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DIABETES INSIPIDUS IN A PEDIATRIC PATIENT WITH SYSTEMIC LUPUS ERYTHEMATOSUS*

A Case Report

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SUMMARY: Tekin N, Kural N, Koçak AK, Köse S. (Department of Pediatrics, Osmangazi University Faculty of Medicine, Eskişehir, Turkey). Diabetes insipidus in a pediatric patient with systemic lupus erythematosus: a case report. Turk J Pediatr 1997; 39: 281-284.

In systemic lupus erythematosus (SLE), the central nervous system (CNS) produces numerous and varying clinical disorders. A 14-year-old girl with the features of cerebral involvement in SLE is presented. The development of diabetes insipidus (DI), which responded to desmopressin, was an interesting finding in this case. Therapy consisting of high-dose methylprednisolone combined with cyclophosphamide was effective in improving the symptoms as well as the DI. *Key words: cerebral involvement, diabetes insipidus, systemic lupus erythematosus.*

The presentation of systemic lupus erythematosus (SLE) varies from an acute, rapidly fatal onset to an insidious chronic disease. Exacerbations may be seen during the course of this multisystemic disease. The basic pathologic lesions of SLE are an immune complex vasculitis and fibrinoid necrosis, inflammatory cellular infiltrates and sclerosis of collagen[1]. Nephritis, pericarditis, thrombocytopenia, episodes of arthritis, splenomegaly and mucocutaneous ulcerations are observed more commonly in children than adults[1].

In this report, a 14-year-old female patient with the clinical symptoms of central nervous system involvement besides the other findings of SLE is presented. The development of diabetes insipidus (DI) during her hospitalization was an interesting clinical manifestation of this case. The criteria for cerebral involvement, the efficacy of high-dose methylprednisolone (HDMP) therapy and probable causes of DI development in SLE are discussed.

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Case Report

A 14-year-old girl presented with arthralgia, headache, rash on her face and hands, and alteration of consciousness. Four months before admission, migratory joint pain associated with edema, and local heat and sun-induced maculopapular rash on her face and hands had been noted. At that time she had been diagnosed first with acute rheumatic fever, and corticosteroid therapy was administered; then, persistance of the symptoms suggested the diagnosis of rheumatoid arthritis and the patient received salicylate therapy. She was noted to have deterioration in mental status with meaningless crying and talking as well as severe headache of four days duration. She was uncooperative and looked chronically ill, with pallor and loss of subcutaneous fat tissue. Examination revealed a fever of 38.5 °C, pulse 150 beats per minute, respiratory rate 30 per minute and blood pressure 100/60 mmHg. The skin of the face, from the nares to the cheeks, erythematous. On cardiovascular examination she had a pansystolic murmur of 4/6 degree over the mitral, tricuspid and pulmonary valves with thrill and marked tachycardia. Edema was present over the knees, elbows and wrists but was not associated with warmth or erythema. Palmar erythema was detected. Her muscles were atrophied. Hypertonicity, spasticity especially of the arms, and hand tremor were present. Deep tendon reflexes were normoactive. Speech was slurred. She was not able to walk, sit or eat meals. Her mental status was disturbed, and sometimes she cried with fear because of hallucinations. The reaction of both pupils to light was normal. The cranial nerves and fundoscopic examination were normal.

Laboratory results were as follows: hemoglobin 10.3 g/dl, hematocrit 31.2%, white blood cell count 6,500/mm^3; platelet count 231,000/mm^3, erythrocyte sedimentation rate 27 mm/hour, BUN 18 mg/dl, Cr 0.8 mg/dl, glucose 83 mg/dl, Na 130 mEq/L, K 4.3 mEq/L, total protein 7.2 g/dl, albumin 3.2 g/dl, ASO 166 Todd U, CRP 24 mg/dl, ANA (+), anti DNA 171.151 (0-6) IU/ml, IgG 2,160 (800-1700) mg/dl, IgM 369 (50-370) mg/dl, C3 20 (50-90) mg/dl and C4 218 (10-40) mg/dl. Urinalysis was normal. Chest roentgenogram revealed cardiomegaly. Mitral insufficiency was detected in echocardiography. Cerebral and cerebellar atrophy were noted on computerized tomography (CT) findings (Fig. 1). Electroencephalogram (EEG) was normal.

On the basis of these findings, the diagnosis of SLE was made. Cerebral findings were prominent. Since cardiomegaly, tachycardia and murmur of 4/6 degree suggested the development of endocarditis due to SLE, heart failure therapy was started. High-dose methylprednisolone therapy was administered for the first three days with standard steroid therapy and cyclophosphamide added to the therapy schedule. A daily urine output of greater than eight liters per day accompanied by a low urine density of les than 1005 suggested the diagnosis of diabetes insipidus. She responded to an injection of 5 µg desmopressin with elevation of urine density to 1020. Desmopressin therapy was given for almost two weeks until the normal urine and density values were obtained during corticosteroid therapy combined with cyclophosphamide. Neurological findings improved partially with the improvement in cardiac symptoms, and she could walk without help.

Discussion

Depending on the system involved during the acute phase of this episodic disease a patient could be misdiagnosed until the correct diagnosis of SLE is established. For this reason, older children commonly have a previous history of intermittent symptoms, such as arthritis, pleuritis, nephritis or dermatitis[1]. Our case had been diagnosed with acute rheumatic fever (ARF) because of the migratory character of the arthritis, and then with rheumatoid arthritis because of the persistence of symptoms. The presence of four criteria out of 11 identified by a committee of the American Rheumatism Association has sensitivity of 96 percent and a specificity of 96 percent for the diagnosis of SLE[1]. In this case the presence of a malar (butterfly) rash, photosensitivity, nonerosive arthritis, encephalopathy, positive antinuclear antibody test and high anti DNA represented six out of 11 criteria.

In our case the most striking finding was the acute organic brain syndrome, which was the reason for admission. Neurological and neuropsychiatric manifestation occur in approximately 60 percent of adult patients with SLE[2,3]. Studies of SLE that involve large groups of children show an incidence in central nervous system (CNS) involvement between nine and 45 percent[2,3]. The records of 37 patients with SLE followed at Children's Hospital of Philadelphia between 1968 and 1978 were reviewed for evidence of CNS involvement[3]. Three criteria were established as objective evidence of CNS involvement: 1) objective neurologic signs; 2) acute organic brain syndrome; and 3) symptoms referable to the CNS with abnormality of one of the following studies: EEG, cerebrospinal fluid (CSF) analysis, and CT scan. In this report, 16 of 37 children had CNS involvement (43%). The presence of one of the three criteria was used to indicate that the patient had CNS involvement. In the neurological examination of our case, the presence of objective neurologic findings such as tremor, spasticity, development of organic brain syndrome with hallucinations, and deterioration in mental status and CT findings were strongly indicative of CNS involvement. Laboratory examinations of cerebral lupus cases may consist of diffuse slowing in EEG, cortical atrophy or cerebral edema in the CT, and pressure and protein elevation in cerebrospinal fluid analysis. EEG examination is usually normal, as it was in our case. The most frequent CT finding is cerebral and cerebellar atrophy, which was also present in this case. Atrophy could be related to active or previous encephalopathy, steroid therapy or some temporary factors. MRI is more sensitive for cerebral edema than CT but was not performed in this case.

In this case DI developed, but responded to desmopressin therapy. The development of DI may be due to autoantibodies which are detected in SLE. Circulating antibodies against AVP neurones were demonstrated in 18 out of 47 patients with central AVP deficiency, suggesting an autoimmune etiology. Of these patients, 13 had other organ-specific antibodies[5]. On the other hand, in three patients with SLE who developed DI, antipituitary antibodies were not detected in their serum. They were accepted as primary empty sella syndrome[6].

The improvement of DI in our case could be due to the cyclophosphamide therapy accompanied by corticosteroid therapy, since the success of cyclophosphamide therapy in cases of diabetes insipidus secondary to Wegener's granulomatosis has been reported[7].

High-dose methylprednisolone (HDMP) therapy has been recommended for CNS involvement, as in cases of renal involvement[4,8]. Recently HDMP pulse therapy in the first three days of therapy followed by standard therapy has been applied to these cases[9,10]. Most symptoms have improved dramatically in the first few days after intravenous rose, approaching the normal range four weeks after pulse therapy[8].

A few cases of SLE associated with DI have been reported. As it is known that cerebral involvement in SLE is manifested by various clinical presentations, more advanced studies are required to identify the etiology and establish the therapy.

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