

NEMATODE FILARIAL WORMS IN CEREBROSPINAL FLUID OF A MULTIPLE SCLEROSIS PATIENT AT AUTOPSY

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ABSTRACT

Multiple Sclerosis is classified according to current Nosology As a human neurodegenerative [demyelinating] disorder, which is favored to be an autoimmune process. The actual causation of Multiple Sclerosis has not been agreed upon. Loss of Myelin in the Brain and Spinal Cord tissues, is accompanied by diverse additional microscopic abnormalities in the Plaques of MS. Subsequent investigation raised the possibility of Chronic Deep Brain and Spinal cord Spirochetal Infections { Steiner, Ichelson, Marshall and others} as the de facto cause of Mylein loss in Multiple Sclerosis. Herein, is described image based evidence for the detection of cerebrospinal fluid infection/Infestation with worms, probably vectored by Ixodid Ticks (Ref. 3), to produce Nematode Filarial CSF infection which is followed by Worm {Nematode Filarial } invasion of the Brain Solid tissue to produce areas of Myelin Destruction, which typify the clinical and pathological signatures of Multiple Sclerosis in the Human host. It is herein proposed, that the worms enter the deep brain white matter regions via direct extension from CSF worm infestations, and that worms slough their outer sheath tissues as detritus. A cascade of host responses which terminates in the destruction of axonal Myelin, and entire brain neural and glial elements produces Multiple sclerosis. Further host insult by the Invading worms in deep brain White matter ensues from the comet like trail of Nematode Filarial Eggs and Zygotes in brain tissue. Collectively, the Worm Foreign material terminates in a host response which destroys the native architecture of the White matter. The inciting Worm in Brain tissue may not be evident at autopsy, because the worms may either have died or moved to a new topographical site remote from the Plaques.

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INTRODUCTION

An Autopsy examination of the Brain and Cerebrospinal fluid was completed in the Case of an 80 year old man. His Clinical Diagnosis at the time of Death was Multiple Sclerosis, based on clinical and Radiology Imaging Studies.

Prior to removal of the Brain, samples of Cerebrospinal Fluid were harvested from the lateral ventricles of the brain. Formalin Fixation of the Brain using "Brain Formalin" were completed over three weeks. The fixed Brain and Cerebrospinal fluid were shipped to the Rocky Mountain Multiple Sclerosis Brain Bank, Boulder Colorado. The Cerebrospinal fluid was Frozen. Upon completion of the Neuropathology examination of the Brain, the Brain Bank was petitioned to provide Cerebrospinal fluid for microscopic and Molecular DNA Probe investigation to investigate the possibility of An infectious etiology for the Multiple Sclerosis using FISH DNA Hybridization with DNA probes specifically designed to bind to DNA of *Burgdorferi borrelia* (sl) family of organisms and to *Miyamotoi Borrelia* DNA. Dark field examination was included in the Cerebrospinal fluid examination.

METHODS AND MATERIALS

Cerebrospinal Fluid Harvest at Autopsy: Aspiration of The Cerebrospinal fluid in the Right and Left Lateral ventricles of the brain with a Syringe and a long bore hypodermic needle produced clear, colorless cerebrospinal fluid . No blood or tissue was visible by gross examination. Thin film preparations of the CSF were prepared on clean glass microscopic slides by placing two drops of CSF on a slide and then using the tip of a sterile plastic pipette, gently swirling the fluid in a circular arc centrifugally, to produce a thin film of CSF which covered the central third of the glass slide. The thin films on glass slides were allowed to air dry in a dust free container. Thin films were fixed in 100% denatured ethanol for 30 minutes. Fixed thin films of CSF were then air dried in a dust free space. The slides were Stained with 1% Toluidine Blue O Stan { American Mastertech Scientific Inc (Item STTBO) for 30 minutes. The slides were then Washed three times in distilled H2O, Air dried with a Hair dryer, cover slipped with Cover Safe histology mounting Medium (Non-Fluorescent) and examined with a 10x Fluorite Ph2 DL microscope objective on a Zeiss Axioskop microscope with White light illumination through An Oil Dark field N.A. 1.4 Condenser with a .. Images were photographed with a 12.Megapixel camera.

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RESULTS

Larval Nematode worms,[but no Conclusive Adult Nematodes or Adult Filarial worms] (species to be determined by DNA sequencing) were identified on every glass slide prepared from Cerebrospinal fluid. Zygote forms, Cuticle debris, and Worm eggs were identified and photographed; with special attention to the Morphology of the Mouth and Tail regions. Each worm revealed subtle variations in microscopic anatomies . The possibility of more than one species of worm simultaneously infecting the Cerebrospinal fluid could not be excluded.



DISCUSSION

This case study is the very first in the world's scientific literature to link a parasitic infestation of human cerebrospinal fluid with concurrent Multiple Sclerosis verified by autopsy. Previous reports of helminthic infestations of the eye, brain, spinal cord and extracranial viscera by helminthic infections in veterinary and in human patients are numerous. In 1880, Evans described "SURRA" caused by a trypanosome in India in horses and mules with "lumbar paralysis. In 1942 African Sleeping sickness was linked to trypanosomiasis .Helminthic central nervous system parasitoses as a group of disorders are vectored by blood sucking insects. Ixodid ticks have recently been added to the list of vectors of Nematode filarial worms.[Ref.3] Japanese reports of the "nematode" "cause and effect relationship between *malacia* lesions in brain and spinal cord and nematode CNS infestations were published in year 1939. Multiple Sclerosis in Humankind is a "*malacia*" lesion. Because of the tissue wandering behavior of larval nematodes, the worm may have moved beyond the area of "*malacia*" And "subsequent to the production of trauma, be found free in the craniovertebral canal" [Ref.1.]

CONCLUSIONS

1. Unconcentrated cerebrospinal fluid from a Multiple Sclerosis patient contained numerous larval nematode filarial worms, zygote forms, eggs, and sloughed cuticle fragments.
2. Injuries in the model of veterinary Cerebrospinal Nematodiasis induced Brain and spinal cord malacia lesions exactly recapitulate the pathology of human Multiple Sclerosis.
3. Ixodes Scapularis ticks are capable of vectoring Nematode Filarial worms through regurgitation of their gut contents into the human blood stream

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