A rare adult case of poststreptococcal acute glomerulonephritis with a retropharyngeal abscess

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Received: 24 January 2017 / Accepted: 20 March 2017 / Published online: 27 March 2017
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Abstract Retropharyngeal abscess is an infection involving the retropharyngeal space which is posterior to the pharynx and oesophagus, and it results as a complication of a primary infection elsewhere in the head and neck including the nasopharynx, paranasal sinuses, or middle ear, which drain lymph to the retropharyngeal lymph nodes. Their lymph nodes are prominent in children and atrophy with age. Therefore, retropharyngeal abscess is most frequently encountered in children, with 75% of cases occurring before the age of 5 years, and often in the first year of life. We experienced a rare adult case of poststreptococcal acute glomerulonephritis with a retropharyngeal abscess, and conservative therapy ameliorated them. According to past reports, only one child with a retropharyngeal abscess and poststreptococcal acute glomerulonephritis has been presented at a conference to date; this is the first adult case of poststreptococcal acute glomerulonephritis with a retropharyngeal abscess. Retropharyngeal abscess can be fatal including airway compression, so it is important to remember retropharyngeal abscess in a case of poststreptococcal acute glomerulonephritis with severe symptoms of neck.

Keywords Poststreptococcal acute glomerulonephritis · Retropharyngeal abscess · Adult

Introduction

Poststreptococcal acute glomerulonephritis (PSAGN) is characterized by the sudden appearance of hematuria, proteinuria, red blood cell casts in the urine, edema, hypertension, and acute kidney injury. It results from an antecedent infection of the skin (pyoderma) or throat (pharyngitis, tonsillitis) caused by nephritogenic strains of group A beta-hemolytic streptococci and follows throat infection with group A streptococci M protein types 1, 2, 3, 4, 12, 25, and 49 and pyoderma with streptococci M types 2, 47, 49, 55, 57, and 60 [1–4]. The overall risk of developing PSAGN after infection by these nephritogenic strains is about 15%. The risk of PSAGN is typically increased in children between 2 and 12 years of age, with a peak prevalence in individuals aged approximately 5–6 years [5, 6].

We experienced a rare adult case of PSAGN with a retropharyngeal abscess (RA). To the best of our knowledge, no similar case has been reported to date. Herein, we report this case and take into consideration from the literature.

Case report

A 72-year-old man presented with fever of 39 °C, cough, pharyngalgia, and dysphagia several days before he was hospitalized. He had occasionally received indication of hypertension before, but had not been treated for hypertension. In addition, he had no prescription drugs, because he had not gone to the hospital periodically before hospitalization. He had a past history of hearing impairment due to otitis media. Physical examination on admission revealed weight gain (90.5 kg), hypertension (195/101 mmHg), generalized edema, and pain of neck without inflammation of the palatine tonsils. Pulmonary rales were not audible. The

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laboratory data (Table 1) showed the elevation of the white blood cell count (20,270/ μ L), C-reactive protein (26.3 mg/dL), serum creatinine (4.3 mg/dL), anti-streptolysin O (ASLO: 1,144 U/mL), and anti-streptokinase titers (ASK: 2560 times), while C3 (4.2 mg/dL) and CH50 (less than 14

CH50/mL) levels were low. Rheumatoid factor and anti-nuclear antibody were negative. Urinalysis showed occult blood, granular cast, and urinary protein–creatinine ratio (U-Pro/Cr) was 1.15 g/gCr. Bacteriological examinations detected no bacteria. Chest radiography showed that the

Table 1 Laboratory findings on admission

Peripheral blood		Serology	
White blood cell count	20,270/ μ L	C-reactive protein	26.3 mg/dL
Neutro.	81.0%	Immunoglobulin G	1971 mg/dL
Lymph.	8.0%	Immunoglobulin A	343 mg/dL
Mono.	10.0%	Immunoglobulin M	80 mg/dL
Eosino.	1.0%	Immunoglobulin E	564 U/mL
Baso.	0%	Rheumatoid factor	4.7 U/mL
Red blood cell count	$392 \times 10^4/\mu$ L	Antinuclear antibody	<40 times
Hemoglobin	12.8 g/dL	C3 complement	4.2 mg/dL
Hematocrit	36.2%	C4 complement	16.2 mg/dL
Platelets	$15.8 \times 10^4/\mu$ L	CH50	<14 CH50/mL
Chemical analysis		Anti-streptolysin O	
Total protein	6.7 g/dL	Anti-streptokinase	2560 times
Albumin	2.9 g/dL	Myeloperoxidase anti-neutrophil cytoplasmic antibody	(–)
Urea nitrogen	84.0 mg/dL	Proteinase3 anti-neutrophil cytoplasmic antibody	(–)
Creatinine	4.3 mg/dL	Anti-glomerular basement membrane antibody	(–)
Estimated glomerular filtration rate	12 mL/min/1.73 m ²	Hepatitis B surface antigen	(–)
Uric acid	10.3 mg/dL	Hepatitis C virus antibody	(–)
Total bilirubin	0.94 mg/dL	Urinalysis	
Aspartate aminotransferase	55 U/L	pH	5.5
Alanine aminotransferase	31 U/L	Specific gravity	1.011
Lactate dehydrogenase	361 U/L	Protein	(2+)
Alkaline phosphatase	210 U/L	Occult blood	(3+)
γ -Glutamyl transpeptidase	43 U/L	Glucose	(–)
Creatine kinase	288 U/L	Urobilinogen	($\pm$)
Cholinesterase	161 U/L	Keton	(–)
Glucose	134 mg/dL	Bilirubin	(–)
Total cholesterol	127 mg/dL	Nitrate	(–)
Triglycerides	102 mg/dL	White blood cell	(3+)
High-density lipoprotein cholesterol	30 mg/dL	Urine sediment	
Sodium	131 mEq/L	Red blood cell	>100/HPF
Potassium	4.6 mEq/L	White blood cell	>100/HPF
Chloride	98 mEq/L	Granular cast	1–4/HPF
Calcium	7.8 mg/dL	Erythrocyte cast	(–)
Phosphorus	7.3 mg/dL	Urine chemistry	
Ferrum	79 μ g/dL	<i>N</i> -acetyl- β -D-glucosaminidase	22.9 U/L
Total iron binding capacity	108 μ g/dL	β 2-microglobulin	1099 μ g/L
Ferritin	383.4 ng/mL	Protein	162 mg/dL
Hemoglobin A1c	5.8%	Creatinine	140.3 mg/dL
Blood coagulation			
Prothrombin activity	46.3%		
Prothrombin time-international normalized ratio	1.44		
Activated partial thromboplastin time	35.0 sec		
Fibrin degradation product	16.3 μ g/mL		

cardiothoracic ratio was 49% and right costphrenic angle was slightly dull. Ultrasonic cardiography showed that the ejection fraction was 69.9% and there was no vegetation. The inferior vena cava revealed respiratory changes and did not collapse. Ultrasonography and plain computed tomography (CT) of the abdomen revealed slight enlarged kidneys without hydronephrosis. He did not hope for kidney biopsy. Pharyngeal endoscopy revealed severe inflammation of the pharyngeal posterior wall (Fig. 1A). Plain CT of the neck revealed a low density area in the retropharyngeal space (Fig. 2). Based on the above results, we excluded pre-renal, post-renal, or other factors causing acute renal failure (ARF), and he was diagnosed as PSAGN with a RA. His clinical course in the hospital is shown in Fig. 3. In regard to RA, the infusion of antibiotics (piperacillin and clindamycin) and hydrocortisone ameliorated his symptoms of the neck and inflammatory reaction without the drainage (Fig. 1B). On the other hand, PSAGN was ameliorated with conservative therapy including rest and diet therapy (restrictions of water, sodium, and protein). Urine output was about 150 mL/day from day 1 to day 3, about 1500–2100 mL/day from day 4 to day 24 and about 1000 mL/day after day 25. Hypertension was improved with the

oral administration of nifedipine and losartan. We selected a calcium channel blocker in the acute phase. After renal function was improved, his urinary protein did not completely become negative. Therefore, we added an angiotensin II receptor blocker for purposes of antihypertensive and the renal protection. The parameters improved to weight 73 kg, serum creatinine 0.92 mg/dL (peak value 5.41 mg/dL), U-Pro/Cr 0.59 g/gCr (peak value 8.52 g/gCr), ASLO 239 IU/ml (peak value 1,234 U/mL), ASK 2,560 times (peak value 20,480 times), C3 129.9 mg/dL, and CH50 43.5 CH50/mL about 2–3 months later.

Discussion

PSAGN is a representative disease of acute nephritic syndrome in which inflammation of the glomerulus is manifested by proliferation of cellular elements secondary to an immunologic mechanism [7]. Nephritogenic streptococci produce proteins with unique antigenic determinants. The major antigens including nephritis strain-associated protein (NSAP), streptococcal pyrogenic exotoxin B (SPEB), nephritis-associated plasmin receptor (NAPlr), etc. have

Fig. 1 Pharyngeal endoscopy showing swelling and reddening of the pharyngeal posterior wall (white arrows) on admission (A) and improvement on day 13 (B)

Fig. 2 Noncontrast computed tomography of the neck showing a low density area (black arrows) in the retropharyngeal space

Fig. 3 Clinical course. *Scr* serum creatinine, *Alb* serum albumin, *CRP* C-reactive protein, *U-Pro/Cr* urinary protein–creatinine ratio, *PIPC* piperacillin, *CLDM* clindamycin

presently been identified as the potential causes of PSAGN [8–12].

Cultures from either the pharynx or skin may be positive to look for evidence of streptococcal infection. However, recent poststreptococcal infection is most commonly demonstrated by serologic markers for elevated antibodies to extracellular streptococcal antigens. The streptococcal antibodies measured ASLO, ASK, antihyaluronidase (AH), antinicotinamide–adenine dinucleotidase

(anti-NAD), or anti-DNAse B antibodies. Apart from ASK, all other streptococcal antibodies are commonly elevated after throat infection, whereas only AH and anti-DNAse B antibody titers are typically increased after pyoderma. Whichever test is used, a rise in the titer of the antibody, measured at an interval of 2–3 weeks, is more meaningful than a single measurement. For example, an ASLO titer of 250 U or higher is highly suggestive of

recent streptococcal infection. In this case, ASLO and ASK were useful for his diagnosis.

Kidney biopsy is generally not recommended in the evaluation of patients with PSAGN, because the clinical history is usually highly suggestive and resolution of PSAGN typically begins within 1 week of presentation. However, atypical features that suggest the need for kidney biopsy include the following [12–15]:

- absence of the latent period between streptococcal infection and acute glomerulonephritis;
- rapidly progressive glomerulonephritis;
- massive proteinuria (nephrotic syndrome);
- no rise in antistreptococcal antibodies;
- normocomplementemia or persistent hypocomplementemia beyond 6–8 weeks;
- no improvement or continued decrease in the glomerular filtration rate by 4 weeks.

The present case showed massive proteinuria and ARF, but he did not hope for kidney biopsy. Therefore, we could not perform it. The clinical features of this case seem to be massive proteinuria and the significant decline in glomerular filtration rate as compared to the commonly experienced clinical course of PSAGN. As far as we searched, there are no reports about relations among these clinical features and the sites of antecedent infection. However, early administration of an antibiotic is reported to prevent or ameliorate the severity of PSAGN and at least one report suggests that PSAGN patients that receive antibiotic treatment have a milder clinical course [12, 16, 17]. Therefore, the above-mentioned clinical features may have something to do with the severity of streptococcal infection.

The immediate prognosis of PSAGN is excellent for children. In contrast, elderly patients who develop PSAGN usually present with debilitating conditions (malnutrition, alcoholism, diabetes, or chronic illness) and have a high incidence of azotemia (60%), congestive heart failure (40%), and proteinuria in the nephrotic range (20%) [18, 19]. The present case presented with massive proteinuria and ARF, but did not have debilitating conditions.

In regard to the long-term prognosis of PSAGN, the incidence of ESRD in studies with 15 years of follow-up is less than 1%, with the exception being that long-term prognosis is poor in elderly patients who develop persistent proteinuria in the nephrotic range; 77% of these patients develop chronic renal failure [14, 17, 20, 21]. The present case developed nephrotic syndrome, but fortunately recovered. However, his urinary protein did not completely become negative, so we need to follow up his renal function carefully in the future.

RA is a infection involving the retropharyngeal space which is posterior to the pharynx and oesophagus. It

results as a complication of a primary infection elsewhere in the head and neck including the nasopharynx, paranasal sinuses, or middle ear, which in turn drain lymph to the retropharyngeal lymph nodes (RLNs). Suppuration of RLNs then leads to an extension of the infection to the surrounding tissues. Causative agents are variable and include group A *Streptococcus*, *S aureus*, *H Influenzae*, anaerobic organisms, M tuberculosis, etc [22]. There may be a slight male predilection [23].

RLNs are prominent in children and atrophy with age [24]. Therefore, RA is most frequently encountered in children, with 75% of cases occurring before the age of 5 years, and often in the first year of life [22, 25]. According to past references, only one child diagnosed with RA and PSAGN has been presented at a conference to date [26]. This is the first adult case of PSAGN with RA. In adults, secondary RA can occasionally result from a variety of other miscellaneous causes, including trauma, foreign body injection, endoscopy, intratracheal intubation, etc. Immunocompromised patients are also at increased risk of developing a RA. However, this case was not immunocompromised state and had no causes of secondary RA.

Contrast-enhanced CT is excellent at diagnosing RA. However, noncontrast CT was performed in this case with renal dysfunction.

A poor improvement of RA with the administration of antibiotics warrants the consideration of the surgical drainage (usually performed via a transoral route). Fortunately, this case recovered by only antibiotics without the drainage.

RA can lead to potentially life-threatening complications including [23]:

- airway compression (anterior compression);
- discitis, osteomyelitis, or epidural abscess (posterior extension);
- mediastinitis (inferior extension into the mediastinum);
- haemorrhage, thrombosis, or pseudoaneurysm (lateral extension involving carotid artery and jugular vein);
- systemic dissemination, sepsis, etc.

Therefore, prompt diagnosis and therapy are required. It is important for nephrologists to remember RA in a case of PSAGN with severe symptoms of the neck.

Compliance with ethical standards

Conflict of interest The authors have declared that no conflict of interest exists.

Ethical statement This article does not contain any studies with human participants or animals performed by any of the authors.

Informed consent Informed consent was obtained from the patient included in this article.

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