

## Paramyxoviruses and *Multiple Sclerosis*

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### **Abstract:**

Multiple Sclerosis (MS) is a progressive neurological disease characterized by periods of quiescence and exacerbation, epidemiological data suggest the notion that MS is an acquired autoimmune disease caused by environmental factors, probably infectious, in genetically susceptible individuals. The submitted research was attempted to study the possible viral (Paramyxoviruses) role in MS, the sera of 57 MS patients were assayed for anti-measles and anti-mumps IgG antibodies using ELISA technique, the results were compared in order to establish the presence or absence of a significant difference regarding both number of positive cases and antibodies titer between the two groups, the results revealed that there is no in number of measles positive cases in both MS patients and controls while a significant difference in number of positive cases of mumps and measles anti-measles IgG titer and a highly significant difference regarding mumps IgG Abs titer between the two studied groups, this may be considered as a preliminary indicator to the role of those two paramyxoviruses in MS.

**Key words:** Multiple sclerosis, mumps, measles

### **Introduction:**

Multiple Sclerosis, shortly referred to as (MS), is a neurological disease usually begins in the early adulthood with an autoimmune inflammatory "strike" against component of the myelin sheath, paralysis, sensory disturbance, lack of coordination and visual impairment are common features, relapsing-remitting phase often lasts 5-10 years but about 30% of individuals with this form of disease enter the chronic –progressive form which characterized by inability to walk, the disease progress insidiously [1].

Although many papers interpret MS as an autoimmune response, others accept the fact that MS is in part an inflammatory response to environmental agents such as viruses as fundamental cause, especially measles virus [2,3,4].

Viruses employment in MS etiology is based on epidemiological evidence of childhood exposure to infectious agents and increase disease exacerbations with viral infections, normal immune response to a variety of viruses and analogy with animal models and other human disorders in which viruses can cause diseases with long incubation period, relapsing-remitting courses and demyelination [3,5] Paramyxoviruses have been more thoroughly investigated than others because of the similarities of the viral envelope to the plasma membrane of host cells [6].

### **Materials and Methods:**

A total number of 57 blood samples have been collected from patients already diagnosed as multiple sclerosis cases from Baghdad Teaching

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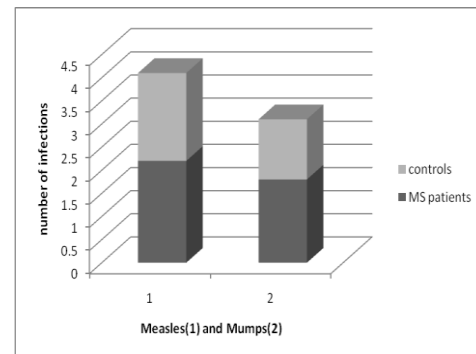
hospital/medical city/Baghdad from the period 1<sup>st</sup> July to the 1<sup>st</sup> September/2009 from both sex another 34 samples have been collected from healthy blood donors from both sex also. All samples have been centrifuged at 3000 rpm/15 min. to get sera which were liquated to small eppendorf tubes, to avoid repeated freezing/thawing cycles and stored at -20 C° each sample submitted for classic ELISA technique -indirect method- with chromogenic substrate to detect anti-IgG antibodies against measles (human Gesellschaft fur Biochemica und Diagnostica mbh, Wiesbaden. Germany) and mumps (human Gesellschaft fur Biochemica und Diagnostica mbh, Wiesbaden. Germany).

### Results:

It was found that most of the MS patients were female, M:F number was 19:38 and so M:F ratio was 1:2 comparing to 20:14 among the control group, representing 1.4:1 M:F ratio. (Chi square 5.650, DF:1, P-value<0.05),referring to the presence of a significant difference between the two groups regarding sex.

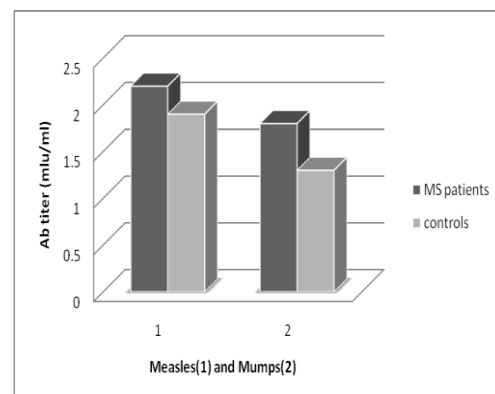
Age for MS patients ranged from 22-55 years old, the age mean was 36.8 years old while the age of the control group ranged 23-55, with age mean 32years old.

It was found also that there was no significant difference regarding the number of patients( 56 out of 57 ) and controls ( 33out of 34 )carrying anti-measles-IgG antibodies(Abs').(Chi square 0.14, DF:1, P-value>0.05) while there was a significant difference regarding the number of patients (56 out of 57) and controls (27 out of 34) carrying anti-mumps IgG Abs'(Chi square 6.971, DF:1, P-value<0.05).(figure-1).



**(Fig.1)Comparison between number of MS patients and controls infected with Measles and Mumps**

Concerning the antibody titer, it was found that there is a significant difference between anti-measles and anti-mumps IgG Ab titer of patients (2.2mlu/ml) comparing to that of controls (1.9mlu/ml), (sig.0.011, P-value<0.05) on the other hand, a highly significant difference was detected between MS patients (1.8mlu/ml) and healthy controls (1.3mlu/ml) concerning anti-mumps IgG Ab titer (sig.0.000,P-value<0.001)(figure-2).



**(Fig.2)Comparison between MS patients and controls regarding anti-Measles and anti-Mumps IgG Ab titer**

### Discussion:

Depending on the given results it is clear that most of MS infections occurred among females more than males M:F ratio is 1:2 this finding matches results reported before that approximately 10<sup>6</sup> individuals are

afflicted with MS, women with the disease outnumber men two-one[1],this may spot the light to the possible role of sex hormones in appearance and/or relapses Multiple sclerosis.By comparing number of positive cases for anti-measles and anti-mumps IgG Abs' between MS patients and controls, it was found that there is no significant difference between number of positive cases for anti-measles between patients and controls while there is a significant difference regarding number of patients and controls carrying anti-mumps antibodies.Concerning the titer of anti-measles and mumps Abs, a significant difference can be detected between the titer of anti-measles IgG antibodies of MS Patients and controls while a highly significant difference is detected concerning anti-mumps IgG antibodies titer between those two groups.The results above pointed to the possible role of viral infection in MS, it could be suspected that a virus acts as either a direct etiological agent for MS or a cofactor increases the disease intense and triggers relapses.

One of the observations that supported our speculation that Many microbial proteins homologs with structures found on the myelin sheath ,this leads to an attack on myelin via a process called "molecular mimicry"[1].

Moreover, relapses in MS is often triggered by a common viral infection viruses such as HHV-6, influenza, measles, papillomaV6 and EBV, those viruses have genes encoding sequences that mimic those found in the major structural proteins of myelin[1] depending on results obtained in this study, mumps virus could be added to those viruses.

To date measles seem to be the most seriously incriminated virus in the etiopathogenesis of MS, mumps ranking second[6] several studies have identified measles virus as being in the

fore front of the etiological picture, that comes from several facts including the association between measles and demyelination and oligodendrocyte damage [7]while the submitted research revealed that mumps ranks first and then measles.The exact link between viruses and MS still unrevealed and the researchers continue to explore possibilities, one of the logical theories is the autoimmune action,Perhaps the immune system cells mistake the viral protein and attack the myelin.

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## فيروسات ال ( paramyxo viruses ) ومرض تصلب الاعصاب المتعدد

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### الخلاصة:

يعتبر مرض تصلب الاعصاب المتعدد احد الامراض العصبية والتي تتميز بفترات من السكون والهيجان ويعتقد انه احد امراض المناعة الذاتية المتسببه عن احد العوامل البيئية ومنها الاصابات الفيروسية في الاشخاص المهيئين وراثيا لظهور المرض. البحث المقدم يهدف لدراسة دور بعض الفيروسات من عائلة ال ( paramyxo ) وهما فيروسي الحصبة والنكاف، حيث تم جمع 57 عينة دم لاشخاص مصابين بالتهاب الاعصاب المتعد من مستشفى بغداد التعليمي | مدينة الطب | بغداد و 34 عينة لاشخاص غير مصابين بهذا المرض كمجموعة سيطره وتم فحص هذه العينات للاجسام الضاده نوع ( IgG ) لفيروسي الحصبة والنكاف ومقارنة نتائجهم من حيث عدد الاصابات والحجم العياري للاجسام المضاده ( antibody titer ) ومقارنتهم لملاحظة وجود فرق معنوي بين المجموعتين من عدمه، اوضحت النتائج عدم وجود فرق معنوي في عدد الاصابات بالحصبة بين المجموعتين بينما الفرق معنوي فيما يخص عدد المصابين بالنكاف اما قياس الحجم العياري للاجسام المضاده للمجموعتين فقد اثبت ان الفرق معنوي بما يخص فيرس الحصبة بينما تم تسجيل فرق معنوي عالي لفيروس النكاف، مما تقدم ممكن ان نستنتج ان للاصابه الفيروسيه بشكل عام دور في مرض تصلب الاعصاب المتعدد بشكل مباشر او غير مباشر وخصوصا فيروس النكاف.