Ketoacidosis Related to Infections Induced by Bee Sting: A Case Report

Mansur K. Erkuran¹, Arif Duran¹ and Tarık Ocak²
¹Abant Izzet Baysal University, Izzet Baysal Medical Faculty, Department of Emergency Medicine, 14280 Golkoy – BOLU, TURKEY
²Istanbul Kanuni Sultan Süleyman Training and Research Hospital Emergency Medical Training Clinic, Istanbul, Turkey

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*Corresponding author: Arif Duran, Abant Izzet Baysal University Medical Faculty, Department of Emergency Medicine, 14280 Golkoy – BOLU, TURKEY, Tel: +90-374-253-4656; Fax: +90-374-253-4615; E-mail: drarfurduran@gmail.com

Abstract

Diabetic ketoacidosis is a life-threatening complication of diabetes, and its mortality increasing with age is about 5 %. Infectious diseases are the most prevalent causes of diabetic ketoacidosis. Indeed, infections related to bee sting are unusual. However, even if it's not frequent, cases with infection have been reported. In this report, we aimed to present a diabetic ketoacidosis case associated with bee sting in a patient with diabetes mellitus.

Keywords: Ketosis; Insect Bites; Bee Sting; Abscess

Introduction

The incidence, mortality and hospitalization rates of Diabetes Mellitus type 2 have been increasing in many countries, but this varies based upon geography, age, gender, family history, and ethnicity. About 10.8 % ($548 billion) of all health-care costs have been used for Diabetes Mellitus (DM) and its complications in Turkey during 2013. DM is one of the leading causes of death in the world, with a rate of 8.4 %. Diabetic ketoacidosis (DKA) is a life-threatening complication of diabetes, and its mortality is about 5 % [1]. Pneumonia and urinary tract infections are the most frequent reasons (30-50%). Hepatitis, wound site infections and dental abscess may also cause DKA less frequently [2]. Allergic reactions associated with insect sting are mostly caused by bees. In various epidemiological studies, the risk of allergic reactions is reported as 2.8-28.7 % [3]. Allergic reactions are categorized as normal local reactions, large local reactions and systemic reactions. Infections associated with bee sting are seen rarely [4].

In this study, we aimed to present a diabetic ketoacidosis case associated with bee sting in a patient with diabetes mellitus.

Case Report

A 46-year-old male patient was brought to our emergency service because of weakness, nausea and vomiting. These symptoms had lasted for 2 days. On physical examination, we determined that his general situation was bad and he wasn't cooperative. A 10×8 cm lesion with redness and swelling was observed on the left side of the neck (Figure 1). It was learnt that the patient had experienced a bee sting four days ago, but he hadn't need any treatment. The patient had a history of diabetes mellitus type 2 for five years. The patient was blind in his left eye due to a trauma that he experienced when he was a child, and he was blind in right eye also due to diabetic retinopathy. Laboratory test results were detected as follows: hemoglobin: 13 gr/dL, hematocrit: 37% and white blood cells: 26.000/mm³. The following results were obtained from arterial blood gas analyses: pH: 7.13, HCO₃⁻: 2.6 mmol/L, pCO₂: 8 mmHg, lactate 2.3 mmol/L, glucose 750 mg/dL, Na: 122 mmol/L, K: 5.6 mmol/L, urea: 101 mg/dL and creatinine: 2.36 mg/dL. Urine analysis results were determined like that: glucose: +++, ketone: +++, density: 1015, pH: 5. We unfortunately have no blood ketone measurement in our hospital. Ultrasonography revealed that the mass located on the neck was an abscess. A computerized tomography was needed to clarify the spread of the mentioned abscess. We observed a formation of abscess covering the area from superior of the left occipital region to C6 (Figure 2).

The patient, whose metabolic acidosis was found associated with diabetic ketoacidosis, was admitted to intensive care unit of emergency department. Hydration and insulin infusion were administered with blood glucose monitoring and electrolyte monitoring. Required insulin dose was calculated according to the weight of the patient, then administered at the rate of 2 U/hour. The results of arterial blood gas obtained two hours after were as follows: pH: 7.28, HCO₃⁻: 6.8 mmol/L, pCO₂: 14.6 mmHg, lactate 1.1 mmol/L, glucose: 567 mg/dL, Na: 126 mmol/L. The results of arterial blood gas obtained six hours after were as follows: pH: 7.42, HCO₃⁻: 14.4 mmol/L, pCO₂: 22.6 mmHg, lactate 1.5 mmol/L, and glucose: 244 mg/dL, Na: 132 mmol/L. Plasma sodium and potassium became normal owing to fluid resuscitation. The insulin infusion was maintained until obtaining a negative value for ketone bodies. Then, subcutaneous insulin treatment was started. The abscess located on the back of the neck was drained and wound culture was performed. Treatments of intravenous ceftriaxone as 2 grams per day and intravenous metronidazole as 500 mg for every 8 hours were administered. Meropenem / Vancomycine was started to the patient after wound culture grew methicillin-resistant Staphylococcus aureus. After providing blood
glucose regulation and sufficient oral intake of calories, the patient was discharged. Humulin R with a dose of 4 IU three times a day and NPH (Neutral Protamine Hagedorn) with 8 IU once a day were prescribed to the patient before discharge. Finally, a control examination to outpatient Endocrinology clinic was recommended to the patient.

Discussion

Bees may be dangerous for people because of their venom. They are in the first place among animals which attack human. Bees have some substances and enzymes such as hyaluronidase, phospholipase A2 and histamine which are composed of proteins. These matters are the majority of their dry weight. The principal component of bee venom is melittin. Melittin consists of polypeptide and it causes destruction of cell membrane and degranulation of mast cells and basophiles. Mast cell damage is responsible for the beginning of cytolytic activity [5]. Phospholipase A2 is responsible for coagulation defect [6]. Local or systemic clinic symptoms may be observed as a result of bee sting. When considering literature, cases of heart attack, Guillain-Barre Syndrome, and necrotizing fasciitis associated with bee sting have been observed [7,8]. Indeed, infections due to bee sting are no unusual. However, even if it’s not common, cases with infections associated with bee sting have been reported. Three mechanisms are known as responsible for an infection. The first mechanism is touch of bees with infected materials and propagation of those materials during the release of their venom. The second possible mechanism is a reaction to the remaining part of the sting as foreign material and a secondary bacteria infiltration. Finally, the third one is tendency to infection due to epidermis damage resulted from itching of the bite site [4]. In case of immunodeficiency, infection is determined with higher incidence rates. Diabetic patients have a significant increased risk for infections. Infections and noncompliance with diabetes treatment are the most frequent causes of the DKA. Infections are responsible for 20-40 % of DKA and the most prevalent infections are pneumonia and urinary tract infections [9]. The other rare causes of DKA are tansilphophanyritis, post-surgical wound infections, preexisting ulcer and insect stings [10]. Our patient, who is diabetic, has taken insulin for five years. We performed a case study with an unstable patient due to DKA affected by an abscess on the back of the neck. The area where the abscess existed was bee sting site. The late application to the hospital due to blindness and insufficient self-care was an important factor of the heavy clinic picture. The rapid medical support such as administration of antibiotics, fluid resuscitation, insulin therapy and drain of abscess, accelerated the process of recovery.

Conclusion

As a result, tendency to infections is increased in diabetic patients. Serious infections associated with bee sting may develop especially in those patients. Therefore, even a simple bee sting has to be considered in diabetic patients. The medical history detailed physical examination and required laboratory tests must be performed painstakingly. Early diagnosis and therapy mustn’t be forgotten as requisiteness.

References