

# IgA nephropathy associated with erythrodermic psoriasis

## A case report

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### Abstract

**Rationale:** Cases about IgAN associated with EP are rare and the pathogenesis is poorly understood. We reported a 74-year-old Chinese male who suffered the IgAN and EP at the same time and explored a possible pathophysiologic link and points toward the possible pathogenesis.

**Patient concerns:** The patient complained deteriorating symptoms (erythrodermia, skin pruritus, and pain) of psoriasis and obvious pitting edema on his legs.

**Diagnosis:** The patient was diagnosed as IgAN and EP concurrently according to medical history, physical examination, laboratory test, and pathology.

**Interventions:** Intravenous dexamethasone (5 mg/day) and oral ciclosporin (200 mg twice a day).

**Outcomes:** The patient's symptoms of psoriasis and IgA nephropathy improved obviously after 11-day treatment and discharged from the hospital.

**Lessons:** IgAN should be considered when the patient is diagnosed as EP. The combination of dexamethasone and ciclosporin may be effective option for patients with IgAN and EP concurrently.

**Abbreviations:** EP = erythrodermic psoriasis, IgAN = immunoglobulin A nephropathy.

**Keywords:** case report, erythrodermic psoriasis, IgA nephropathy, pathogenesis

## 1. Introduction

IgA nephropathy (IgAN), first described in 1968 by Berger and Hinglais, has been identified as the leading cause of primary glomerulonephritis and the major etiology of chronic kidney disease and renal failure.<sup>[1]</sup> Psoriasis is a chronic skin inflammation with an estimated 2% prevalence among the healthy population.<sup>[2]</sup> The most common variant of psoriasis associated with IgAN is psoriatic vulgaris, and several cases have been reported.<sup>[3–6]</sup> As IgAN may be one of its systemic inflammatory manifestations, “psoriatic nephropathy” was proposed to demonstrate their close connection.<sup>[7,8]</sup> Erythrodermic psoriasis (EP) is a relatively rare and

severe variant of psoriasis, which accounts for approximately 1% to 2% of all psoriatic patients.<sup>[2]</sup> Cases of IgAN associated with EP are rare, and the pathogenesis is poorly understood. We report an old Chinese man who had IgAN and EP at the same time, and an investigation of a possible pathophysiological link and evidence toward the possible pathogenesis. Written informed consent was provided by the patient for publication of this case report and accompanying images, and this study was approved by the ethics committee of the First Hospital of Jilin University (ethics approval No. 20180201-IRB-00356).

## 2. Case presentation

A 74-year-old Chinese man visited the department of dermatology with a major complaint of deteriorating symptoms (erythroderma, skin pruritus, and pain) of psoriasis. He was diagnosed as having psoriasis vulgaris 20 years before and did not receive appropriate medical care during this period. His medical and surgical histories were unremarkable except for psoriasis vulgaris. He reported having a tobacco smoke addiction with an average of 10 cigarettes per day and occasional alcohol consumption.

The patient's temperature was 37.5°C; blood pressure, 148/98 mm Hg; heart rate, 114 beats/min; respiratory rate, 20 breaths/min; and pulse oximetry saturation, 98%. Physical examination indicated erythrodermic skin on approximately 90% of the whole body, including the face, chest, back, abdomen, and extremity. Moreover, some lesions were severe with escharosis.

A routine blood test revealed white blood cells of  $14.11 \times 10^9/L$  (reference range,  $4.0 \times 10^9$  to  $10 \times 10^9$  cells/L) with 13% eosinophils (reference range, 0.4–8%). As the pitting edema on

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his legs was remarkable, routine urine test was recommended and revealed urine occult blood (2+), protein (3+), and ketobodies (3+). The urinary parameter values were as follows: protein, 5.58 g (reference: <0.2 g); microalbumin, 4212 mg (reference: 0–60 mg);  $\alpha$ -microglobulin, 64.74 mg (reference, <24 mg); and  $\beta$ 2-microglobulin, 1.5 mg (reference: <0.4 mg) in 24-h urine. The C-reactive protein level was 57.2 mg/L (reference: 0–3.5 mg/L); and lactate dehydrogenase level, 441 U/L (reference: 135–226 U/L). Regarding liver function, the total protein content was 57.6 g/L (reference: 65–85 g/L) and albumin content was 24.2 g/L (reference: 40–55 g/L). Skin biopsy showed epidermal hyperplasia with diffuse lymphocytes and scattered eosinophils around the blood vessels in the dermis (Fig. 1). Accordingly, the patient was diagnosed as having EP. The severe immunological derangement suggested by EP may also mediate renal dysfunction. Thus, we performed a kidney biopsy, which disclosed diffuse moderate hyperplasia in glomerular endothelial and mesangial cells, and mesangial matrix with IgA deposition. We also detected a thickened glomerular basement membrane, vacuolar degeneration in renal tubular epithelial cells, mild glomerular atrophy, and renal interstitial infiltration of lymphocytes and macrophages (Fig. 2).

After diagnosis, combination treatment with intravenous dexamethasone (5 mg/day) and oral ciclosporin (200 mg twice a day) was administered. The percentage of eosinophils in blood was significantly decreased from 0.13% to 0.00 within 11 days, and the patient's symptoms of psoriasis and IgAN improved obviously. After 2-year follow-up, complete remission of the EP and partial remission of IgAN were detected with 6-month oral prednisone acetate (5 mg/day) consumption.

### 3. Discussion

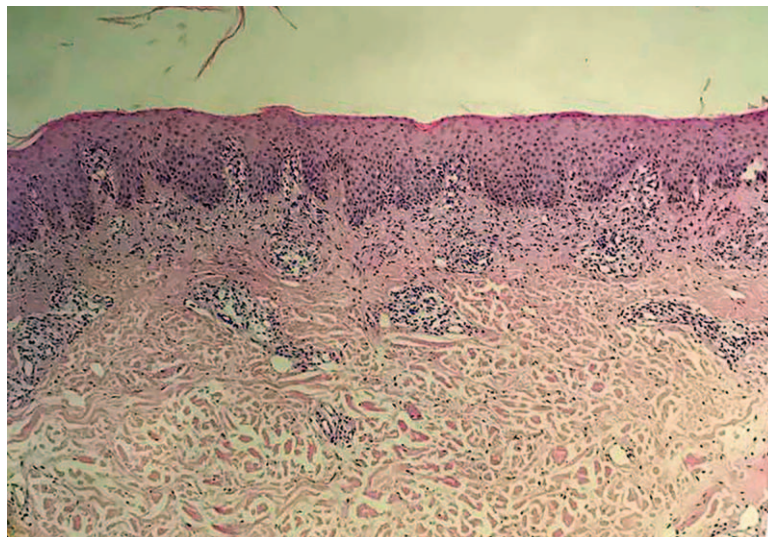
Psoriasis is a chronic inflammatory disorder of the skin mediated by the immune system and can also affect the joints.<sup>[2]</sup> As renal dysfunction secondary to psoriasis is still controversial, Dervisoglu et al investigated the prevalence of urinary abnormalities among psoriatic patients and suggested that psoriasis severity may be related to subclinical glomerular impairment.<sup>[9]</sup> Among the different kinds of incident chronic kidney diseases, the

relationship between psoriasis and IgAN was most interesting. IgA nephropathy is diagnosed with predominant glomerular IgA deposition and can result in severe kidney dysfunction and end-stage renal disease. Grewal et al demonstrated that moderate-to-severe psoriasis patients were more likely to develop IgAN (hazard ratio, 4.75; 95% confidence interval, 1.92–11.76).<sup>[10]</sup> Although Wakatsuki et al reported one case of EP caused by IgAN,<sup>[4]</sup> to our knowledge, our case is the only case of severe erythroderma in an old male patient in which the symptoms of psoriasis and IgAN improved remarkably with combined treatment with dexamethasone and oral ciclosporin.

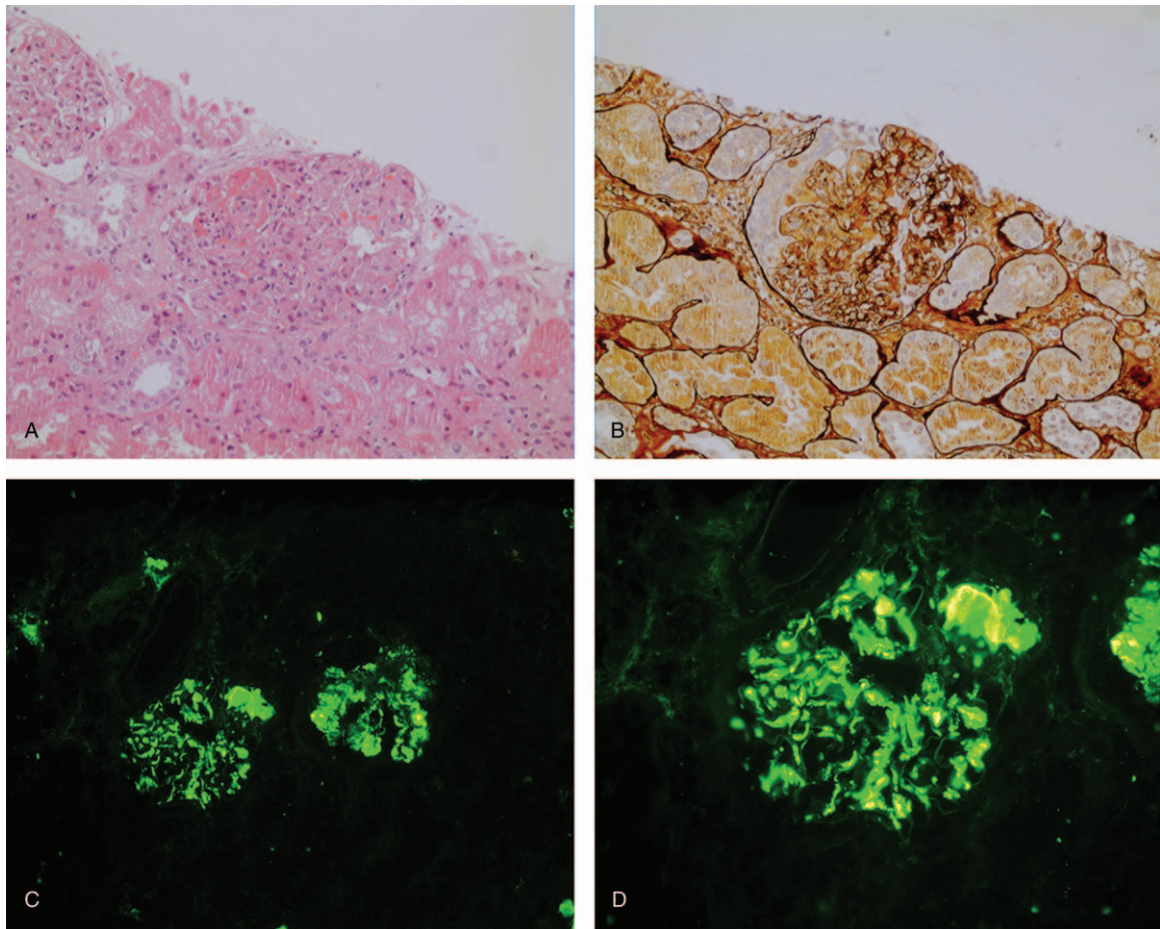
The multi-hit pathogenesis model has been proposed to explain renal injury during IgAN.<sup>[11,12]</sup> The process of multi-hit to kidney is as follows: overproduction of IgA1  $\rightarrow$  increases galactose-deficient IgA1  $\rightarrow$  activate autoimmune response that generates anti-glycan antibodies  $\rightarrow$  produce immune complexes that are deposited in the glomerular mesangium  $\rightarrow$  activate the complement pathway, which induces mesangial cells to secrete cytokines and chemokines  $\rightarrow$  cause renal inflammation and fibrosis.<sup>[11,12]</sup>

Several reasons such as sudden withdrawal of medication or severe systemic infection can lead the progression of an existing psoriasis vulgaris to EP.<sup>[13]</sup> EP is not difficult to diagnose on the basis of patient history and generalized skin erythema. However, skin biopsy is still recommended for the differential diagnosis from other diseases such as drug-induced rash, Sezary syndrome, and pityriasis rubra pilaris.<sup>[13]</sup> The pathogenesis of EP has not been well understood. Compared with the pathogenesis of psoriasis vulgaris, which is the activation of Th1 axes by immune cells and inflammation cytokines, increased Th2 response may be related with EP.<sup>[13]</sup> Evidence to support increased Th2 response in EP patients are as follows:

1. increased serum IgE level;
2. lower Th1/Th2 ratio;
3. significantly higher expression level of interleukin 4 as a signature Th2 cytokine;
4. remarkably higher expression level of GATA-3 as important transcription factor for Th2 development.<sup>[14,15]</sup>



**Figure 1.** Pathology of Skin biopsy (100 $\times$  HE staining): epidermal hyperplasia with diffuse lymphocytes and scattered eosinophils around the blood vessels in the dermis.



**Figure 2.** Pathology of kidney biopsy: (A: 400× HE staining; B: 400× PMSA staining) diffuse moderate hyperplasia existed among glomerular endothelial and mesangial cells; thicken glomerular basement membrane, vacuolar degeneration in renal tubular epithelial cells, mild glomerular atrophy, and lymphocytes and macrophages infiltration in renal interstitial. (C: 200× immunofluorescence staining; D: 400× immunofluorescence staining) large amount of IgA deposited in mesangial matrix.

The mechanism of the comorbidity between IgAN and EP has not been well investigated. Immunity, both humoral and cellular, plays significant roles in the exacerbation of psoriasis and IgAN.<sup>[11,13]</sup> We can hypothesize that the shift from Th1 to Th2 immune response causes increased abnormal production of antibodies and cytokines. The dysregulation in humoral immunity not only aggravates psoriasis to EP but also increases renal injury during IgAN. In addition, infection is another contributing factor to the exacerbation of psoriasis and IgAN at the same time.<sup>[11,13]</sup> Novel infections during the period of psoriasis vulgaris and imbalanced host immunity may deteriorate psoriasis and trigger pre-existing subclinical IgAN to become clinically apparent.

At present, no high-quality evidence has been found from large cohorts to provide reliable prognosis information and treatment recommendations for EP accompanied by IgAN. Given the possible immune mechanism of comorbidity, immunosuppressors and corticoids are also appropriate choices for first-line treatment.<sup>[16]</sup>

#### Author contributions

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