SYMPHILIS, YAWS & LYME BORRELIOSIS

Dr BJ Hudson

Microbiology & Infectious Diseases, Royal North Shore Hospital St Leonards NSW 2065
bhudson@med.usyd.edu.au

Abstract:

Syphilis, yaws and Lyme borreliosis have particular issues that confound interpretation of their serology results. Whilst most laboratory scientists and medical practitioners are comfortable with the known issues surrounding syphilis serology, serology for yaws and Lyme borreliosis presents special issues that may raise new or unusual problems.

Yaws is one of the endemic non-venereal treponematoses caused by Treponema pallidum subspecies pertenue, a spirochete that is almost identical to the causative agent of the venereal treponematosis, syphilis (Treponema pallidum subspecies pallidum). Other endemic treponematoses include bejel (Treponema pallidum ss endemicum) and pinta (Treponema carateum). Yaws is the most common occurring mainly in poor communities in warm, humid tropical areas of Africa, Asia, Latin America and Western Pacific with the less common being Bejel (Sahel region of Africa and Arabian Peninsula) and pinta (Latin America). These infections have no non-human reservoir. Mass eradication campaigns using long-acting penicillin injections in the 1950s-60s reduced global numbers by 95% but yaws reappeared in the 1980s. Renewed attempts at eradication saw WHO eradication initiatives launched in 2012 and success stories such as eradication in India (no new cases since 2004). While diagnosis is mostly clinical, serology is important to confirm or exclude transmission. Typically RPR tests on children aged 1-5 years are performed in serosurveys, with negative results excluding the diagnosis and transmission. Specific treponemal tests usually are not done, but have been developed for field tests. Serology behaves similarly to syphilis - specific tests can stay positive for life. The main problem in developed countries is interpretation of positive specific treponemal tests in sera sent for diagnosis or for antenatal screening. With global population movements, it is likely that more persons in developed countries who have had an endemic treponematosis will present with positive specific treponemal tests. An approach to these patients is described.

Lyme borreliosis (LB), controversial from the time that mothers in Connecticut USA queried the diagnosis of JRA in children who had reported strange bullseye lesions following tickbite to 2013 in Australia where existence of a local spirochete cause is hotly debated. While LB is still a clinical diagnosis when a typical skin lesion occurs at the site of tickbite, other clinical manifestations, in the absence of such skin lesions, are problematic. Specific PCR on skin lesions, synovial fluid and cerebrospinal fluid can be confirmatory but PCR still lacks adequate sensitivity. Culture of the organism remains the gold standard test but is not available in many centres. Positive cultures reported in the literature are overwhelmingly from skin lesions. Accordingly, most cases are diagnosed by serology. Screening tests are typically EIA or IFA, commercial or in-house. IgM and combined IgG and IgM assays commonly yield false positive results, so separate IgM and IgG assays are preferred as screening tests. Traditionally, two-tier testing has been recommended whereby positive screening tests are followed with western blots, with various and controversial interpretative criteria (e.g. CDC vs MiQ 12 plus VlsE). This approach has been questioned with the availability of newer generation EIAs that incorporate the Vmp-like sequence, expressed (VlsE) protein or an immunodominant, largely conserved 25-mer oligopeptide (C6 peptide) corresponding to the sixth invariable region within VlsE. The pros and cons of dropping the two tier approach will be discussed.