Brief Report

Chronic Kidney Disease in Patients with Psoriasis –A Hospital Based Cross Sectional Study

Abstract

Background: Psoriasis is a multi-system inflammatory disease where skin and joints are the primary targets. Recently, some studies had shown the association of psoriasis with kidney disease. **Aims:** To study the association of psoriasis with chronic kidney disease (CKD) in a tertiary health care center. **Methodology:** The study was conducted in the Department of Dermatology in a tertiary care center in Kerala. The study was a descriptive cross-sectional study for 6 months from August 2017 to January 2018. A total of 104 patients with psoriasis were studied. Clinical data was collected. Glomerular filtration rate (GFR) and albumin creatinine ratio (ACR) were found out to know the presence of CKD**.** Descriptive and inferential statistical analysis has been carried out in the present study. **Observations:** Of the 104 patients, 14 were diagnosed as having CKD. Of the 14 CKD patients, 12 had severe psoriasis, 2 had moderate psoriasis, and none had mild psoriasis. The risk factors for CKD (presence of diabetes mellitus/hypertension or intake of drugs—non-steroidal anti-inflammatory drugs [NSAIDs]/cyclosporine) were present in 9 out of 14 CKD patients. The duration of psoriasis was more than 10 years in 10 CKD patients. **Conclusion:** Our study demonstrated that psoriatic patients have an increased risk of developing CKD and this risk is found to increase with the severity and duration of psoriasis. Our results require confirmation in large-patient populations in prospective studies or case-control studies.

Keywords: *Chronic kidney disease, duration, psoriasis, renal failure, severity*

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Introduction

Psoriasis is a multi-system inflammatory disease where skin and joints are the primary targets.[1] In addition to skin and joints, psoriasis can be associated with diabetes, dyslipidemia, metabolic syndrome,[2-4] and rarely malignancies.[5] The chronic inflammation driven by T-cell activation and cytokines may be triggering the systemic associations.[6] Recently, studies have shown the association of psoriasis with renal disease.[7-9] In these studies, the relevance of monitoring the renal status of psoriasis patients is suggested, especially while giving systemic therapy. We performed this study to find the association of psoriasis with CKD.

Methodology

This was a descriptive study conducted in a tertiary care center in Kerala. Consent from the Institutional Research Board and Institutional Ethical Committee was sought. Informed consent was obtained from all the patients. The study period was 6 months from August 2017 to January 2018. Patients clinically diagnosed as having psoriasis were included. Patients who were having kidney disease prior to the diagnosis of psoriasis were excluded. A detailed history was taken with regard to psoriasis, its duration, drug intake, presence of diabetes mellitus, hypertension, and renal disease. The body mass index (BMI) was calculated. Detailed dermatological and systemic examinations were done.

The body surface area of involvement (BSA) was calculated and recorded in the proforma. Patients were classified as having mild, moderate, and severe psoriasis depending upon the BSA of involvement. Mild = BSA <3%, moderate = BSA between 3 and 10%, and severe = BSA >10%.[10] The Psoriasis Area and Severity Index (PASI) score was not used in our study because the severity assessment was done not only based on the present condition but also based on

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history. If the patient gave a history of severe psoriasis earlier (exfoliative psoriasis/pustular psoriasis/psoriatic arthritis) or a history of using full chamber phototherapy, methotrexate, acitretin, cyclosporine, or biologicals, then the patient was considered as having a severe disease irrespective of the present condition.[7] Blood investigations like blood urea, serum creatinine, fasting blood sugar, fasting lipid profile, and urine routine were done. The glomerular filtration rate (eGFR) was measured using MDRD (Modification of Diet in Renal Disease Study Group) equation: $eGFR = 186 \times (Creatinine/88.4)^{-1.154} \times (age)^{-0.203} \times (0.742 \text{ if female}) \times (1.210 \text{ if black})$.[11] If there was an abnormality in the routine urine examination, urine albumin to creatinine ratio (ACR) was measured. CKD was defined using a widely accepted classification guideline by KDIGO (Kidney Disease Improving Global Outcomes).[11]

In the previous studies,[7-9] microalbuminuria (ACR >30) and GFR (GFR <60 mL/min/1.73 m^2) were used to screen for the presence of CKD in psoriasis patients. Hence, in our patients, microalbuminuria and GFR were used to screen for the presence of CKD. If albuminuria or decreased GFR was present, patients were followed up and the tests were repeated after 3 months. If the abnormalities were persisting, the diagnosis of CKD was made. Associations with factors like age, sex, duration, severity, BMI, presence of hypertension, diabetes, and intake of nephrotoxic drugs like non-steroidal anti-inflammatory drugs (NSAIDs) and cyclosporine were analyzed. Regarding methotrexate, there are three major mechanisms of nephrotoxicity related to it.[12] The first one is that induced by an allergic reaction, which usually appears as interstitial nephritis. The second mechanism is direct pharmacological toxicity against renal tubules. The third is the precipitation of methotrexate, which plugs the renal tubules. The latter two are consequently dose-dependent and are associated with high-dose chemotherapy. As the first mechanism is very rare and there will be a definite history of a renal problem after intake of a few doses of methotrexate, which was not given to any of our patients, methotrexate is not considered nephrotoxic in our study.

Descriptive and inferential statistical analyses were carried out in the present study. Significance was assessed at a 5% level. Chi-square/Fisher's exact test was used to find the significance of the study parameters. 'Chi-square for trend' test was done for severity. The odds ratio and confidence intervals were calculated to find the association between the presence of risk factors and CKD. The significance was said to be suggestive if the P value: $0.05 < P < 0.10$, moderately significant if P value: $0.01 < P < 0.05$, and strongly significant if P value: $P < 0.01$. The statistical software namely SPSS 22.0, and R environment ver. 3.2.2 were used for the analysis of the data.

Results

The total number of psoriasis patients was 104. The basic details are summarized in Table 1. The duration of psoriasis was more than 10 years in 40 patients (38.5%). Of the total 104 patients, 6 had mild psoriasis, 31 had moderate psoriasis, and 67 had severe psoriasis. The risk factors for CKD (diseases: diabetes mellitus, hypertension, or intake of NSAIDs/cyclosporine) were present in 30 patients and 74 patients had no risk factors. Only one patient who was diabetic, had taken cyclosporine for 1 month.

Of the 104 patients, 14 were diagnosed as having CKD as per criteria, 9 of them had decreased GFR, 7 had increased ACR, and 2 had both. All the patients with CKD were above 40 years of age. Of these 14 patients, 8 were males and 6 were females. The duration of psoriasis was more than 10 years in 10 patients. Table 1 summarizes the correlation of age in years, gender, BMI, duration of psoriasis in relation to the incidence of CKD of the patients studied. The P value obtained was 0.525, 0.195, 1.00, and 0.054 for age, gender, BMI, and duration of psoriasis, respectively. The P value was significant for duration of psoriasis.

Out of 14 CKD patients, 12 had severe psoriasis and 2 had moderate psoriasis. No patients had mild psoriasis. The 'Chi-square for trend' test was done for severity. The Chi-square value obtained was 3.27 and the 'P' value was 0.07 (significance-suggestive) [Table 2].

The presence of risk factors was there in 9 out of 14 CKD patients. The prevalence of CKD in our psoriasis patients was 14/104, which means 13.46%; the risk is more in patients with diabetes/hypertension. The odds ratio was 5.91 at a 95% confidence level (confidence interval between 1.79 and 19.58), which means an increased risk of developing CKD in the patients with known risk factors [Table 3].

Discussion

Several studies have shown an increased incidence of nephropathy in psoriatic patients.[7-9,13] In a study by Dervisoglu E, *et al*.[8] patients with psoriasis had an increased prevalence of pathologic albuminuria (30 mg/24 h) compared with controls. In a recent Indian study,[9] renal involvement in psoriasis had a positive correlation with hs-CRP (high sensitivity C-reactive protein) indicating the role of inflammatory milieu. In a study from Taiwan, patients with psoriasis had an increased risk of developing glomerulonephritis and CKD. High severity, psoriatic arthritis, and concomitant NSAIDs use further increased the risk of CKD in psoriasis patients.[14]

But the link between psoriasis and kidney disease is controversial as a few studies showed no correlation between the two diseases. In a study of 40 patients with chronic plaque psoriasis with no other risk factors and 40 control patients, no increased risk was found to develop kidney disease.[15]

In our study, 14 out of 104 patients (13.46%) were having CKD as per the diagnostic criteria which is higher

Table 1: Correlation of basic information of patients with CKD

Variables	Number of patients (*n*=104)	CKD		*P*
		Present (14)	Absent (90)	
Age in years				
<20 years	2 (1.9%)	0 (0%)	2 (2.2%)	0.525
21-40 years	13 (12.5%)	0 (0%)	13 (14.4%)	
41-60 years	54 (51.9%)	9 (64.3%)	45 (50%)	
>60 years	35 (33.7%)	5 (35.7%)	30 (33.3%)	
Gender				
Male	76 (73.1%)	8 (57.1%)	68 (75.6%)	0.195
Female	28 (26.9%)	6 (42.9%)	22 (24.4%)	
BMI (kg/m^2)				
<18.5	9 (8.7%)	1 (7.1%)	8 (8.9%)	1.000
18.6-24.9	59 (56.7%)	8 (57.1%)	51 (56.7%)	
25-29.9	29 (27.9)	4 (28.6%)	25 (27.8%)	
>30	7 (6.7)	1 (7.1%)	6 (6.7%)	
Duration of psoriasis				
<1 year	14 (13.5)	1 (7.1%)	13 (14.4%)	0.054+
1-5 years	34 (32.7)	3 (21.4%)	31 (34.4%)	
6-10 years	16 (15.4)	0 (0%)	16 (17.8%)	
>11 years	40 (38.5)	10 (71.4%)	30 (33.3%)	

CKD - Chronic kidney disease; BMI - Body mass index

Table 2: Severity in relation to CKD

Severity	Total	CKD present	CKD absent
Mild	6 (5.8%)	0 (0%)	6 (6.7%)
Moderate	31 (29.8%)	2 (14.3%)	29 (32.2%)
Severe	67 (64.4%)	12 (85.7%)	55 (61.1%)

Chi-square for trend, *P* value was 0.07. CKD - Chronic kidney disease

Table 3: Risk factors in relation to CKD

Risk factors	Total	CKD	
		Present	Absent
Present	30	9	21
Absent	74	5	69
Total	104	14	90

Odds ratio was 5.91 at a 95% confidence level (confidence interval between 1.79 and 19.58). CKD - Chronic kidney disease

than the prevalence of CKD in the general population in Kerala (4.8%).[16]

Although all 14 patients belonged to the age group >40, the association was not found to be significant as the *P* value was 0.525. This may be due to the fact that most of the psoriasis patients were above 40 years. A higher percentage of females suffered from CKD (6 out of 28 females [21.43%] vs. 8 out of 76 males [10.53%]) although the total number of female patients was less. But the association was not found to be significant as the '*P*' value was 0.195. This may be due to small sample size. There was no gender preponderance in any previous studies.

In our study, 12 CKD patients were having severe psoriasis and the other two were having moderate psoriasis. The significance of association with severity was 'suggestive' as the '*P*' value was 0.07. In two population-based cohort studies,[7,17] moderate to severe psoriasis was associated with an increased risk of CKD independent of traditional risk factors. Another study found out that the PASI scores in psoriasis patients correlated significantly with 24-h albuminuria.[8]

The duration of psoriasis was positively associated with the development of CKD in this study (*P* value: 0.054). As chronic inflammation driven by T-lymphocyte activation is implicated as the key factor for a systemic association, this can be influenced by the duration of psoriasis. A similar finding was observed in an Indian study by Kaur *et al.* also.[9]

Although the association of risk factors definitely contributed to CKD (odds ratio: 5.91), five patients with severe psoriasis with no risk factors had evidence of CKD.

These results may imply that psoriasis is associated with renal disease. The three possible mechanisms mediating renal insufficiency in psoriasis are (1) chronic inflammation driven by cell-mediated immunity with T-cell activation and a variety of interleukins and cytokines (2) nephrotoxic drugs used for psoriasis[13] (3) association with diabetes and hypertension.[14]

The limitations of our study are small sample size, and not being a case-control study. It is not possible from our study to know whether CKD is precipitated by psoriasis or other factors.

In summary, our study demonstrated that psoriatic patients are having an increased risk of developing CKD and this

risk is found to be increased with the severity and duration of psoriasis. Large patient populations in prospective studies, or case-control studies are needed to corroborate our findings.

Declaration of patient consent

The authors certify that they have obtained all appropriate patient consent forms. In the form the patient(s) has/have given his/her/their consent for his/her/their images and other clinical information to be reported in the journal. The patients understand that their names and initials will not be published and due efforts will be made to conceal their identity, but anonymity cannot be guaranteed.

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Conflicts of interest

There are no conflicts of interest.

References

1. Gudjonsson JE, Elder JT. Psoriasis. In: Goldsmith LA, Katz SI, Gilchrest BA, Paller AS, Lefell DJ, Wolff K, editors. Fitzpatrick's Dermatology in General Medicine. 8th ed. New York: McGraw Hill; 2012. p. 197-231.
2. Gelfand JM, Yeung H. Metabolic syndrome in patients with psoriatic disease. J Rheumatol Suppl 2012;89:24-8.
3. Gelfand JM, Neimann AL, Shin DB, Wang X, Margolis DJ, Troxel AB. Risk of myocardial infarction in patients with psoriasis. JAMA 2006;296:1735-41.
4. Prathap P, Asokan N, Manjula VD. A case-control study to determine the association of psoriasis with metabolic syndrome in a tertiary care centre. Int J Sci Res 2014;4:1-4.
5. Margolis D, Bilker W, Hennessy S, Vittorio C, Santanna J, Strom BL. The risk of malignancy associated with psoriasis. Arch Dermatol 2001;137:778-83.
6. Malkic Salihbegovic E, Hadzigrahic N, Cickusic AJ. Psoriasis and metabolic syndrome. Med Arch 2015;69:85-7.
7. Wan J, Wang S, Haynes K, Denburg MR, Shin DB, Gelfand JM. Risk of moderate to advanced kidney disease in patients with psoriasis: Population based cohort study. BMJ 2013;347:f5961
8. Dervisoglu E, Akturk AS, Yildiz K, Kiran R, Yilmaz A. The spectrum of renal abnormalities in patients with psoriasis. Int Urol Nephrol 2012;44:509-14.
9. Kaur I, Gandhi V, Raizada A, Bhattacharya SN, Tripathi AK, Jakhar D. Psoriatic nephropathy and its correlation with hs-CRP: A case control study. Indian Dermatol Online J 2020;11:29-34.
10. Yeung H, Takeshita J, Mehta NN, Kimmel SE, Ogdie A, Margolis DJ, *et al*. Psoriasis severity and the prevalence of major medical comorbidity: A population-based study. JAMA Dermatol 2013;149:1173-9.
11. Bargman JM, Skoreckin K. Chronic kidney disease. In: Kasper DL, Fauci AS, Longo DL, Hauser SL, Jameson JL, Loscalzo J, editors. Harrison's Principles of Internal Medicine. 19th ed. Newyork: McGraw-Hill; 2015. p. 1811-22.
12. Ramamoorthy SK, Hephziba R. Acute renal failure post high dose methotrexate infusion successfully managed with high dose folinic acid and high flux dialysis. Indian J Hematol Blood Transfus 2013;29:90-2.
13. Yu S, Tu HP, Yu CL, Lee CH, Hong CH. Is psoriasis an independent risk factor of renal disease? A nationwide retrospective cohort study from 1996 to 2010. Dermatol Sin 2017;35:78-84.
14. Chiu HY, Huang HL, Li CH, Yin YJ, Chen HA, Hsu ST, *et al*. Increased risk of glomerulonephritis and chronic kidney disease in relation to the severity of psoriasis, concomitant medication, and comorbidity: A nationwide population-based cohort study. Br J Dermatol 2015;173:146-54.
15. Tehranchinia Z, Ghanei E, Mohammadi N, Partovi-Kia M, Rahimi H, Mozafari N. No relation between psoriasis and renal abnormalities: A case-control study. ScientificWorldJournal 2018;2018:5301631.
16. Haveri SP, Sebastian NM, Jesha MM, Nath AS. Burden of renal failure among adults in Rural Kerala: A community based study. Indian J Forensic and Community Med 2016;3:288-91.
17. Chi CC, Wang J, Chen YF, Wang SH, Chen FL, Tung TH. Risk of incident chronic kidney disease and end-stage renal disease in patients with psoriasis: A nationwide population-based cohort study. J Dermatol Sci 2015;78:232-8.