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CASE REPORT

Co-occurrence of poststreptococcal reactive arthritis and acute glomerulonephritis

Takehiko Tokura · Yoshitaka Morita · Daisuke Yorimitsu · Hideyuki Horike · Tamaki Sasaki · Naoki Kashihara

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Abstract We report a 16-year-old patient who developed concurrent poststreptococcal reactive arthritis and acute glomerulonephritis. A high titer of antistreptolysin O antibody confirmed the preceding streptococcal infection. The patient presented with symmetric persistent tenosynovitis of hands and feet. Renal biopsy showed typical findings of acute glomerulonephritis with crescent formation. Physicians who treat patients with arthritis of acute onset, especially after throat infection, should be aware of possible urinary abnormalities or renal dysfunction.

Keywords Glomerulonephritis · Reactive arthritis · Streptococcal infection · Tenosynovitis

Introduction

Poststreptococcal reactive arthritis (PSRA) is a disease entity characterized by nonmigratory arthritis, usually of acute onset, after streptococcal tonsillitis. It is well known that streptococcal infection can cause musculoskeletal or renal manifestations such as PSRA, rheumatic fever, and acute glomerulonephritis [1, 2]. However, the simultaneous development of musculoskeletal and renal manifestations in the same patient is relatively uncommon. We report the case of a young adult with PSRA who presented with the typical clinical and biopsy findings of poststreptococcal acute glomerulonephritis (PSAGN).

T. Tokura · Y. Morita (✉) · D. Yorimitsu · H. Horike · T. Sasaki · N. Kashihara
Division of Nephrology and Rheumatology,
Department of Internal Medicine, Kawasaki Medical School,
577 Matsushima, Kurashiki, Okayama 701-0192, Japan
e-mail: morita@med.kawasaki-m.ac.jp

Case report

A 16-year-old Japanese man presented to our clinic in September 2004 with a two-week history of polyarthralgia. He reported the appearance of low-grade fever one month before consultation, which resolved spontaneously without treatment. Physical examination showed a body temperature of 37.3°C, a blood pressure of 150/84 mmHg, a puffy face and bilateral pretibial edema. The patient reported a 5-kg increase in body weight in the last few months. The left wrist was swollen and tender, and the ankles were tender and swollen bilaterally. No skin rash was observed. The tonsils were noted to be normal. Heart sounds were regular with no murmur, and lung examination was unremarkable.

Urinalysis showed numerous erythrocytes per high-power field. Red and white blood cell casts were observed. Urine protein was positive at 0.69 g/day. Complete blood count showed a hemoglobin value of 10.6 g/dl with normal mean corpuscular volume, a leukocyte count of 4,380/μl, and a platelet count of 19.9×10^4/μl. Serum C-reactive protein was elevated at 3.48 mg/dl (normal < 0.30), and erythrocyte sedimentation rate was 93 mm/h. Serum creatinine level was slightly increased at 1.03 mg/dl. Serum albumin was normal at 3.4 g/dl. Rheumatoid factor, antinuclear antibodies, cryoglobulin, and antineutrophil cytoplasmic antibodies were all negative. Serum C3 complement concentration was low at 35.0 mg/dl (normal 70–140), but C4 concentration was normal at 38.7 mg/dl (normal 12–40). CH50 was decreased at 13.7 U/ml (normal 27–51). Antistreptolysin O antibody (ASO) titer was 650 IU/ml (normal < 160). HLA typing demonstrated the presence of antigens DRB*01 and DRB*14. Plain chest X-ray showed mild cardiomegaly and ultrasound cardiac echogram showed no valve disease and normal cardiac function.

Gadolinium-enhanced magnetic resonance imaging showed active tenosynovitis of the extensor digitorum of the left hand (Fig. 1). Renal biopsy was performed and the histology revealed marked diffuse and global endocapillary and mesangial cell proliferation with neutrophil infiltration (Fig. 2a). Cellular crescents were found in 30% of the examined glomeruli ($n = 20$). Immunofluorescence examination showed granular deposition of C3 in capillary walls and mesangial areas, with a starry sky-like pattern. Subepithelial electron-dense "hump-shaped" deposits, classically described in PSAGN, were observed on electron microscopy (Fig. 2b).

Based on the above clinicopathological findings, the final diagnosis was PSRA and PGAGN. Treatment with prednisolone (30 mg/day) after steroid pulse therapy resulted in immediate improvement of polyarthritis without worsening of edema or blood pressure. Follow-up laboratory tests performed in October 2004 demonstrated that serum C3 concentration was 63.9 mg/dl, C4 concentration 19.9 mg/dl, and ASO 272 IU/ml. Urinary abnormalities disappeared in the following six months. Prednisolone was tapered and ultimately discontinued after eight months. Prophylactic treatment with antibiotics was not performed in our patient because of the lack of evidence supporting this practice in PSRA [1]. The patient remains clinically well without recurrence 36 months after discontinuation of steroid therapy.

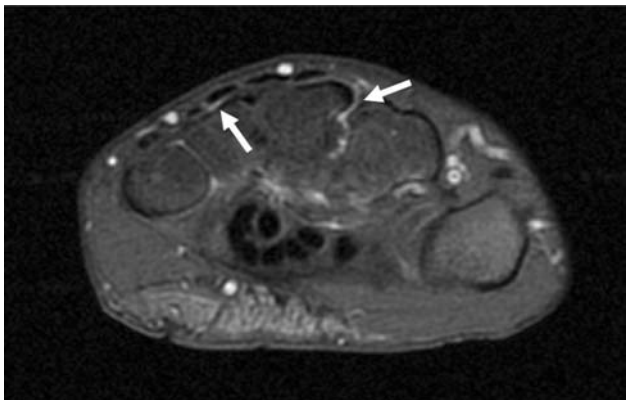

Fig. 1 Transverse gadolinium-enhanced T1-weighted magnetic resonance imaging of the left hand showing tenosynovitis of the extensor digitorum (*arrows*)

Discussion

PSRA is considered a clinical entity that is distinct from acute rheumatic fever and other forms of reactive arthritis, although the difference is still not clear [3]. Because of certain similarities between PSRA and acute rheumatic fever, some researchers have suggested that PSRA may be a variant of acute rheumatic fever [4, 5]. The major differences from acute rheumatic fever are considered to be: (1) short latency period (<10 days); (2) nonmigratory and persistent arthritis; (3) common tenosynovitis, and; (4) poor responsiveness of arthritis/arthralgia to salicylates or other nonsteroidal anti-inflammatory drugs. Our patient presented with symmetric persistent tenosynovitis in hands and feet. No carditis was observed. An elevated titer of ASO on admission confirmed the pathological role of the preceding streptococcal infection. These findings provided support for the diagnosis of PSRA.

Acute glomerulonephritis is characterized by the presence of hematuria, proteinuria and edema, and is often complicated with hypertension and acute renal failure [6]. The prototype of acute glomerulonephritis is PSAGN, which can occur after both streptococcal pharyngeal and skin infections. Approximately 90% of PSAGN patients are young children [6]. Our case represented typical clinical and histological findings of PSAGN. The simultaneous development of PSRA and PSAGN in the same patient has been reported previously [7], although the exact frequency

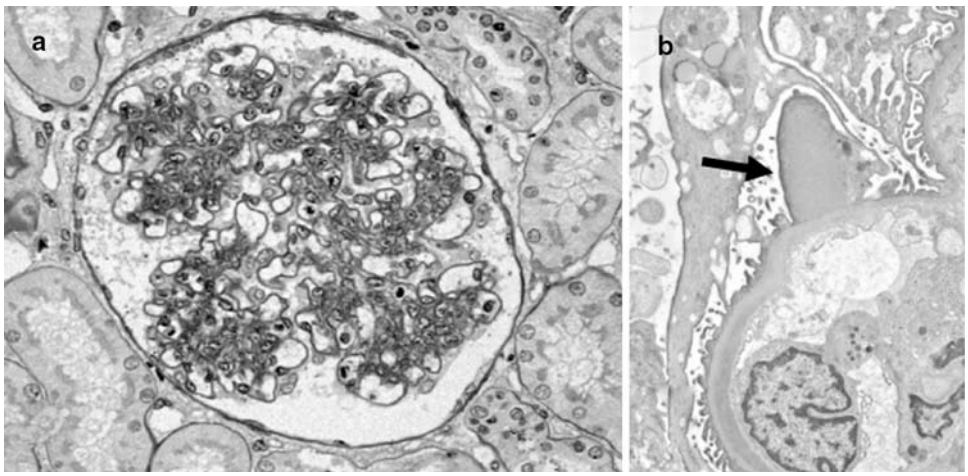

Fig. 2 Renal biopsy specimen. **a** PAS-stained light micrograph showing a hypercellular glomerulus with neutrophil infiltration (×400). **b** Electron micrograph showing glomerular epithelial cells with subepithelial electron-dense "hump-shaped" deposit (*arrow*, ×4,000)

of co-occurrence is unknown. Based on a review of case reports and case series published between 1982 and 2002, "glomerulonephritis" was diagnosed in 8 of 188 cases of PSRA [8]. However, the clinical details, such as urinary abnormalities, renal dysfunction, serological data, histopathology and clinical course, were poorly described in that review article.

Although group A streptococcus can cause both PSRA and PSAGN, the pathological mechanisms underlying each disease might be different. CD4+ T cells presumably play an important role in the pathogenesis of PSRA. The hypothesis is supported by the finding that a significant increase in HLA-DRB*01 antigen, which was expressed in our patient, has been demonstrated in PSRA [5]. On the other hand, PSAGN is considered to be an immune complex disorder with deposits of complements in glomeruli and transient hypocomplementemia [9]. Only certain strains of streptococci appear to cause PSAGN and only these strains produce nephritis-associated antigens [10, 11]. The type of strain of the infective streptococcus was not examined in our patient. Furthermore, it could not be determined whether our patient had a single strain that resulted in both PSRA and PSAGN, or whether several strains of streptococci were present simultaneously.

PSAGN typically recovers spontaneously in almost all patients, even those who develop renal insufficiency during the acute episode. However, irreversible renal failure is reported in some patients [12, 13]. Our case and that reported previously [7] emphasize the importance of recognizing poststreptococcal renal manifestations. Physicians who treat patients with arthritis of acute onset, especially after throat infection, should be aware of urinary abnormalities including hematuria and proteinuria.

Conflict of interest The authors declare no conflict of interest.

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