JC Virus Antibody Testing for Patients With MS: A Review

Context
Multiple sclerosis (MS) is an unpredictable, often disabling, disease of the central nervous system. Canada has one of the highest rates of MS in the world. Natalizumab is an effective treatment for MS; however, it can result in progressive multifocal leukoencephalopathy (PML) — a rare and often fatal disease. PML is caused by John Cunningham virus (JCV), and approximately 60% to 80% of people have antibodies to the virus indicating previous exposure. However, JCV does not usually cause disease in healthy individuals.

Technology
Screening for JCV by detecting its DNA in blood and urine samples does not appear to be sensitive enough and does not correlate well with PML risk. Another diagnostic approach involves detecting antibodies to JCV in the serum of patients. The Stratify JCV test (Biogen Idec) is a two-step, virus-like, particle-based, enzyme-linked immunosorbent assay (ELISA) designed to detect serum anti-JCV antibodies in MS patients. Quantitative anti-JCV antibody assays have also been developed.

Issue
The availability of anti-JCV antibody tests may allow for the identification of MS patients who may be at increased risk of developing PML with natalizumab use. Determining the diagnostic accuracy of tests for JCV in patients with MS will help guide decisions about whether to test patients who are considering treatment with natalizumab. A review of guidelines and protocols will also contribute to the decision-making process.

Methods
A limited literature search was conducted of key resources, and titles and abstracts of the retrieved publications were reviewed. Full-text publications were evaluated for final article selection according to predetermined selection criteria (population, intervention, comparator, outcomes, and study designs).

Key Messages
For identifying MS patients who are risk for developing PML with natalizumab treatment:
- The reviewed antibody tests for JCV identified anti-JCV antibodies in 50% to 60% of patients taking or considering taking natalizumab.
- No evidence-based guidelines or testing algorithms for JCV antibodies were found.
- All patients who developed PML tested positive for antibodies.

There is currently no gold-standard test to identify all JCV-infected patients, making it difficult to determine the true diagnostic accuracy of anti-JCV antibody tests.

Results
The literature search identified 193 citations of which 5 were deemed potentially relevant. No potentially relevant reports were identified through grey literature searching. Of the 5 reports, 4 prospective observational studies met the criteria for inclusion in this review.

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