.2	1.1 (0.6–2.0)
Hypertension					
Never	510	91.1	629	91.2	1 <sup>b</sup>
Ever	50	8.9	61	8.8	0.8 (0.5–1.3)
Ischemic heart disease					
Never	550	98.2	681	98.7	1 <sup>b</sup>
Ever	10	1.8	9	1.3	1.3 (0.5–3.4)
Hyperlipidemia					
Never	524	93.6	651	94.4	1 <sup>b</sup>
Ever	36	6.4	39	5.7	1.1 (0.7–1.7)
Peptic ulcer					
Never	544	97.1	659	95.5	1 <sup>b</sup>
Ever	16	2.9	31	4.5	0.5 (0.3–1.1)
Cholelithiasis					
Never	542	96.8	662	95.9	1 <sup>b</sup>
Ever	18	3.2	28	4.1	0.8 (0.4–1.4)
Chronic hepatitis					
Never	542	96.8	676	98.0	1 <sup>b</sup>
Ever	18	3.2	14	2.0	1.7 (0.8–3.6)
Pancreatitis					
Never	559	99.8	690	100.0	1 <sup>b</sup>
Ever	1	0.2			NE
Renal stones					
Never	540	96.4	663	96.1	1 <sup>b</sup>
Ever	20	3.6	27	3.9	0.9 (0.5–1.6)
Gout					
Never	557	99.5	687	99.6	1 <sup>b</sup>
Ever	3	0.5	3	0.4	1.9 (0.2–4.9)
Neoplasms (any type)					
Never	552	98.6	679	98.4	1 <sup>b</sup>
Ever	8	1.4	11	1.6	0.9 (0.3–2.2)
Recent infectious disease					
Never	493	88.2	623	90.3	1 <sup>b</sup>
Ever	66	11.8	67	9.7	1.4 (0.9–1.8)

Data may not reach the total because of some missing values. Figures in parentheses indicate 95% CI. NE = Not estimable.

<sup>a</sup> Multiple logistic regression estimates, including terms for sex and age.

<sup>b</sup> Reference category.

**Table 3.** Distribution of 560 cases of psoriasis and 690 controls and OR estimates according to drug use, Italy, 1988–1997

	Cases		Controls		OR <sup>a</sup>
	n	%	n	%	
Histamine 2 receptor antagonists					
Never	555	99.1	670	97.1	1 <sup>b</sup>
Ever	5	0.9	20	2.9	0.3 (0.1–0.8)
Diuretics					
Never	543	97.0	676	98.0	1 <sup>b</sup>
Ever	17	3.0	14	2.0	1.3 (0.6–2.5)
β-Blockers					
Never	547	97.7	682	98.8	1 <sup>b</sup>
Ever	13	2.3	8	1.2	2.1 (0.9–5.1)
NSAIDs					
Never	519	92.7	630	91.3	1 <sup>b</sup>
Ever	41	7.3	60	8.7	0.7 (0.5–1.1)
Systemic corticosteroids					
Never	551	98.4	679	98.4	1 <sup>b</sup>
Ever	9	1.6	11	1.6	1.0 (0.5–1.8)
Lithium salts					
Never	560	100	688	99.7	1 <sup>b</sup>
Ever	–	–	2	0.3	NE
Oral antidiabetics					
Never	381	99.7	514	98.9	1 <sup>b</sup>
Ever	1	0.3	6	1.1	0.3 (0.0–2.2)
Any systemic antibiotics					
Never	368	96.3	506	97.3	1 <sup>b</sup>
Ever	14	3.7	14	2.7	1.5 (0.8–3.1)
Calcium antagonists					
Never	380	99.5	517	99.4	1 <sup>b</sup>
Ever	2	0.5	3	0.6	1.4 (0.3–6.0)
Tranquillizers					
Never	153	86.0	158	92.9	1 <sup>b</sup>
Ever	25	14.0	12	7.1	1.4 (0.7–2.9)
Antidepressant drugs					
Never	176	98.9	166	97.6	1 <sup>b</sup>
Ever	2	1.1	4	2.4	0.2 (0.1–1.8)

Data may not reach the total because of some missing values. Figures in parentheses indicate 95% CI. NE = Not estimable.

<sup>a</sup> Multiple logistic regression estimates, including terms for sex and age.

<sup>b</sup> Reference category.

No other significant association was observed for the drugs examined. The OR in β-blocker users was increased, but the estimate was not significant (OR 2.1, 95% CI 0.9–5.1).

## Discussion

Before discussing specific results, possible sources of biases should be considered. Selection bias was reduced by including according to predefined criteria all the con-

secutive newly observed cases and controls identified at the participating centers on randomly selected days during the study periods.

Berkson bias, i.e. the possibility that a specific combination of exposure and the disease under study increases per se the risk of seeking specialist advice, is a special problem when examining disease associations. This potential bias was reduced by selecting controls in the same medical setting as cases, under the same degree of medical attention. Overmatching may result from choosing cases too similar to controls as for risk factor profile. We tried to avoid such a problem by selecting controls with a wide spectrum of different cutaneous diseases and by excluding from the control group drug reactions and cutaneous signs of systemic disorders (e.g. icterus). Cases were all referred to specialists for symptoms related to psoriasis. A standardized questionnaire was used to collect medical histories, and recall bias should not, in our opinion, be very important for most of the conditions and drugs assessed in our questionnaire. In evaluating the exposures, we assumed the day of diagnosis of the cutaneous condition by a specialist as the index day. A careful standardized history of the cutaneous condition was obtained, and analyses were also conducted by taking as an alternative index day the day of first appearance of cutaneous signs of the examined condition. Interobserver variability is an issue of concern in a study like ours where several centers participated. We tried to reduce it to a minimum by organizing training sessions with the interviewers and by periodically monitoring the quality of the interviews. Moreover, it should be noted that the same interviewers interviewed in parallel cases and controls. In principle, information bias, i.e. differential quality of the information between compared groups, may result from awareness of the status of the interviewed subjects as cases or controls. However, it is expected that the use of standardized questionnaires by interviewers who were not aware of the main study hypotheses helped to minimize such a potential bias. Being based on the concept of ‘case-control surveillance’ [16], the study spanned 3 time periods over about one decade. It is quite plausible that some exposures, especially medications, showed remarkable changes over such a long period of time. Even if it is quite reassuring that the results observed in the different study periods were comparable and that no important differences among the participating centers were observed (data not shown), we caution the reader to consider the limitation of our study in assessing risks for recently marketed drugs and for drug exposures which showed large variations of use over the periods examined.

The National Health System in Italy provides care for all Italian citizens and covers specialist consultations. As a consequence, most cases of psoriasis in Italy are referred for specialist assessment at an early stage. This is also suggested by the low percentage of cases in our study who had taken any long-term topical treatment for their condition: only 15% cases had received any specific topical treatment for their psoriasis during the year preceding the diagnosis and no case had received a systemic treatment for psoriasis (data not shown).

In our study, none of the diseases considered in our questionnaire was significantly associated with psoriasis. Even if negative, these results are of major interest, since they suggest that the reported associations of psoriasis with relatively common conditions such as diabetes mellitus, hypertension and hyperlipidemia do not precede the onset of psoriasis. These conditions may represent a late effect of well known risk factors for psoriasis such as smoking and overweight [1]. Alternatively, they may reflect factors related to the long course of psoriasis itself or more in general increased medical surveillance in psoriatic subjects. As a note of caution, it must be emphasized that for exposures with a relatively low expected prevalence in the control group (i.e. lower than 5%) our study was able to detect only very strong associations (about 3-fold or higher increase over controls) and, therefore, weaker associations cannot be excluded.

A number of clinical reports suggest that bacterial infection can trigger psoriasis, and it has been known for a long time that acute exacerbation of psoriasis may follow streptococcal infection [18–21]. The resulting psoriasis is commonly of the guttate pattern, but existing plaque psoriasis may also be exacerbated [3, 21].

We did not find any clear association between recent infection and risk of psoriasis in the general data set (the estimated OR was 1.4, but the lower CI was 0.9). However, in a previous analysis of the data set limited to cases of acute guttate psoriasis, we observed an association with acute infection [14].

Several drugs have been associated with psoriasis mainly on the basis of anecdotal reports. The most frequently reported associations are with lithium salts,  $\beta$ -adrenergic blocking agents and NSAIDs [6–9, 22]. Our study was unable to document any significant association of psoriasis with these classes of drugs taken for at least 2 weeks before the reported disease onset or diagnosis. Our data are particularly reassuring for what concerns NSAIDs since their prevalence of use among controls was well above 5%, while for  $\beta$ -adrenergic blocking agents only very strong associations (OR greater than 3) could

be reliably documented by our study, and hence the non-significant doubling of risk we found should be taken cautiously. A distinction has been proposed between drugs influencing the onset of psoriasis and those causing relapse of the disease [6]. Lithium salts and  $\beta$ -blockers have been associated with both the new onset and exacerbation of psoriasis including pustular flare [8, 9]. NSAIDs have been mainly associated with exacerbation. This distinction is to some extent artifactual since the real onset of a condition like psoriasis, which may have a long subclinical phase, may be difficult to define. When the study focus is on the acute short-term effect of triggering factors, a better design compared to the case-control study we adopted would be a classical cohort study or the more recently introduced case-crossover methodology [23].

A final comment concerns the inverse association of histamine 2 receptor antagonists with psoriasis. The limited data available in our study as reflected by the large CI do not allow any firm conclusions. Earlier clinical studies suggested a worsening of psoriasis as a short-term effect of cimetidine. However, subsequent data pointed to a possible beneficial effect of cimetidine and ranitidine after at least 2 months' treatment (the studies are reviewed in Witkamp et al. [24]). The histamine 2 receptor antagonists are likely to have immunomodulating properties [25, 26].

In conclusion, our study examined several diagnoses and medications in relation to psoriasis. We were able to rule out a strong significant association of common diseases like hypertension and diabetes mellitus with psoriasis at its first ever diagnosis. In addition, we were not able to document a statistically significant association of psoriasis with several drugs frequently implicated in the appearance or acute exacerbation of the dermatosis. Partly unexpected was the apparent protection from psoriasis of histamine 2 receptor antagonists.

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## Commentary

### Psoriasis and Metabolic Comorbidities: The Importance of Well-Designed Prospective Studies

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Psoriasis is a chronic inflammatory skin disease affecting 2–3% of the population, and that is now recognized to be associated with other diseases. The more common comorbidities include anxiety/depression disorders. Although suspected for many years, recent large epidemiological studies have confirmed that psoriasis and psoriatic arthritis are also associated with metabolic diseases including obesity, dyslipidemia and diabetes [1–5]. Moreover, an increased mortality from cardiovascular diseases has been documented in patients with severe

psoriasis, and psoriasis may confer an independent risk of myocardial infarction especially in young patients [6–8]. Young patients (aged 20–40 years) with psoriasis have indeed a 2- to 3-fold increase in manifesting myocardial infarction compared to nonpsoriatic controls [7]. Major factors that can contribute to this unfavorable cardiovascular risk profile include cigarette smoking, obesity, physical inactivity, hyperhomocysteinemia and psychological stress that have a higher prevalence among patients with psoriasis [6–9]. Patients with psoriasis have

also an increased prevalence of metabolic syndrome compared to nonpsoriatic dermatological patients [10]. The metabolic syndrome is a cluster of risk factors, which include central obesity, atherogenic dyslipidemia, hypertension and glucose intolerance, and is a strong predictor of cardiovascular diseases, diabetes and stroke [11, 12]. The metabolic syndrome takes into account the fat distribution, with central or abdominal obesity more relevant than peripheral or subcutaneous obesity. The importance of the metabolic syndrome is that it may confer a cardiovascular risk higher than the single components. In addition, the metabolic syndrome also increases the risk of all cause and colon cancer mortality. Interestingly enough, its prevalence does not correlate with psoriasis severity [10].

The directionality of the association between metabolic comorbidities and psoriasis is not known. The results of a case-control study published in this issue of *Dermatology* suggest that psoriasis comes before some of these comorbidities [13]. In particular, the study shows that psoriasis patients when they were first ever diagnosed of having psoriasis did not have an increased prevalence of hyperlipidemia, diabetes, hypertension or any other medical conditions. In contrast, a higher proportion of psoriatic patients were overweight or obese when they were first diagnosed to be affected with psoriasis. This observation is in contrast with that of other studies showing that patients with psoriasis at their disease onset do not have an increased prevalence of obesity [14, 15]. One such study also reports that serum lipid abnormalities precede the onset of psoriasis [15]. We found that the psoriasis patients with metabolic syndrome had disease onset at an earlier age and a longer disease duration compared to psoriasis patients without metabolic syndrome [10], suggesting that psoriasis duration is a risk factor for metabolic syndrome. The major problem with all these studies is that they are retrospective. Prospective research with well-designed longitudinal studies is urgently needed to precisely assess whether metabolic disorders are risk factors for psoriasis and whether psoriasis favors atherosclerosis, and to accurately estimate the increased cardiovascular risk in psoriasis [16].

It is likely that some common genetic background predisposes to both psoriasis and psoriatic arthritis as well as to obesity and metabolic diseases. Psoriasis is associated with depression, altered eating habits, physical inactivity and alcohol consumption, all of which favor weight gain. On the other hand, abdominal obesity is a proinflammatory state with the visceral adipose tissue being a

rich source of inflammatory mediators known as adipocytokines. These include adiponectin, leptin, resistin and visfatin, which may provide an important link between obesity, insulin resistance and related inflammatory disorders. Other products of adipose tissue that have been characterized include TNF- $\alpha$ , IL-6 and MCP-1 [17]. These products have well-established roles in the pathogenesis of psoriasis and at the interface between the immune and metabolic systems. In line with this hypothesis is the evidence that obesity is a risk factor for other inflammatory diseases such as atherosclerosis and asthma. The relationship between chronic inflammatory disorders, metabolic deterioration, cardiovascular risk factors (e.g. insulin resistance) and accelerated atherosclerosis is well known for rheumatoid arthritis and systemic lupus erythematosus [18, 19], and may well apply for psoriasis, where skin and/or joint inflammation, obesity and metabolic alterations may establish vicious circles or reciprocal deterioration.

The association of psoriasis with metabolic disorders has many relevant practical implications. First, we should be aware that cyclosporin, retinoids and methotrexate can negatively affect metabolic comorbidities, such as dyslipidemia, glucose intolerance, hypertension and hyperhomocysteinemia [20]. Biologicals are apparently not associated with these side effects. However, a recent retrospective study showed that anti-TNF- $\alpha$  therapy (infliximab and etanercept) is associated with a significant weight gain after 6 months compared to methotrexate [21]. In particular, about one fourth of patients under anti-TNF- $\alpha$  gained 4–10 kg body weight, suggesting caution in the use of these drugs in overweight or obese patients and a careful follow-up with diet advice for the others. Another important point is that dermatologists should be prepared to accurately screen patients for comorbidities and be actively involved in the treatment of comorbidities, especially obesity. Apart from markedly improving quality of life and being of the utmost importance in the global management of patients, reduction of body weight may render patients more responsive to antipsoriatic drugs, a hypothesis currently tested in our clinic.

In conclusion, psoriasis and psoriatic arthritis have implications far beyond the skin or the joints. Research aimed at understanding the biological bases of the associations with metabolic comorbidities and how to fit this information in the management of patients is an important challenge for the very near future.

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