مجلة المثنى للعلوم الصرفة
AL-Muthanna Journal of Pure Sciences (MJPS)
VOL.(3)...NO.(1) ….2016

Decrease of immunological parameters for down syndrome patients in Thi-Qar marshes

Alaa Abd- Alhasan Hamdan
Center of marshes researches

ABSTRACT

Down's syndrome are known to have increased susceptibility to infections. Quantitative or qualitative differences in the various components of the immune system could account for increased susceptibility to infection involving the upper respiratory tract and others. In an effort to establish certain normal values and to determine if humoral immune abnormalities are associated with the chromosomal anomalies of Down's syndrome, immunoglobulin levels, certain complement component levels, from a down syndrome patients were compared with those of age, sex and race matched control. Its appear there is an associated between abnormally low levels of immunoglobulins and complement component with down syndrome.

Introduction

The immunological response varies in the aging process. In children over the age of 6, the absolute number of IgG and IgA increases. IgM rates decrease in adolescence and throughout the aging process, there is a low number of circulating B cells (CD19), a decrease of CD4+, an increase of CD8 and NK cells. Patients with Down's syndrome (DS) are known to have an increased incidence of infections. It has been postulated that these infections may be associated with an immunodeficiency or immunoincompetency. To determine whether or not a humoral immunodeficiency exists, DS serum immunoglobulins G, M and A have been quantitated by many investigators with somewhat conflicting results 1,5,8,9,10,13, suggesting that more precisely selected DS and control populations should provide data for more definitive information. Down syndrome (DS) is the most common chromosomal anomaly among live-born infants, with an incidence of one in 600 to one in 900 in the United States [1,2]. DS is also the most frequent genetic cause of mental retardation and is associated with a high incidence of congenital cardiac and gastrointestinal tract anomalies [3]. Autoimmune phenomena, including hypothyroidism [3] and coeliac disease [4,5], and haematological abnormalities such as acute lymphoblastic leukaemia and transient myeloproliferative disease, occur at much higher frequency compared to non-DS individuals [6]. Alternatively, few studies have been carried out in which immunoglobulins D and E and complement components 3 and 4 have been quantitated. The present study compares immunoglobulin levels and complement levels in DS patients with age, sex and race matched control populations

Materials and Methods

Sera were obtained from 20(male and female) DS patients ranging in age from 8 to 35 years and 20 non-Down's patients from Thi Qar Marshes (during the period March–December 2013). Each DS patient had an age, race and sex matched control. Immunoglobulins G, M and A and complement components C3 and C4 were quantitated by radial immunodiffusion utilizing the Mancini endpoint technique. Immunoglobulin D was measured by the Fahey technique. IgE determinations were made by radioimmunoassay All of the immunoglobulin and complement determinations were run in duplicate against known standards, and the mean value of the two determinations recorded. Duplicate samples with differences exceeding 10 percent of their mean value were repeated. The Paired Student t test was used to detect differences in mean values between patient and control groups for all quantitative measurements since each patient was matched with his own control.

Results

In table 1 are shown the mean immunoglobulin levels for the DS patients and their respective controls. The DS inpatients were found to have IgM levels that were significantly lower than their controls; however, IgG and IgD levels were, significantly higher than their control group. No significant difference was found between these groups for levels of IgA or IgE. The mean C3 and C4 levels for the DS patients and their matched controls can be seen in table 2. DS patients were found to have C3 levels that were significantly lower than the control, while no difference was found between DS patient and control for levels of C4.

TABLE 1: Serum Immunoglobulin Levels of Downs Syndrome and Control

Immunoglobulin	Down syndrome			control			Significant level
	range	mean	SE	range	mean	SE	
IgA (mg/dl)	98-486	258.9	20.98	58-356	197.3	13.66	NS
IgM (mg/dl)	55-258	137.3	10.52	80-288	185.8	12.44	P < 0.01
IgG (mg/dl)	1120-2040	1534.2	50.53	560-1810	1130.8	55.11	P < 0.005
IgD (mg/dl)	4.1-12.0	7.2	0.44	0.3-10.0	4.3	0.49	P < 0.005
IgE (IU/dl)	20-3000	268.1	116.25	20-2600	597.7	160.88	NS

TABLE 2: Serum Complement Levels of Down's Syndrome and Control

Complement Component	Down syndrome			control			Significant level
	range	mean	SE	range	mean	SE	
C3 (mg/dl)	50-111	79.6	3.14	63-202	92.1	5.70	P < 0.05
C4 (mg/dl)	14-52	32.3	1.70	15-60	33.0	2.01	NS

Discussion

It appear that there is low levels of immunoglobulins, C3 or C4,in DS patients as compare with control. However, IgM was decreased for DS indicating a possible relationship with the syndrome itself. This deficiency could be due to several possibilities including decreased production or half life of the μ chains necessary for IgM synthesis.

It is not thought that the IgM produced is defective since these individuals are known to exhibit normal isoagglutinins and to produce a primary humoral response to antigenicstimulation both of which are primarily of the IgM class. The increased levels of IgG found in the institutionalized DS patients support the findings of Sutnick etal, who suggested that this increase is a response to persistent infection common to DS institutionalized populations. This increase may also be a compensation for the low levels of IgM as proposed by Stiehm and Fudenberg. Serum levels of IgA were found to be normal in DS. Increased levels of IgD were found in the patient of DS group which is in agreement with the work of Rundle et al. Since little is known about IgD, and its role in the defense has not been firmly established, the significance of this increase remains unknown at present. It does not seem probable that IgE synthesis is directly related to the chromosomal abnormality since IgE levels were the same or lower than the control. The mean IgE level for the inpatients was not significantly lower than the controls; however, only one DS inpatient had an IgE level greater than 800 IU per ml while the control group had six individuals exceeding this level. These findings are in agreement with those of Lopez [11]. in his study on an institutionalized DS population. All of the immunoglobulins measured, except IgD in the control group, were higher in the patient further supporting the theory of Sutnick et al, of increased immune responses in institutionalized DS populations owing to persistent infections. Complement should be assessed on patients with recurrent infections, especially if antibodies appear to be normal. C3, which is the complement component present in largest amounts in the serum and generally reflects the total complement activity, is often decreased in immune complex and autoimmune d iseases. C4 is present in lower concentrations than C3 and may be used as a more sensitive indicator of complement consumption. C4 is also involved in the classical antigen-antibody activation of the complement pathway but not the properd in or a alternate complement pathway. In certain disease states, depression of C4 concentration may precede and is often more marked than depression C3. Agarwal et al,[2] did not find levels of C3 and C4 in DS patients to be significantly different from healthy controls. In the present study C4 levels did not differ significantly from control populations. Although decreased C3 levels were found in the DS patients which were significantly different from their controls, these data do not seem to be of critical clinical significance since these levels of C3 approximate the lower limits of the normal range. It does not seem, therefore, that these two major components of the complement t system are quantitatively involved in the increased susceptibility of DS individuals to upper respiratory infections. The question as to functional capability of complement remains unanswered owing to our inability to freeze the sera before the complement was inactivated.

Referances

1. Adinolfi, M., Gardner , B., and Marin , W. Observations on the levels of *yG*, *yA*, and yM globulins, anti-A and anti-B agglutinins, and antibodies to *Escherichia coli* in Down's anomaly. J. Clin. Path. 20:860-864, 1988.

2. Agarwal , D. P., Srivastava, L. M., Benkmann, H. G., and Goedde , H. W. Studies on the polymorphism of C3,

Tfand Bg in Down's syndrome and other diseases. Springer-Verlag 29:23-28, 1975.
3. Blumberg, B. S., Gersly , B. J. S., Hungerford, D. A., London, W. T., and SUTNICK, A. I.: A serum antigen (Australia antigen) in Down's syndrome, leukemia, and hepatitis. Ann. Intern. Med. 66:924-930, 1990.
4. Buckley, R. H. and Dees, S. C.: Correlation of milk precipitins with IgA deficiency. New Eng. J. Med. 281:465-469, 1997.
5. Dyggve, H. and Clausen, J.: The serum immunoglobulin level in Down's syndrome. Develop. Med. Child Neurol. 72:193-196, 1998.
6. Fahey , J. L. and McKELVEY, E. M.: Quantitative determination of serum immunoglobulins in antibody-agar plates. J. Immunol. 94:84-90, 2000.
7. Gordon, M. C., Sinha, S. K., and Carlson, S. D.: Antibody responses to influenza vaccine in patients with Down's syndrome. Amer. J. Ment. Def. 75:391-399, 1991.
8. Greene, E. L., Shenker, I. R., and Karelitz, S.: Serum protein fractions in patients with Down's syndrome (mongolism). Amer. J. Dis. Child. 215:599-602, 1988.
9. Gr if f ith s , A. W., Sylvester, P. E., and BayliS, E. M.: Serum globulins and infection in mongolism. J. Clin. Path. 22:76-78, 1993.
10. Hayashi, H. and LOGRIPPO, G. A.: Humoral immune status of mongoloid children compared with other congenital defects: Quantitative and qualitative aspects of immunoglobulins. Health Lab Science 9:203-207, 1972.
11. Lopez,V.I.:Serum IgE concentration in trisomy 21.J.Ment. Defic. Res.28:111-114,1994.
12.Mancini, G., Carbonara, A. O., and Here- MANS, J. F. Immunochemical quantitation of antigens by single radial immunodiffusion. Immunochemistry 2 :235-254, 1985.
13. Rittner, C. and SCHWINGER, E.: Studies in Down's syndrome: II. Association studies with blood, serum and enzyme groups, and with the Au/SH antigen. Clin. Genet. 4:398-406, 2003.

انخفاض المستويات المناعية لمرضى متلازمة داون في اهوار محافظة ذي قار

م.د. آلاء عبد الحسن حمدان
جامعة ذي قار/ مركز أبحاث الاهوار

الخلاصة

ان الأشخاص المصابين بمتلازمة داون يكونون أكثر عرضة للإصابة بالأمراض مقارنة بالأشخاص الطبيعيين. وسبب دلك هو انخفاض المؤشرات المناعية لجهازهم المناعي،تضمنت هده الدراسة قياس الاميونوكلوبيولين (IgM, IGg, IgA, IgD, IgD) ومكونات نظام المتمم الثالث والرابع لعينة من مرضى متلازمة داون ومقارنتها بعينة السيطرة ،حيث تم ملاحظة فرق معنوي لانخفاض الاميونوكلوبيولين ونظام المتمم الثالث مقارنة بالاشخاص الطبيعين.