

## Case Report

# Psoriasis accompanying focal segmental glomerulosclerosis: a case report and literature review

Guang-Yu Zhou<sup>1</sup>, Wan-Ning Wang<sup>3</sup>, Chen Wu<sup>1</sup>, Ying Guo<sup>1</sup>, Hua-Ying Wang<sup>1</sup>, Wen-Long Zhang<sup>2</sup>

Departments of <sup>1</sup>Nephrology, <sup>2</sup>Hematology, China-Japan Union Hospital of Jilin University, Changchun, China;

<sup>3</sup>Department of Nephrology, First Hospital of Jilin University, Changchun, China

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**Abstract:** Psoriasis is an immune-mediated chronic inflammatory disorder of the skin, which may be complicated by different types of glomerular lesions. This report presents a case of psoriasis with focal segmental glomerulosclerosis (FSGS) and reviews all similar cases available in the PubMed database. The patient had been suffering from nephrotic syndrome before psoriasis for 22 years and was treated with tacrolimus contributing to remission of renal and cutaneous symptoms. This result implies that tacrolimus may be an effective and safe option for similar cases.

**Keywords:** Psoriasis, focal segmental glomerulosclerosis, tacrolimus, immunotherapy

### Introduction

Psoriasis is increasingly being recognized as a systemic inflammatory disorder that can occur at any age. Generally, the psoriatic process is limited to the skin, however internal organs such as kidneys may also be involved in the course, particularly for patients with severe psoriasis or psoriatic arthritis [1-3]. The term "psoriatic nephropathy" was first introduced by N.P. Singh to describe the secondary kidney disease accompanied with psoriasis [4]. There are several types of renal lesion identified to be associated with psoriasis [5], represented by renal amyloidosis in psoriatic arthropathy and drug-induced renal lesions secondary to methotrexate or cyclosporine [4]. In addition, it is relatively common for the patient with psoriasis to have mesangioproliferative glomerulonephritis with IgA deposits. However, case reports focusing on the assessment of the association between psoriasis and focal segmental glomerulosclerosis (FSGS) are rare and cross-sectional, with varying treatments and outcomes [1, 6, 7]. Here, the current report will introduce a case of FSGS in a psoriatic patient and review all the similar cases in recent years available in the PubMed database.

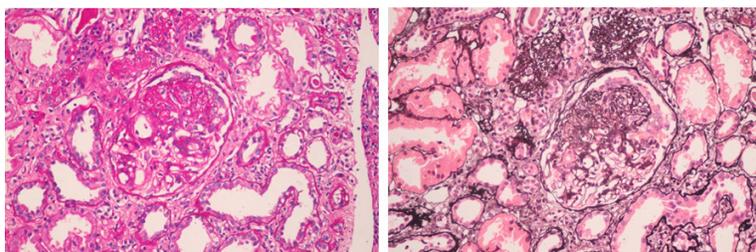
### Case report

A 56-year-old male without history of hypertension, diabetes, and heart or liver diseases was referred to the nephrology department for slightly edematous legs and nephritic range proteinuria. He had been suffering from psoriasis vulgaris for 22 years, but had not received any standardized treatment, leading to the worsening of the symptoms during the last few months. On physical examination, the patient had a normal body temperature (36.3°C), and his blood pressure (on treatment with adalat GITS) was 145/90 mmHg. Additionally, it was revealed that erythema scaly skin lesions had covered his scalp and the extensor surface of extremities in a typical distribution with pitting edema on both lower extremities (**Figure 1**). The laboratory result showed: selective proteinuria (5.25 g/day) and numerous red blood cells, normal renal function (serum creatinine 101.59 µmol/L, BUN 4.32 mmol/L), total serum protein 51.61 g/L, and serum albumin 19.95 g/L, triglyceride 2.03 mmol/L, C-reactive protein 78.8 mg/L, and erythrocyte sedimentation rate 72 mm/h. The result presented no obvious changes under a renal ultrasound scan. In addition, the anti-neutrophilic cytoplasmic antibody (ANCA), anti-nuclear antibody (ANA), anti-dsD-

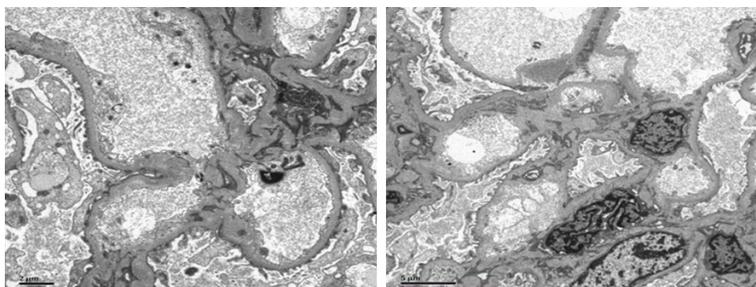
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**Figure 1.** Cutaneous lesions. A. Psoriatic plaque on the back of the patient before treatment. B. Clearance of psoriatic lesions after treating with tacrolimus.



**Figure 2.** Histopathological changes in the kidney of the patient. Kidney tissue sections were subject to PAS and PASM. Original magnification  $\times 400$ .



**Figure 3.** Transmission electron micrographs of ultrastructure changes in the kidney of the patient. Original magnification  $\times 3000$ .

NA, viral serologies for human immunodeficiency virus (HIV) and hepatitis B and C were detected to be negative. The serum complement, and the IgG, IgM, IgA values were within normal limits.

Percutaneous kidney biopsy was performed due to persistent proteinuria. Of the 30 retrieved glomeruli, 10 presented global sclerosis. Moreover, segmental sclerosis was observed in 3 glomeruli under the light microscope. Remaining glomeruli exhibited the expansion of mesangial matrix and mesangial hypercellularity (**Figure 2**). Additionally, there was granular and vacuolar degeneration as well as focal atrophy (atrophy area of about 15%) detected

in renal tubular epithelial cells. The arteriolar wall was found thickened, and the lumen narrowed at the same time. The electrolyte microscope only indicated visceral epithelial cell foot process effacement (**Figure 3**), without any electron-dense deposits. Immunofluorescent microscopy demonstrated only IgM (+/-), which, however, was negative for C3, C1q, Fib, PLA2R, and immunoglobulin deposits. The pattern was consistent with an unspecified variant of FSGS (FSGS, NOS).

Following diagnosis of FSGS, the patient took an immunosuppressive treatment with tacrolimus (0.05 mg/kg), twice a day. After 10 days of intensive treatment, the proteinuria level dropped to 0.26 g/day and serum albumin levels were increased to 33.28 g/L. The patient was discharged in a stable condition. Of note, the patient had achieved an overall improvement on his skin conditions accompanied by the partial remission of FSGS though he did not receive any other medications for psoriasis. Receiving outpatient follow-up and treatment regularly in our hospital, his condition was stable.

### Discussion

This report presents a patient with a combination of two diseases: Psoriasis and FSGS. FSGS is a progressive glomerular disease first described by Rich in the 1950s [8]. The glomerular pathology of FSGS is characterized by sclerotic lesions in the focal and segmental location. Although studies have identified numerous underlying pathogenetic mechanisms, FSGS is still complex. It is usually classified into the primary (idiopathic) FSGS and the secondary FSGS. The former often displays much severer clinical features than the latter. Our patient had no obvious predisposing cause for FSGS such as a history of pyelonephritis,

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**Table 1.** Reported Cases of Psoriasis accompany with FSGS

Study	Patient number	Age	Sex	Prior history of psoriasis	Degrees of glomerular involvement	Treatment	Outcome
Sirilli, 2000 [18]	1	62 years	Male	10 years	Proteinuria, cylindruria and microhematuria	NA	NA
Singh, 2005 [4]	1	65 years	Male	15 years	Nephrotic syndrome	NA	NA
Ceri, 2010 [1]	1	43 years	Female	18 years	Sub-nephrotic proteinuria, normal renal function	Methylprednisolone (1 mg/kg/day, tapered to 4 mg/day), ramipril (2.5 mg/day), and azathioprine therapy (2 mg/kg/day)	No improvement in proteinuria, kidney function was normal
Pradhan, 2014 [7]	1	20 months	Male	No, 5 weeks after nephrotic syndrome	Steroid-resistant nephrotic syndrome	Cyclosporine A (CsA), oral corticosteroids and ACE inhibitor	Complete healing of skin lesion and resolution of edema
Khan, 2017 [19]	4	NA	NA	NA	NA	NA	NA

NA: not available.

vesicoureteral reflux, HIV, or hepatitis B. In addition, his ANCA, ANA, and anti-dsDNA were negative. Therefore, exclusion of secondary FSGS caused by other ailments could be determined. Considering the close relationship between the degree of skin lesions and the nephrotic syndrome, as well as the good response to calcineurin inhibitor tacrolimus, it was confirmed that psoriasis was associated with the nephrotic syndrome, suggesting that they are not two independent diseases.

Some reports explored cases with psoriasis, and referred them to the evaluation of the steroid-resistant nephrotic syndrome (SRNS) [1]. Arvind et al. introduced four children who suffered from the steroid-resistant minimal change disease before or simultaneously accompanying with psoriasis. After receiving corticosteroids and cyclosporine, their syndromes were in remission. Of all cases, more than 75% showed a steroid-resistant form of FSGS [9, 10]. An association of corticosteroids and cyclosporine A (CsA) remains essential for treatment. Tacrolimus (TAC), a congener of cyclosporine, is an immunosuppressant that can inhibit calcineurin, which is involved in T-cell activation and proliferation [11]. Wide exploration about using Tacrolimus in the topical treatment of psoriasis has been reported [12-15]. According to an open-label pilot study involving thirty patients who suffered from severe plaque type psoriasis and were unresponsive to at least one systemic treatment, oral tacrolimus is an effective and safe option for the short-term treatment of severe plaque psoriasis [16].

Currently, there are only 5 cases with 8 patients who had FSGS and psoriasis reported (Table 1). Most reports did not mention the treatment and outcome. Pradhan et al. described how a 20-month-old boy who was referred for the steroid-resistant nephrotic syndrome responded within six weeks to the treatment with cyclosporine A (CsA), oral corticosteroids and ACE inhibitor and achieved the complete healing of skin lesions and the resolution of edema. In addition, Ceri et al. reported a psoriatic case with steroid-resistance FSGS. Despite the resolution of psoriatic skin lesions and remission of proteinuria following CsA (2 mg/kg/day), the patient did not tolerate the therapy because of adverse gastrointestinal effects. In the present study, the patient is a 56-year-old male with

psoriasis who had a rare histopathological type of glomerular involvement, namely focal and segmental glomerulosclerosis. The patient responded to treatment with oral Tacrolimus with the complete healing of skin lesions and the nephrotic syndrome within 10 days, indicating that Tacrolimus monotherapy could be as effective as the combination of corticosteroids and CsA. The potential pathogenesis of this rare association between psoriasis and FSGS remains unknown, due to the limited number of cases. Evidence only demonstrated the primary T-lymphocyte-based immunopathogenesis in the etiology of psoriasis. Similarly, it has been proven that cell-mediated immunity plays an important role in the pathogenesis of FSGS. Therefore, resolution of psoriatic skin lesions and remission of proteinuria following tacrolimus therapy support the hypothesis that there is defective cell-mediated immunity in both disorders. As is well known, the action of tacrolimus involves blocking the cytosolic component of nuclear factor of activated T cells from translocation and inhibiting the transcription of multiple cytokines, the product of cell-mediated immunity.

In conclusion, an English literature search from PubMed on psoriasis accompanying with FSGS was performed. Following tacrolimus treatment, the patient achieved an overall improvement on his skin conditions and partial remission of FSGS without obvious adverse effects. Therefore, FSGS and psoriasis might share similar pathogenesis [17] and tacrolimus may be an effective and safe option for similar cases.

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### Disclosure of conflict of interest

None.

**Address correspondence to:** Wen-Long Zhang, Department of Hematology, China-Japan Union Hospital of Jilin University, No. 126, Xiantai Street, Changchun 130033, China. Tel: +86-13504311151; E-mail: 24052035@qq.com

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### References

- [1] Ceri M, Kurultak I, Unverdi S, Altay M and Duranay M. An unusual cause of focal segmental glomerulosclerosis: psoriasis vulgaris. *Ren Fail* 2010; 32: 639-641.
- [2] Gonzalez-Parra E, Dauden E, Carrascosa JM, Oliveira A, Botella R, Bonanad C and Rivera R. Kidney disease and psoriasis. a new comorbidity? *Actas Dermosifiliogr* 2016; 107: 823-829.
- [3] Augustin M, Reich K, Glaeske G, Schaefer I and Radtke M. Co-morbidity and age-related prevalence of psoriasis: analysis of health insurance data in germany. *Acta Derm Venereol* 2010; 90: 147-151.
- [4] Singh NP, Prakash A, Kubba S, Ganguli A, Singh AK, Sikdar S, Agarwal SK, Dinda AK and Grover C. psoriatic nephropathy—does an entity exist? *Ren Fail* 2005; 27: 123-127.
- [5] Takeshita J, Grewal S, Langan SM, Mehta NN, Ogdie A, Van Voorhees AS and Gelfand JM. Psoriasis and comorbid diseases: implications for management. *J Am Acad Dermatol* 2017; 76: 393-403.
- [6] Santra G, Sinha PK and De D. Nephropathy in association with annular psoriasis. *J Assoc Physicians India* 2011; 59: 595-597.
- [7] Pradhan SK and Beriha SS. Focal segmental glomerulosclerosis associated with psoriasis. *Saudi J Kidney Dis Transpl* 2014; 25: 670-671.
- [8] Rich AR. A hitherto undescribed vulnerability of the juxtamedullary glomeruli in lipoid nephrosis. *Bull Johns Hopkins Hosp* 1957; 100: 173-186.
- [9] Meyrier A. An update on the treatment options for focal segmental glomerulosclerosis. *Expert Opin Pharmacother* 2009; 10: 615-628.
- [10] Han Kh and Kim SH. Recent advances in treatments of primary focal segmental glomerulosclerosis in children. *Biomed Res Int* 2016; 2016: 3053706.
- [11] Thomson AW, Bonham CA and Zeevi A. Mode of action of tacrolimus (fk506): molecular and cellular mechanisms. *Ther Drug Monit* 1995; 17: 584-591.
- [12] Jain A, Doppalapudi S, Domb AJ and Khan W. Tacrolimus and curcumin co-loaded liposphere gel: synergistic combination towards management of psoriasis. *J Control Release* 2016; 243: 132-145.
- [13] Steele JA, Choi C and Kwong PC. Topical tacrolimus in the treatment of inverse psoriasis in children. *J Am Acad Dermatol* 2005; 53: 713-716.
- [14] Lebwohl M, Freeman A, Chapman MS, Feldman S, Hartle J and Henning A. Proven efficacy of tacrolimus for facial and intertriginous psoriasis. *Arch Dermatol* 2005; 141: 1154.
- [15] Kroft EB, Erceg A, Maimets K, Vissers W, Van Der Valk PG and Van De Kerkhof PC. Tacrolimus ointment for the treatment of severe facial plaque psoriasis. *J Eur Acad Dermatol Venereol* 2005; 19: 249-251.
- [16] Mittal A, Dogra S, Narang T and Sharma A. Pilot study to evaluate the efficacy and safety of oral tacrolimus in adult patients with refractory severe plaque psoriasis. *J Cutan Med Surg* 2016; 20: 228-232.
- [17] Kronbichler A, Leierer J, Oh J, Meijers B and Shin JI. Immunologic changes implicated in the pathogenesis of focal segmental glomerulosclerosis. *Biomed Res Int* 2016; 2016: 2150451.
- [18] Sirolli V and Bonomini M. Glomerulopathies associated with psoriasis: a report of three cases. *Nephron* 2000; 86: 89-90.
- [19] Khan A, Haider I, Ayub M and Humayun M. Psoriatic arthritis is an indicator of significant renal damage in patients with psoriasis: an observational and epidemiological study. *Int J Inflam* 2017; 2017: 5217687.