Nephrotic syndrome following a single bee sting in a child

K. Kaarthigeyan, S. Sivanandam, K. Jothilakshmi, J. Matthai
Department of Pediatrics, PSG Institute of Medical Sciences & Research, Coimbatore, India

ABSTRACT

The occurrence of nephrotic syndrome following a bee sting is rarely reported in the literature. Hypersensitivity is believed to be the precipitating factor for the renal disease. We report a two-year-old boy, who developed generalized edema and decreased urine output, seven days after a bee sting. Physical examination and laboratory findings were consistent with nephrotic syndrome; and corticosteroid treatment induced prompt remission with resolution of clinical symptoms and normalization of laboratory findings. There was no relapse of the disease during a one-year follow up.

Key words: Bee sting, child, corticosteroids, nephrotic syndrome

Introduction

Nephrotic syndrome (NS) in children is usually idiopathic, but may also be triggered by immunological stimuli like vaccination, infection, insect sting, or pollen hypersensitivity. The relation between allergy and NS is unclear.[1] Humoral and cellular immune function studies suggest that abnormal immune response is the probable cause in this clinical entity.[2] Bee sting has been implicated in the development of NS, but occurrence in children has rarely been reported in literature. These patients need a shorter course of steroids, but show excellent response and have a low risk of relapse.

Case Report

A 2-year-old boy was hospitalized with generalized edema and decreased urine output of 4-day duration. Facial swelling developed initially and then the edema extended to the legs, eventually affecting the entire body. There was no history of fever or any intake of drugs. There was a history of a bee sting on the dorsal aspect of his right hand 7 days earlier, which had resulted in severe pain, redness, and local swelling for about 48 hours. He had no history of atopy or similar episodes in the past.

On physical examination, he was afebrile, had facial edema, pitting pedal edema with abdominal distension. His blood pressure was normal (90/60 mm Hg), and a bee sting mark was visualized over the dorsum of the right hand [Figure 1]. Laboratory investigations revealed hemoglobin of 13.7 g/dl, white blood cell count of 25 400/mm^3, 35% neutrophils, 58% lymphocytes, 5% eosinophils, 2% monocytes, and platelet count of 331 000/mm^3. His erythrocyte sedimentation rate was 69 mm/hr and peripheral smear showed normocytic normochromic red blood cells with leukocytosis and adequate platelets. He had decreased serum proteins (total protein 3.9 g/dl, and albumin 1.5 g/dl); elevated serum

Figure 1: Bee sting over the dorsum of the right hand

Address for correspondence:
Dr. K. Kaarthigeyan, Department of Pediatrics, PSG Institute of Medical Sciences & Research, Coimbatore - 4, TN, India.
E-mail: kaarthigeyank@yahoo.com

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cholesterol (382 mg/dl); and normal renal parameters (blood urea 34 mg/dl and creatinine and 0.37 mg/dl). Urine analysis revealed 3+ proteinuria with a 24-hour urinary protein excretion of 0.9 g. Complement C3 level was 1.16 g/dl (0.90 - 1.80 g/dl); immunoglobulins profile showed IgA - 0.32 g/dl (0.14 - 1.59 g/dl), IgM - 0.9 g/dl (0.43 - 2.07 g/dl), IgG - 2.92 g/dl (3.45-12.36 g/dl), and IgE - 245 IU/l (<230 IU/l). Chest X-ray was normal and the ultrasound revealed free fluid in the abdomen. Mantoux test and HBs antigen were negative. Serological investigations were negative for antinuclear antibodies and antistreptolysin-O. Renal biopsy was not performed.

On admission, he was managed symptomatically with diuretics and with salt and fluid restriction. After the laboratory results, he was started on oral prednisolone (2 mg/kg/day). The boy progressively improved and diuresis set in on the fifth day; edema regressed by the seventh day; and urine became albumin-free by the 10th day of admission. Corticosteroids were then changed to alternate-day regimen and tapered gradually after 8 weeks and withdrawn. During the regular 1-year follow-up after the end of treatment, the boy remained well without any recurrence.

Discussion

NS in childhood,[3] can be triggered by immunological stimuli including infection, vaccination, insect bites, pollen and drug-induced hypersensitivity.[4]

Bee stings are usually followed by minor local allergic reactions and rarely anaphylactic or delayed hypersensitivity reactions.[5,6] Other reported systemic complications following multiple bee stings include acute renal failure (ARF), myocarditis, myocardial infarction, centrilobular necrosis of liver, acute encephalopathy, Guillain-Barre syndrome, vasculitis, disseminated intravascular coagulation, and thrombocytopenia.[7,8]

Though causal relationship and association between bee stings and development of NS has long been described,[3] no report has demonstrated the presence of bee venom antigens in the glomeruli. NS can develop even after a single bee sting,[3] like in our case which occurred within 7 days. The cause-and-effect relationship between the bee sting and renal disease is speculative, made on the basis of a temporal association.

Bee venom exposure may be associated with albuminuria.[9] Relapse of NS following a bee sting has been reported.[10] It is postulated that components of the bee venom mediate immunological disturbances, with involvement of T-lymphocytes and their cytokine secretion, influencing the permeability of the glomerular basal membrane with consequent development of proteinuria.[3]

Pathologic findings of NS following a bee sting are diverse, which include minimal change lesions, mesangial proliferative glomerulonephritis, membranous glomerulonephritis, and glomerulosclerosis.[11] ARF following multiple bee stings is attributed to acute tubular necrosis due to hypotension or pigment nephropathy resulting from rhabdomyolysis, intravascular hemolysis, and acute interstitial nephritis.[12,13]

Spontaneous remission is occasionally seen in an NS patient after an insect sting.[14] Most reported cases had a favorable clinical course with corticosteroid treatment. In our case, oral prednisolone induced prompt remission and the child remained well at follow-up. Steroids shortened the duration of disease, and no relapse or chronic renal disease is so far reported.[3] Cytotoxic agents may also induce remission in the occasional steroid-resistant cases.[11]

In conclusion, though rare, children with insect stings, particularly bee stings, must be closely followed up for multiple problems, especially immune-mediated complications such as NS.

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