Clinical, Neuro-Immunological, Neurophysiological, Neuro-Radiological Studies in Multiple Sclerosis

Thesis

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Introduction

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Abbreviations

MS -—- Multiple Sclerosis.

CSF —- Cerebrospinal fluid.

Gd-DTPA —-Gadolinium-diamine-triamnic- penta acetic acid.

PVP — Perventricular plaques.

VEP — Visual evoked potential.

BAEP — Brainstem & auditory evoked potential.

SEP —- Somatosensory evoked potential.

BBB — Blood Brain Barrier.

MRI — Magnetic Resonance Imaging.

SPECT —- Single Photon Emission Computed Tomography.

CT —- Computed Tomography.

FS — Functional Systems.

EDSS — Expanded Disability Status Scale.

NPN — Negative-Positive- Negative (Waves of VEP).

TNF — Tumor necrosis Factor.

IL1 — Interleukin 1.

C3 — Complement 3.

C4 — Complement 4.

ATT — Alpha 1 antitrypsin.

IgA — Immunoglobulin A.

IgM — Immunoglobulin M.

IgG — Immunoglobulin G.

IgD — Immunoglobulin D.

IgE — Immunoglobulin E.

HLA — Human leucocytic antigen.

MRS — Magnetic Resonance Spectroscopy.

MHC — Major Histocompatibility complex.

CD — Cell of differentiation.

T4+ — T helper, inducer lymphocytes.

T8+ — T-suppressor, cytotoxic lymphocytes.

TGF — Tumor growth factor.

LN — Lymph node.

MALT —- Mucosa associated lymphoid tissue.

NK — Natural killer cells.

TCR — T- cell receptor.

IFN — Interferon.

APCS — Antigen presenting cells.

SD — Standard deviation.

Da — Dalton.

MBP — Myelin basic protein.

RT — Repetition time.

TE —- Echo time.

RR — Remitting-Relapsing.

Q — Albumin quotient.

PD — Proton Density (of MRI).

T1 wt. Image — Tl Relaxation time weighted image (of MRI).

T2 wt. Image — T2 Relaxation time weighted image (of MR1).

REVIEW OF LITERATURE

EPIDEMIOLOGY AND ETIOLOGY

Epidemiology and Etiology

- Multiple sclerosis is the most common untreatable neurological disease that causes disability among young adults. It is defined as an inflammatory demyelinating disease, which affects different parts of the central nervous system through the destruction of myelin sheath (which is a fatty material that insulate nerves and allowing the nerve to transmit its impulses rapidly). Resulting in an inflammatory response that produces any number of symptoms including: blurred vision, staggering gait, numbness, dizziness, tremors, slurred speech, bowel and bladder problems, sexual impotence in men and paralysis, (O'Connor P. et al 1994).

- Multiple sclerosis has a very specific geographic distribution around the world. As a significantly higher incidence of the disease is observed in the northern latitudes of the Northern Hemisphere as compared to the southern latitudes. While in the Southern Hemisphere this gradient is reversed, (meaning that there is an increased rate of multiple sclerosis as we get away from the equator). However, there are a few notable exceptions to this previous general pattern of distribution. Found in Japan where surveys have shown multiple sclerosis uncommon and in Israel where it is found common, regardless to the location of both countries from the equator. (Kurtzke J.F. 1995)

- Therefore, the world is divided into three large clusters:
    - Low incidence areas: including Arabia, Tropical countries and Asia.

- Medium incidence areas: including southern regions of the U.S.A.
- High incidence areas: including northern U.S.A, northern European countries and Australia.

(Adams R.D. et al 1997).

Fig. (1) Geographic distribution of multiple sclerosis worldwide Coated from (Fox C.M.Adams R.D. et al 2004).

Prevalence and Incidence:

- Compston D.A. et al (1993) calculated the prevalence of multiple sclerosis worldwide to be from 10 to 200 cases per 100,000 Populations. They assured that multiple sclerosis had a prevalence of less than 1 per 100.000 in equatorial Africa, from 6 to 20 per 100.000 in the southern United States and southern Europe and from 30 to 150 in Canada and northern U.S.A.

- Lauer K. et al (1994) estimated the prevalence of multiple sclerosis in the United Kingdom to be from 90 to 150 per 100.000 populations, compared to that of Finland, which reached up to 200 per 100.000 populations.