The Journal of Advanced Health Informatics

The Journal of Advanced Health Informatics

JAHI

ISSN: e – 2456-9313 Available from URL: http://mbnc.edu.in/UTUJAHI.html

RESEARCH ARTICLE

GAUCHER'S DISEASE

Lecturer, Maniba Bhula Nursing College

ARTICLE INFO

Article History:

Received on:12/09/2019

Received in: 15/09/2019

Accepted on: 20/09/2019

Published online on:25/09/2019

Key Words:
Gaucher's disease

Corresponding Author:

ABSTRACT

Gaucher's disease is an inherited disorder. It is most common in Jewish people of Eastern and Central European. The National Gaucher's Foundation (United States) states the incidence of Gaucher's disease is about one in 20,000 live births. Around one in 100 people in US is a carrier for type I Gaucher's disease, giving a prevalence of one in 40,000. The tradition of consanguineous marriages are responsible to increase the frequency of Gaucher's disease in India. It is the result of a buildup of certain fatty substances in certain organs, particularly spleen and liver. Due to that organ get enlarge and can affect their function. The fatty substances also can build up in bone tissue, weakening the bone and increasing the risk of fractures. An individual patient requires optimal monitoring, enzyme therapy and genetic counseling for good prognosis

Introduction

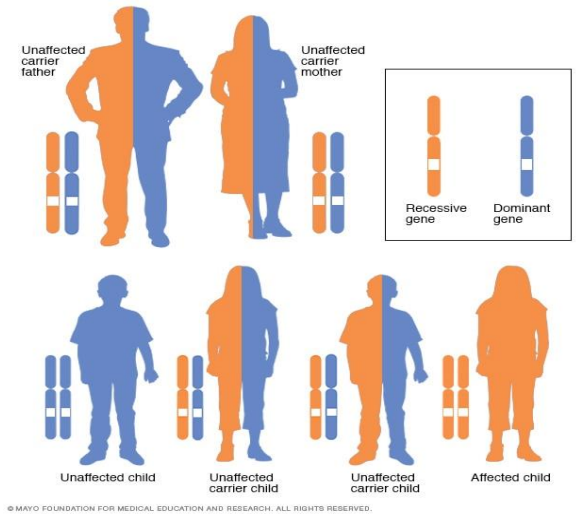
The disease was first recognized by the French doctor Philippe Gaucher's, who originally described it in 1882 and lent his name to the condition. During his observation, he thought the patient died of leukemia. However, during the autopsy, he discovered that the spleen wasn't just engorged—the organ itself had enlarged cells. Those enlarged cells are now known as Gaucher's cells, and the enlarged spleen is a hallmark of the disease. It seems likely that the frequency of Gaucher's disease may be higher in India. Of more than 300 mutations catalogued in Gaucher's disease, L444P appears to be the most prevalent in India.

Meaning of Gaucher's disease

Gaucher's disease is a inherited disorder. It is the result of a buildup of certain fatty substances in certain organs, particularly spleen and liver. This causes these organs to enlarge and can affect their function. The fatty substances also can build up in bone tissue, weakening the bone and increasing the risk of fractures. If the bone marrow is affected, it can interfere with blood's ability to clot. An enzyme that breaks down these fatty substances doesn't work properly in people with Gaucher's disease.

Causes

Gaucher's disease is passed along in an inheritance pattern called autosomal recessive. Both parents must be carriers of a Gaucher's changed (mutated) gene for their child to inherit the condition.



Risk factors

People of Eastern and Central European Jewish (Ashkenazi) ancestry are at higher risk of developing the most common variety of Gaucher's disease.

Types

There are mainly three types.

- Type 1 - Nonneuronopathic Gaucher's disease
- Type 2 - Acute neuronopathic Gaucher's disease
- Type 3 - Chronic neuronopathic Gaucher's disease

Genetics

Homozygosity for L444P mutation typically results in neuronopathic disease. The three types of Gaucher's disease are autosomal recessive. Both parents must be carriers for a child to be affected. If both parents are carriers, the chance of the disease is one in four, or 25%, with each pregnancy for an affected child. Each type has been linked to particular mutations. In all, about 80 known GBA gene mutations are grouped into three main types: Type I (N370S homozygote), the most common, also called the "non-neuropathic" type. Type II (one or two alleles L444P) is characterized by neurological problems in small children. The enzyme is hardly released into the lysosomes. Prognosis is poor: most die before the age of three. Type III (also one or two copies of L444P, possibly delayed by protective polymorphisms).This group develops the disease somewhat later, but most die before their 30th birthday.

Pathophysiology

The disease is caused by a defect in housekeeping gene for lysosomal glucocerebrosidase (also known as beta-glucosidase, on the first chromosome (1q22). The enzyme is a 55.6-kilodalton, 497-amino acid-long protein that catalyses the breakdown of glucocerebroside, a cell membrane constituent of red and white blood cells. In Gaucher's disease, the enzyme is unable to function correctly and glucocerebroside accumulates. The macrophages that clear these cells are unable to eliminate the waste product, which accumulates in fibrils, and turn into 'Gaucher's cells', which appear on light microscopy to resemble crumpled-up paper.

Signs and symptoms

While Gaucher's disease manifests with vast clinical heterogeneity, it has traditionally been differentiated into the following three clinical subtypes, delineated by the absence or presence of neurologic involvement and its progression:

Patients with type 1 disease commonly present with painless splenomegaly, anemia, or thrombocytopenia. They may also have chronic fatigue, hepatomegaly (with or without abnormal liver function test findings), bone pain, or pathologic fractures and may bruise easily because of thrombocytopenia. Bleeding secondary to thrombocytopenia may manifest as nosebleeds, bruising, or both.

Patients with type 2 disease may present at birth or during infancy with increased tone, seizures, strabismus, and organomegaly. Failure to thrive, swallowing abnormalities, oculomotor apraxia, hepatosplenomegaly, and stridor due to laryngospasm are typical in infants with type 2 disease.

Individuals with type 3 disease have neurologic involvement, most often including slowing of the horizontal saccadic eye movements.

More rarely, Gaucher's disease affects the brain, which can cause abnormal eye movements, muscle rigidity, swallowing difficulties and seizures. One rare subtype of Gaucher's disease begins in infancy and typically results in death by 2 years of age.

Diagnosis

Abdominal examination is helpful to determine the Gaucher's disease. It also requires the monitoring of standardized growth charts, lab tests, imaging scans and genetic counseling.

Lab tests

Blood samples can be checked for levels of the enzyme associated with Gaucher's disease. Genetic analysis can reveal whether you have the disease.

Imaging Tests

People diagnosed with Gaucher's disease typically require periodic tests to track its progression, including:

- **Dual energy X-ray absorptiometry (DXA).** This test uses low-level X-rays to measure bone density.
- **MRI.** Using radio waves and a strong magnetic field, an MRI can show whether the spleen or liver is enlarged and if bone marrow has been affected.

Preconception screening and prenatal testing

Genetic screening, family history of Gaucher's disease, prenatal testing is require to see if the fetus is at risk of Gaucher's disease.

Treatment

A variety of treatments can help to control symptoms, prevent irreversible damage and improve quality of life. People with mild symptoms don't need treatment. Routine monitoring to watch for disease progression and complications is enough for disease progress.

A) Medications

Many people who have Gaucher's disease have seen improvements in their symptoms after beginning treatment with:

1) Enzyme replacement therapy. This approach replaces the deficient enzyme with artificial ones. These replacement enzymes are given in an outpatient procedure through a vein (intravenously), typically in high doses at two-week intervals. Occasionally people have an allergic or hypersensitivity reaction to enzyme treatment.

2) ***Miglustat (Zavesca).*** This oral medication appears to interfere with the production of fatty substances that build up in people with Gaucher's disease. Diarrhea and weight loss are common side effects.

3) ***Eliglustat (Cerdelga).*** Approved by the Food and Drug Administration in 2014 for treating the most common form of Gaucher's disease, this drug also seems to inhibit the production of fatty substances that build up in people with this this condition.Possible side effects include fatigue, headache, nausea and diarrhea.

*4)****Osteoporosis drugs.*** These types of medication can help rebuild bone weakened by Gaucher's disease.

B) Surgical and other procedures

If symptoms are severe then doctors suggest for:

Bone marrow transplant. In this procedure, blood-forming cells that have been damaged by Gaucher's disease are removed and replaced, which can reverse many of Gaucher's signs and symptoms. Because this is a high-risk approach, it's performed less often than is enzyme replacement therapy.

Spleen removal. Before enzyme replacement therapy became available, removing the spleen was a common treatment for Gaucher's disease. Now this procedure typically is used as a last resort.

Conclusion

Gaucher's disease is inherited disorder. It seems likely that the frequency of Gaucher's disease may be higher in India. So it is very necessary to make awareness among the people about disease condition and its treatment. For better prognosis an individual patient requires optimal monitoring of the condition, enzyme therapy and genetic counseling.

References

1. Ellen Sidransky, Gaucher's disease. Medscape [online,cited on 23rd september 2019]. Available from URL: https://emedicine.medscape.com/article/944157-overview.
2. Mayo clinic, Gaucher's disease. January 2008; [online,cited on 23rd september 2019]. Available from URL: https://www.mayoclinic.org/diseases conditions/gauchers-disease/symptoms-causes/syc-20355546
3. Organization for rare diseases in India, Gaucher's disease, [online, cited on 23rd September 2019]. Available from URL: https://ordindia.org/diseases/gaucher-disease/
4. Ratna Dua Puri, Diagnosis and Management of Gaucher's Disease in India, Indian Pediatric 2018 [online, cited on 26 september 2019]. Available from URL: https://ordindia.org/diseases/gaucher-disease/.
5. Wikipedia Gaucher's disease. January 2008; [online,cited on 25th september 2019]. Available from URL: https://en.wikipedia.org/wiki/Gaucher%27s_disease.