Genetic Testing for Mitochondrial Disorders

DESCRIPTION

Mitochondrial disorder (MD) refers to approximately 40 different disorders, presenting mostly in childhood (usually by age 10), affecting one or more organ systems and varying in degree of dysfunction; all caused by mutations in either the mitochondrial and/or nuclear DNA. The prevalence of mitochondrial disorders is approximately 1 in 5000 births in the US. No known cure exists for any of the disorders. Currently less than half of the named disorders have an identified genetic cause, and the presence of the gene variant does not predict the severity of the disorder. While larger expanded panels (e.g. GeneDx®) or mitochondrial genome sequencing may be useful in diagnosing a mitochondrial disorder, whole exome sequencing does not sequence mtDNA.

Some of the more common named mitochondrial disorders are: Leigh Syndrome (LS), mitochondrial encephalomyopathy lactic acidosis with stroke-like episodes (MELAS), Leber hereditary optic neuropathy (LHON), and Neuropathy ataxia retinitis pigmentosa (NARP). The diagnosis of a mitochondrial disorder can be difficult, as symptoms often mimic other disorders such as Autism, and Parkinson’s. In addition, the symptoms of the various mitochondrial disorders often overlap. Standard tests used in diagnosing a mitochondrial disorder may include:

- Levels of certain substances in a sample of blood or cerebrospinal fluid
- Magnetic resonance spectroscopy (detects abnormalities in the brain's chemical makeup)
- Imaging studies of the brain such as MRI or CT scan
- Electroencephalography (EEG)
- Electrocardiography and echocardiography
- Muscle biopsy

Treatment of mitochondrial disease is largely supportive, as there are no specific therapies that impact the natural history of the disorders.

POLICY

- Genetic testing (single gene or multi-gene panels) to confirm the diagnosis of a mitochondrial disorder may be considered medically necessary if the medical appropriateness criteria are met. (See Medical Appropriateness below.)

- Targeted genetic testing for a known familial variant of at-risk relatives may be considered medically necessary as part of a preconceptual evaluation if the medical appropriateness criteria are met. (See Medical Appropriateness below.)

- Pre- and post- genetic counseling as an adjunct to genetic testing itself is considered medically necessary.

MEDICAL APPROPRIATENESS

- Genetic testing of a mitochondrial disorder is considered medically appropriate if ANY ONE of the following criteria are met:
  - To confirm the diagnosis of a mitochondrial disorder with ALL of the following:
    - Clinical signs and symptoms are consistent with a specific mitochondrial disorder
    - The diagnosis cannot be made with certainty by clinical and/or biochemical evaluation (e.g., one or more of the standard tests such as metabolite analysis of blood and/or urine sample)
At-risk relatives as part of a preconceptual evaluation if ALL of the following:

- There is a diagnosed mitochondrial disorder in a parent, sibling, or previous child of sufficient severity to cause impairment of quality of life or functional status
- The specific genetic variance has been documented to be associated with a mitochondrial disorder

IMPORTANT REMINDERS

- Any specific products referenced in this policy are just examples and are intended for illustrative purposes only. It is not intended to be a recommendation of one product over another, and is not intended to represent a complete listing of all products available. These examples are contained in the parenthetical e.g. statement.

- We develop Medical Policies to provide guidance to Members and Providers. This Medical Policy relates only to the services or supplies described in it. The existence of a Medical Policy is not an authorization, certification, explanation of benefits or a contract for the service (or supply) that is referenced in the Medical Policy. For a determination of the benefits that a Member is entitled to receive under his or her health plan, the Member's health plan must be reviewed. If there is a conflict between the Medical Policy and a health plan, the express terms of the health plan will govern.

ADDITIONAL INFORMATION

Mitochondrial disorders are either inherited maternally, or when both parents carry the recessive trait. When a disorder is severe enough to cause impairment and/or disability in a sibling or previous child of either parent, genetic testing prior to future reproductive decisions is a reasonable choice.

SOURCES


**EFFECTIVE DATE**

10/1/2017

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