Net Letter

Prevalence and stages of chronic kidney disease in psoriasis and psoriatic arthritis: A cross-sectional study

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Sir,

A few retrospective cohort studies have reported an increased incidence of chronic kidney disease (CKD) in patients with psoriasis, independent of traditional cardiovascular risk factors and nephrotoxic drugs.[1,2] However, those studies have relied mainly on secondary data which makes it impossible to stratify patients. Additionally, mild-to-moderate declines in estimated glomerular filtration rate (eGFR) were not reported.

Our aim was to describe the prevalence of eGFR stages and CKD in a representative cohort of patients with moderate-to-severe psoriasis, and to explore predictors of CKD.

We conducted a prospective, cross-sectional study in patients aged 20 or above who had been diagnosed with moderate-to-severe psoriasis on the basis of their need for phototherapy or systemic treatment (≥6 months) and/or psoriatic arthropathy. Participants were recruited from dermatology and rheumatology outpatient clinics at a tertiary University Hospital between October 2007 and May 2018. This study was approved by the Ethics Committee of our hospital.

We examined laboratory data of serum creatinine and eGFR using the Chronic Kidney Disease-Epidemiology Collaboration (CDK-EPI) formula. The criteria for CKD were an eGFR value under 60mL/min/1.73m^2 on at least 2 occasions separated by at least 3 months. Acute kidney impairment was ruled out. To identify the risk factors associated with comorbid CKD, we performed univariate and multivariate logistic regression analyses (SPSS, v25). A *P* value of less than 0.05 was considered statistically significant.

Our study population included 558 patients: 221 (39.6%) had purely cutaneous psoriasis, 108 (19.4%) had only psoriatic arthropathy whereas 229 (41%) had both. Three patients with psoriatic arthropathy had concomitant renal amyloidosis. Characteristics and potential confounders have been summarised in Table 1.

The overall prevalence of CKD was 15.2% (1.4% for age 20-39 years; 9.4% for age 40-64 years and 38.1% for age >64 years). In patients who had only skin disease, the prevalence of CKD was 9.5% compared with 18.8% in the group with skin disease and psoriatic arthropathy. Prevalence of eGFR as per staging is shown in Table 2. Unadjusted associations for CKD are shown in Table 3. On multivariate analysis, only age >64 years, hypertension and psoriatic arthropathy remained as independent predictors of CKD [Table 4].

A total of 85 patients (15.2%) had CKD. Although the study lacks a control group, the prevalence of CKD and of mildly decreased eGFR found are higher than those in the general population.[3] We also found an overall prevalence of 45.5% for stage 2 eGFR, a relatively high percentage compared to data from the general population, particularly in younger individuals (35.2% for age 20-39 years). Cardiovascular mortality increased linearly when eGFR decreased to below 75 mL/min/1.73m^2, independent of traditional cardiovascular risk factors and albuminuria.[4] In this study group, 30.7% patients had results below this threshold (5.6% for age 20-39 years; 24.6% for age 40-64 years; and 59.7% for age >64 years), a finding that could be associated with an increased cardiovascular risk.

The three independent predictors of CKD were age >64 years, hypertension and psoriatic arthropathy. Although eGFR decreases with age, the prevalence of CKD over 64 years of age in our study group (38.1%) is higher than what is reported for the general population (21.4%).

It has been hypothesised that the decrease in eGFR in patients with psoriasis may be due to an increase in systemic

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Table 1: Demographic, clinical and treatment characteristics of the study population (*n*=558)

Feature	*n* (%)
Sex	
Male	315 (56.5)
Female	243 (43.5)
Age (years) range	
20-39	71 (12.7)
40-64	353 (63.3)
>64	134 (24)
Smoking status	
Current smoker	135 (24.2)
Ex-smoker	63 (11.3)
Non-smoker	360 (64.5)
Alcohol intake	
Alcohol consumer	117 (21)
Non-consumer	441 (79)
BMI	
Obesity (BMI >30 kg/m^2)	144 (25.8)
Overweight (BMI 2530 kg/m^2)	135 (24.2)
Normal weight (BMI 18.5-24.9kg/m^2)	279 (50)
Comorbidities	
Hypertension	158 (28.3)
Dyslipidaemia	206 (36.9)
Ischaemic heart disease	21 (3.8)
Diabetes	82 (14.7)
Psoriasis duration (years)	
Duration >10	339 (60.8)
Clinical characteristics	
Psoriasis	450 (80.7)
Chronic plaque psoriasis	422 (93.8)
Guttate psoriasis	12 (2.7)
Erythrodermic psoriasis	5 (1.1)
Generalized pustular psoriasis	6 (0.1)
Palmoplantar pustular psoriasis	23 (5.1)
Psoriatic arthritis (all subtypes)	337 (60.4)
Subtypes	
Oligoarthritis	145 (43)
Polyarthritis	94 (27.9)
Axial	22 (6.5)
Oligoarthritis with axial involvement	31 (9.2)
Polyarthritis with axial involvement	34 (10.1)
Distant interphalangeal arthritis	11 (3.3)
Comorbid manifestations	
Dactylitis	116 (34.4)
Tendonitis	129 (38.3)
Plantar fasciitis	34 (10.1)
Enthesitis	88 (26.1)
Coexisting renal amyloidosis	3 (0.9)
Use of NSAIDs	
Non-user	106 (19)
Low frequency user(<2 prescriptions/year)	390 (69.9)
Moderately frequent user (2-5 prescriptions/year)	50 (9)
Highly frequent user (>5 prescriptions/year)	12 (2.2)
Treatments received >6 months	
Phototherapy	155 (27.8)
Methotrexate	372 (66.7)
Leflunomide	108 (19.4)
Salazopyrin	20 (3.6)
Hydroxychloroquine	16 (2.9)
Cyclosporin	47 (8.4)
Acitretin	44 (7.9)
Apremilast	13 (2.3)
Adalimumab	74 (13.3)
Etanercept	80 (14.3)
Infliximab	28 (5)
Golimumab	8 (1.4)
Certolizumab	4 (0.7)
Ustekinumab	50 (9)
Secukinumab	16 (2.9)
Ixekizumab	6 (1.1)
Efalizumab	25 (4.5)

BMI: Body mass index, NSAIDs: Nonsteroidal anti-inflammatory drugs

cytokines (tumor necrosis factor-α and interleukin-6) and endothelial dysfunction, which has been associated with an increase in fibroblast growth factor-23.[2] In our study group, the presence of psoriatic arthropathy increased the risk of CKD (odds ratio, 2.5) after adjustment for conventional risk factors and nephrotoxic drugs. Psoriatic arthropathy may increase chronic inflammation more than psoriasis without arthropathy.

This study is limited by the small sample size and the lack of a control group. Nonetheless, it includes a cohort undergoing close monitoring, which allowed us to stratify eGFR stages and to obtain the prevalence of CKD defined by eGFR (using the CKD-EPI equation, which has been shown to be more accurate than other formulae).[5] Moreover, the eGFR classification was based on 2 values obtained more than 90 days apart and acute renal impairment was systematically ruled out.

To conclude, the prevalence of CKD among patients with moderate-to-severe psoriasis and/or psoriatic arthropathy is high. Age over 64 years and the presence of hypertension may predict an increased likelihood of CKD. In other words, psoriasis could increase the likelihood of renal impairment in patients with conventional cardiovascular risk factors and the presence of psoriatic arthropathy may be associated with additional risk. Mildly decreased eGFR was highly prevalent and could increase cardiovascular risk in these patients. Our findings suggest that renal and cardiovascular risk factors should be taken into consideration in cases of moderate-to-severe forms of psoriasis.

Table 2: Prevalence of estimated glomerular filtration rate stages and overall chronic kidney disease (stages 3-5) in the study population (*n*=558)

	Prevalence of eGFR (mL/min/1.73 m²) distributed in categories and overall CKD. Expressed by *n* (%)						
	Normal (≥90)	Stage 2 (60-89)	Stage 3a (45-59)	Stage 3b (30-44)	Stage 4 (15-29)	Stage 5 (<15)	CKD (Stages 3-5) (overall <60)
Total (*n*=558)	219 (39.3)	254 (45.5)	58 (10.4)	16 (2.9)	9 (1.6)	2 (0.4)	85 (15.2)
Age (years)							
20-39 (*n*=71)	45 (63.4)	25 (35.2)	-	-	1 (1.4)	-	1 (1.4)
40-64 (*n*=353)	164 (46.5)	156 (44.2)	26 (7.4)	5 (1.4)	1 (0.3)	1 (0.3)	33 (9.4)
>64 (*n*=134)	10 (7.5)	73 (54.5)	32 (23.9)	11 (8.2)	7 (5.2)	1 (0.8)	51 (38.1)
Sex							
Male (*n*=315)	124 (39.4)	147 (46.7)	34 (10.8)	6 (1.9)	4 (1.3)	-	44 (14)
Female (*n*=243)	95 (39.1)	107 (44)	24 (9.9)	10 (4.1)	5 (2.1)	2 (0.8)	41 (16.9)

eGFR: Estimated glomerular filtration rate, CKD: Chronic kidney disease

Table 3: Unadjusted associations (univariate analysis) between demographic, clinical and systemic therapies, and the presence of chronic kidney disease (estimated glomerular filtration rate <60 ml/min/1.73m²)

Characteristic (reference)	OR (95% CI)	*P*
Age >64 years (v/s ≤64 years)	6.6 (4-10.7)	<0.001
Age >64 years (v/s 20-39 years)	43 (5.8-319.3)	<0.001
Age 40-64 years (v/s 20-39 years)	7.22 (1-53.7)	0.02
Men (v/s women)	1.3 (0.8-2)	0.344
Alcohol consumer (v/s non-consumer)	0.6 (0.3-1.2)	0.163
Current smoker (v/s non-smoker)	1 (0.5-1.7)	0.855
Ex-smoker (v/s non-smoker)	1.5 (0.8-3)	0.233
Obesity, BMI >30 kg/m² (v/s normal, 18.5-25 kg/m²)	1.2 (0.7-2)	0.538
Overweight, BMI 25-30 kg/m² (v/s normal, 18.5-25 kg/m²)	0.8 (0.5-1.5)	0.510
Hypertension (v/s absence)	4.3 (2.7-6.9)	<0.001
Dyslipidaemia (v/s absence)	1.7 (1.1-2.8)	0.019
Ischaemic heat disease (v/s absence)	2.9 (1.2-7.5)	0.019
Diabetes (v/s absence)	2.8 (1.6-4.9)	<0.001
Psoriatic arthritis (v/s absence)	2.2 (1.3-3.8)	0.002
Disease duration >10 years (v/s ≤10 years)	1 (0.6-1.5)	0.877
NSAIDs frequent user (2-5 prescriptions/y) (v/s nonuser)	1 (0.4-2.4)	0.991
NSAIDs high-frequent user (>5 prescriptions/years) (v/s nonuser)	0.9 (0.2-4.5)	0.914
Methotrexate (v/s absence)	0.8 (0.5-1.3)	0.359
Leflunomide (v/s absence)	1.1 (0.7-2)	0.644
Salazopyrin (v/s absence)	0.8 (0.8-1)	0.503
Hydroxychloroquine (v/s absence)	0.8 (0.2-3.5)	0.758
Cyclosporin (v/s absence)	0.8 (0.3-2)	0.623
Acitretin (v/s absence)	0.9 (0.4-2.1)	0.759

BMI: Body mass index, CI: Confidence interval, OR: Odds ratio, NSAIDs: Nonsteroidal anti-inflammatory drugs

Table 4: Multivariable logistic regression analysis of epidemiological and clinical factors: Independent predictors of chronic kidney disease (estimated glomerular filtration rate <60 ml/min/1.73 m²) in the multivariate logistic regression model

Predictor	OR (95 CI)	*P*
Age >64 years (v/s ≤64 years)	4.7 (2.7-8.1)	<0.001
Hypertension (v/s absence)	2.3 (1.3-4)	0.005
Psoriatic arthritis	2.5 (1.4-4.5)	0.002
Men (v/s woman)	0.9 (0.5-1.5)	0.682
Alcohol consumer (v/s nonconsumer)	1.4 (0.2-9.2)	0.755
Currently smoker (v/s nonsmoker)	0.6 (0.1-4.4)	0.581
Exsmoker (v/s nonsmoker)	1 (0.6-1.8)	0.897
Obesity, BMI >30 kg/m² (v/s normal, 18.5-25 kg/m²)	0.9 (0.5-1.6)	0.658
Overweight, BMI 25-30 kg/m² (v/s normal, 18.5-25 kg/m²)	0.5 (0.2-1.1)	0.172
Dyslipidaemia (v/s absence)	1.3 (0.8-2.4)	0.310
Ischaemic heat disease (v/s absence)	1.2 (0.4-3.8)	0.719
Diabetes (v/s absence)	1.4 (0.7-2.8)	0.306
Disease duration >10 years (v/s ≤10 years)	1.6 (0.9-2.8)	0.147
NSAIDs frequent user (2-5 prescriptions/years) (v/s nonuser)	1.6 (0.8-3.3)	0.164
NSAIDs high-frequent user (>5 prescriptions/years) (v/s nonuser)	1.4 (0.3-7.3)	0.686
Methotrexate (v/s absence)	0.7 (0.4-1.2)	0.189
Leflunomide (v/s absence)	0.6 (0.3-1.2)	0.160
Salazopyrin (v/s absence)	0.5 (0.2-1.1)	0.078
Hydroxychloroquine (v/s absence)	1.6 (0.8-3.2)	0.208
Cyclosporin (v/s absence)	1.3 (0.5-3.5)	0.663
Acitretin (v/s absence)	1.9 (0.7-5.4)	0.238

BMI: Body mass index, CI: confidence interval, OR: Odds ratio, NSAIDs: Nonsteroidal anti-inflammatory drugs

Declaration of patient consent

The authors certify that they have obtained all appropriate patient consent.

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Conflicts of interest

There are no conflicts of interest.

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