A Novel Scoring System for Lyme's Disease; a Spirochetal Infection

Spirochetes are elongated spiral Gram-negative bacteria that cause some globally prevalent infections such as syphilis (*Treponema pallidum*), leptospirosis (*Leptospira* spp.), Lyme's disease (LD) (*Borrelia burgdorferi*), and relapsing fever (*B. recurrentis*).[1] They are distinguished from the other bacteria by the location of their flagella that help them to move in a twisting fashion. Furthermore, a conserved signature indel has been found exclusively shared by all spirochetes species in the flagellar basal-body rod protein FlgC which is an important part of the unique endoflagellar structure shared by spirochetes species.[1] They are not easy to culture using routine culture techniques and need dark-field microscopy for visualization.[1] Diagnosis of the most spirochetal infection requires proper history taking and good clinical examination in addition to the laboratory tests that are available.

Leptospira spp. causes acute febrile illness that can be rapidly fatal even before the diagnosis is confirmed. It mimics scrub typhus, dengue, chikungunya, malaria, and viral exanthems during the first few days of illness.[2] There is no specific test to diagnose leptospirosis within the 1st week. Therefore, modified Faine's criteria comprising clinical signs, symptoms, and laboratory values have been recommended to reach a final diagnosis of leptospirosis.[2] Utilization of a composite scoring system has greatly helped in making a diagnosis of leptospirosis in field settings.[2]

People suffering from syphilis and LD often do not report early due to the nonserious nature of their initial stages. Both infections have a chronic progressive illness that ultimately involves skin, peripheral, and central nervous system; cardiovascular system; and musculoskeletal system.[3,4] In late stages of syphilis and LD, many patients develop isolated organ dysfunction, and it is common for the unsuspecting physicians to miss the real diagnosis in such cases.[3,4] This is why both LD and syphilis have been called "the great imitators."[1]

Patients of LD have been wrongly diagnosed as multiple sclerosis, rheumatoid arthritis, fibromyalgia, chronic fatigue syndrome, and Crohn's disease.[5] Prompt diagnosis and early treatment of LD are necessary to prevent permanent damage to the nervous system in LD.[6] Even after completion of the treatment of LD, up to 20% of patients may experience intermittent of progressive symptoms after 12 months.[3]

The recommended two-tier diagnostic test for LD using ELISA and Western Blot was found to have a false negative rate of 36%.[7] Therefore, the diagnosis of LD has to be made clinically in almost one-third of the cases. The center for disease control (CDC) has given a long list of signs and symptoms to be looked for in suspected patients of LD in addition to the two-tier testing.[8]

The article "A Novel Scoring System Approach to Assess Patients with Lyme Disease (Nutech Functional Score [NFS])" published in an earlier issue describes a score named NFS that according to the authors is a 43-point directional and positional scoring system.[9] NFS utilizes 43 symptoms associated with LD where each symptom has been graded into five positions or grades in the same direction (bad to good). Each position from bad to good for each symptom has an associated score. The patient answers in yes or no for each symptom position, and based on the response each symptom gets a score. The total NFS score is to be determined at the time of the diagnosis. Low score indicates bad and high indicates good condition. The authors claim that this score can be utilized both for diagnosis and monitoring the treatment response of LD.

The NFS for LD is currently and the only statistically validated score for monitoring the effect of LD treatment. The score has been derived from the symptoms described by the LD patients treated in Nutech Mediworld since 2000.

The possible drawback of the score includes the absence of erythema chronicum migrans (ECM), a sign that makes the diagnosis of LD certain. The absence of ECM from the scoring system diminishes its utility in making a diagnosis of LD. The NFS, however, is designed not primarily for the diagnosis, but for the monitoring of treatment effect on LD after the diagnosis is made. According to the CDC, alone in the US, an estimated 3,00,000 new cases of LD are happening every year.[5] The bacterium of LD is not easy to culture, and the laboratory tests have poor sensitivity (70%).[7] In such circumstances, the diagnosis and follow-up of LD are largely based on clinical signs and symptoms. The NFS holds a promise and now, awaits its further validation in larger studies in different centers across the world.

To conclude, there was a felt need for a good scoring system for the diagnosis of LD. The NFS is slightly lengthy but relatively easy to administer functional score without any ambiguity regarding the categorization of patient responses and should prove to be an excellent tool for monitoring of treatment response in LD patients.

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