Hyper IgE syndrome presenting with brain abscesses

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Abstract

Hyper-IgE syndromes are rare, complex primary immunodeficiencies characterized by increased susceptibility to staphylococcal and mycotic infections. Skin and lungs are the most common sites of infections. Brain abscesses are rare in HyperIgE syndrome. We report a 10 year old male with HyperIgE syndrome presenting with brain abscesses secondary to septic emboli from lungs spreading to brain via the bidirectionally shunting ASD. Investigations showed striking eosinophilia, raised serum IgE levels and abscesses positive for Staphylococcus aureus. Brain abscesses were drained by burr hole drainage and he was treated adequately with IV antibiotics. He was put on prophylactic antibiotics with activity against Staphylococci.

Keywords: HyperIgE syndrome, brain abscess

Introduction

The hyper-IgE syndromes are rare, complex primary immunodeficiencies characterized by increased susceptibility to staphylococcal and mycotic infections (1). The clinical triad of symptoms includes: 1) recurrent staphylococcal abscesses, 2) recurrent airway infections, 3) increased concentration of immunoglobulin E in serum [2]. A hallmark of the syndrome is an increased concentration of immunoglobulin E in the serum. A value of 2000 U/ml is considered to be the cut-off point[3]. Affected patients will show striking blood and sputum eosinophilia. The most effective therapy is long-term administration of therapeutic doses of a penicillinase-resistant antistaphylococcal antibiotic and adding other agents as required for specific infections. Brain abscesses are rare in HyperIgE syndrome [4].

Case report

10year old male presented to us with history of recurrent skin abscesses from the age of 6months, atopic dermatitis like rash over the neck from the age 4years and recurrent episodes of pneumonia from the age of 4 years. Skin abscesses were treated by Incision and Drainage and oral antibiotics. Atopic like rash over the neck responded to local antibiotic ointments. Each episode of pneumonia required inpatient management with IV antibiotics and supportive management. Frequency of recurrent pneumonias being 3-4per year. He developed pneumonia with pneumatocoele formation progressing to pyopneumothorax during an episode of severe pneumonia at the age of 9 years which required intercostal drainage. At the age of 10years, during an episode of pneumonia, he developed multiple brain abscesses. Culture of the abscess grew Staphylococcus aureus. Echocardiography done during that period showed ostium secondum ASD with bidirectional shunting with severe pulmonary hypertension. Detailed evaluation was done at a tertiary care centre for the cause of recurrent pneumonia and abscess formation which showed-microcytic hypochromic anemia with neutrophilic leucocytosis with eosinophilia, Sputum culture grew Staphylococcus aureus, Lymph node biopsy (done from posterior cervical lymph nodes) showed reactive lymphadenitis with increased eosinophils, AEC (absolute eosinophil count) was 9900/cmm, Bone marrow showed normoblastic marrow with

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increased eosinophils. Brain abscesses were drained by burr hole drainage and he was treated with appropriate IV antibiotics (Vancomycin) for 3 weeks.

He presented to us with an episode of severe pneumonia at the age of 10years. On examination he had- pallor, signs of chronic malnutrition (weight 18kg, height 120cm), healed scars of atopic dermatitis like rash over the neck, generalized lymphadenopathy, respiratory distress with bilateral extensive crepitations and grade 3 systolic murmur in pulmonary area with loud P2. We evaluated him for immunodeficiency. HIV was nonreactive and Immunoglobulin profile showed IgE- 2302IU/ml, IgG- 11.5gm/L, IgM- 0.92gm/L, IgA- 1.26gm/L. With all clinical features and investigations suggestive, a diagnosis of hyper-IgE syndrome was made. He was managed with appropriate IV antibiotics (Linezoild) for 2 weeks and he was put on prophylactic antibiotics (Co-trimoxazole) during discharge for Staphylococcal infections.

Brain abscesses which are unusual in HyperIgE syndrome were explained by the septic emboli from lung spreading to brain via a bidirectionally shunting ASD.

Discussion

The hyper-IgE syndromes are rare, complex primary immunodeficiencies characterized by clinical manifestation diversity, by particular susceptibility to staphylococcal and mycotic infections. Two distinct entities - the classical hyper-IgE syndrome which is inherited in an autosomal dominant pattern and the autosomal recessive hyper-IgE syndrome have been recognized. The autosomal dominant hyper-IgE syndrome is associated with a cluster of facial, dental, skeletal, and connective tissue abnormalities which are not observable in the recessive type(1).

The clinical triad of symptoms includes: 1) recurrent staphylococcal abscesses, 2) recurrent airway infections, 3) increased concentration of immunoglobulin E in serum (2). Atopic dermatitis like rash is typically the first manifestation of the disease. Severe recurrent respiratory infections are usually caused by Staphylococcus aureus, including *MRSA* and, less frequently by Haemophilus influenzae and Streptococcus pneumoniae. Pneumonias are typically complicated by lung abscesses, bronchiectases, bronchopleural fistulae and the formation of pneumatocele[5, 6]. Pulmonary sequelae lead invariably to the development of chronic respiratory insufficiency and are the main cause of mortality in Hyper IgE syndrome.

In the majority of affected individuals, characteristic constitutional features are noticeable, such as a coarse facies, rough skin, deep-set eyes, a prominent forehead, prognathism, thick lower lip and auricles, a wide nose and increased interalar distance [7, 8].

The hallmark of the syndrome is an increased concentration of immunoglobulin E in the serum. A value of 2000 U/ml is considered to be the cut-off point (3). Concentrations of IgG, IgA, and IgM are usually normal. Blood, sputum, and histologic sections of lymph nodes, spleen, and lung cysts show striking eosinophilia [4].

The most effective therapy is long-term administration of therapeutic doses of a penicillinase-resistant antistaphylococcal antibiotic and adding other agents as required for specific infections. IVIG should be administered to antibody deficient patients, and appropriate thoracic surgery should be provided for superinfected pneumatoceles or those persisting beyond 6 months. Kimata et al reported positive results of high-dose intravenous immunoglobulins, leading to the decrease in IgE concentration and in effective protection against severe infections. (9).

Brain abscesses are unusual in HyperIgE syndrome. Beitzke M et al reported Community acquired Staphylococcus aureus meningitis and cerebral abscesses in a patient with a hyper-IgE syndrome (10). Ayse Metin et al reported a case of Tubercular brain abscess in a case of Hyper IgE syndrome [11]. Congenital heart diseases accounted for 12.8% as the etiology of the brain abscesses in children in a study by S. Malik et al [12]. Congenital heart disease was the most common predisposing factor accounting for 35% of patients with brain abscess and Staphylococcus aureus was the most common pathogen in a study by Kai-Liang Kao et al [13**]**. Brain abscesses in our case were staphylococcal and occurred during an episode of Staphylococcal pneumonia in presense of a bidirectionally shunting ASD. Hence they were explained by the septic emboli

from lung spreading to brain via the bidirectionally shunting ASD.

This article highlights high index of suspicion of HyperIgE syndrome in patients with recurrent skin and lung infections with blood eosinophilia. These patients in addition to treatment of each episode of pneumonia and skin infections, need long term antibiotics with antistaphylococcal activity to prevent infections and to improve the quality of life.

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