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Case Report

Henoch-Schönlein purpura (IgA vasculitis) developing after postoperative wound infection by methicillin-resistant Staphylococcus aureus

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ABSTRACT

Henoch-Schönlein purpura (HSP) is an acute small-vessel leukocytoclastic vasculitis, affecting the skin, joints, gastrointestinal tract and kidneys. Its prognosis depends on the severity of nephritis. A wide variety of pathogens, drugs, and other environmental exposures have been associated with HSP. Although group A β-haemolytic streptococcus has been the most studied, the majority of cases showed no direct link to streptococcal infection. Here we report a case of methicillin-resistant Staphylococcus aureus (MRSA) infection-associated HSP. A 68-year-old woman underwent a coronary artery bypass surgery. After the surgery, a postoperative chest wound was infected by MRSA and sternal osteomyelitis developed. Palpable purpura then appeared on the extremities, followed by hematuria, proteinuria and increased serum creatine. Treatments with antibiotics and debridement of the infected wound and sequestrum resulted in rapid improvement of skin symptoms. Renal function partially recovered, however mild hematuria and proteinuria remained. Published work review and the present case suggest that Staphylococcal infection-associated HSP frequently involves kidney disease and its prognosis is likely to be poor compared to a common type of HSP. Further studies are needed to establish an appropriate treatment strategy for Staphylococcal infection-associated HSP.

Key words: Chronic kidney disease; IgA vasculitis, Purpura; Staphylococcus aureus; Vancomycin

INTRODUCTION

Henoch-Schönlein purpura (HSP) (IgA vasculitis) is a systemic small vessel vasculitis associated with IgA1-dominant immune deposits, which may affect the skin, joints, gastrointestinal tract and kidneys [1]. Purpura, arthritis and abdominal pain are known to be the classical triad of HSP, however the prognosis predominantly depends on the degree of renal involvement. A variety of factors, such as infection and drugs, have been associated with the pathogenesis of HSP [1,2]. Although it is well documented that HSP occurs frequently following upper respiratory tract streptococcal infection [3], most cases have no direct link to streptococcal infection [2]. In this report, we describe a case of HSP with renal failure, associated with methicillin-resistant Staphylococcus aureus (MRSA) infection in a postoperative wound after coronary artery bypass surgery.

CASE REPORT

A 68-year-old Japanese woman with a history of hypertension and diabetes mellitus was admitted to our hospital because of unstable angina pectoris. After undergoing coronary arterial bypass grafting, a postoperative wound was infected, and sternal osteomyelitis occurred and worsened due to poor glycemic control (blood sugar level: 400-500 mg/dl). Bacteriological analysis showed methicillin-sensitive Staphylococcus aureus (MSSA) infection. In spite of intensive blood glucose control with insulin and

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intravenous administration of clindamycin, the surgical wound infection with pustular exudates and a high-grade fever continued. One month and a half after the operation, a culture of the wound was positive for MRSA. An antibiotic therapy consisting of vancomycin was initiated with poor response. A few days later, the patient developed multiple purpura on her extremities, and vancomycin was stopped because of suspected drug-induced vasculitis. When the patient presented to our clinic, multiple, slightly elevated purpura were present on the legs and forearms (Fig. 1). She did not complain of either arthralgia or abdominal pain. Periodontitis and swollen tonsils were not observed. Laboratory investigations revealed an elevated white blood cell count of 5300/mm3 (52.7% neutrophils and 1.0% eosinophils); serum creatinine, 0.73 mg/dl; C-reactive protein (CRP), 6.5 mg/dL; HbA1c, 6.9 %; and IgA of 737 mg/dL. Her hemoglobin concentration decreased to 7.9 g/dl. The levels of liver function and serum complements (CH50, C3 and C4) were normal. Anti-streptolysin O, anti-nuclear antigen, MPO- and PR3-ANCA were negative. Urinalysis showed 3+ for blood and slightly positive for protein. A skin biopsy from the leg showed leukocytoclastic vasculitis of the small vessels in the upper and middle dermis (Fig. 2). On direct immunofluorescence examination, IgA and C3 were positive in the vessel walls in the upper dermis. Based on these findings, a diagnosis of HSP was established. We decided to initiate oral administration of tranexamic acid and carbazochrome sodium sulfonate hydrate. However, there was no significant improvement in the purpura. In addition, the hematuria continued, the urinary protein excretion gradually increased (3348 mg/day at the maximum), and the serum creatinine elevated up to 2.21 mg/dl. As a result of poor control of the postoperative suppurative wound, the patient developed sternal osteomyelitis, and the wound was infected with MRSA (3+). We therefore performed debridement and sequestrectomy followed by continuous local washing therapy 2 months after the surgery. Oral linezolid was also initiated. These treatments resulted in reducing bacterial counts of MRSA and levels of CRP, as well as accelerating the wound healing. Two weeks after the debridement, the purpuric lesions on the extremities disappeared. The proteinuria began to ameliorate and serum creatinine decreased to 1.2~1.4 mg/dL 4 weeks post-debridement, however she progressed to moderate chronic kidney disease. In light of the clinical course and pathological findings, we made the diagnosis of MRSA infection-associated HSP.

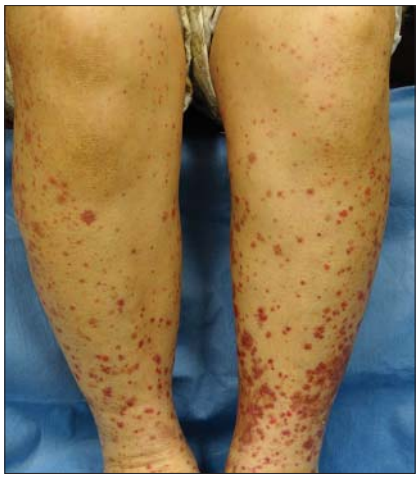

Figure 1: Clinical appearance of the eruption. Multiple, slightly elevated purpura were present on the legs.

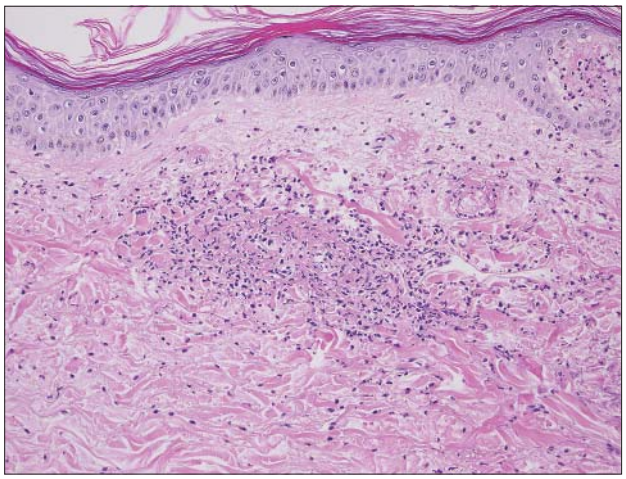

Figure 2: Histological analysis of a skin biopsy from the lesional skin. Hematoxylin-eosin staining showed vascular damage with perivascular neutrophilic infiltrate, fibrinoid change of vessel walls and nuclear debris in the upper and middle dermis, which was consistent with leukocytoclastic vasculitis.

Prior to the study, patient gave written consent to the examination and biopsy after having been informed about the procedure.

DISCUSSION

Herein we presented a case of MRSA infection-induced HSP with a renal dysfunction. Debridement and antibiotics treatment rapidly improved the skin symptoms and prevented deterioration of kidney disease. To date, 22 cases of HSP associated with Staphylococcus aureus infection have been reported in 11 studies [4-14], including the present case. The mean age was 51.9 years (range, 17-90 years). Men were affected more often than women (19 men, 2 women and 1 unknown gender). Twelve cases underwent a

skin biopsy that revealed leukocytoclastic vasculitis. Eight of 9 cases, in which a direct immunofluoroscence examination was performed, showed IgA deposits in vessel walls. MRSA was detected in 15 patients, and MSSA in 7 patients from various infected sites such as skin ulcers/wounds, osteomyelitis, endocarditis, otitis media, external, cutaneous or retroperitoneal abscesses, pneumonia, and sepsis among others. One case developed HSP associated with saphenectomy wound infection after coronary bypass surgery [11]. Twenty-one cases (95%) had glomerulonephritis and/or decreased renal function. With respect to treatments, antibiotics were administered in all cases, and prednisolone and/or immunosuppressive drugs in 14 cases (64%). Renal dysfunction remained or chronic kidney disease was progressed in twelve cases (55%). In two cases, the patients died due to hepatic failure or sepsis [12].

Although common HSP in adulthood presents a variable frequency of renal involvement (40-85%) [1,2,4], the final outcome is good (end-stage kidney disease in 20-30% in long term follow-up) [4]. On the other hand, the renal involvement in Staphylococcal infection-associated HSP was frequent and its renal outcome was poor. In fact, our published work review indicates that 14 (64%) of the 22 Staphylococcal infection-associated HSP cases resulted in chronic kidney disease or death. Therefore, it is important to differentiate patients with common HSP from patients with Staphylococcal infection-associated HSP. Hirayama et al. [12,13] proposed that Staphylococcus aureus enterotoxins may act as superantigens, which could induce strong activation of T cells and cytokine release, and contribute to the pathogenesis of rash and systemic vasculitis. Thus, proper antimicrobial therapy is undoubtedly essential, but resolution of infection does not necessarily result in resolution of skin eruption and nephritis. Some case reports described patients with Staphylococcal infection-associated HSP who were resistant to antibiotics and improved by administration of steroids [8,10]. In contrast to such cases, Fujiwara et al. [7] reported a case where the patient was unresponsive to steroid therapy and improved by antibiotics administration. At present, steroid therapy may exacerbate infection and its therapeutic benefit is controversial.

In conclusion, we report a case with MRSA infection-associated HSP that occurred after coronary artery bypass surgery. By the combination therapy of antibiotics and debridement of the infected wound and sequestrum of the chest, the purpura on the extremities rapidly disappeared but moderate chronic kidney disease remained. In this rare type of HSP, renal involvement frequently occurs and its prognosis is poor compared to a common type of HSP. Further studies are needed to establish an appropriate treatment strategy in Staphylococcal infection-associated HSP.

Consent

The examination of the patient was conducted according to the Declaration of Helsinki principles.

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