What is HSP?

What is Hereditary Spastic Paraplegia?

Hereditary Spastic Paraplegia (HSP) is a broad group of inherited, degenerative disorders characterised by impaired walking due to spasticity and weakness of the legs. The primary features of HSP are spasticity and weakness with the proportions varying from individual to individual. Symptoms worsen over time. Diagnosis is primarily by neurological examination and testing to exclude other disorders. Specialised genetic testing and diagnosis is now available in several countries.

Also known as

Hereditary Spastic Paraplegia (HSP) is also called Familial Spastic Paraplegia or Paraparesis (FSP) and Strumpell-Lorraine Syndrome, as well as other less commonly used names including Spastic Paraplegia, Hereditary Charcot-Disease, Spastic Spinal Paralysis, Diplegia Spinalis Progressiva, French Settlement Disease, Troyer syndrome, and Silver syndrome. Hereditary Spastic Paraplegia is the most common name used in the USA, Europe and Australia.

Prevalence

The disease has been reported in nearly every country. Frequency estimates vary widely (from 0.5 to 12 people per 100,000 of population) and are an estimate or approximation as highly reliable data is not available. Based on studies on prevalence, a rate of 7.4/100,000 of population has been estimated globally. No differences in rate relating to gender were found. Average age of symptom onset is 24 years old. There is also juvenile onset HSP which can show up in children of any age and tends to be associated with more severe symptoms.

Being rare, it is a low profile disease globally, largely unknown in the general population, and receiving little medical research attention.

Worldwide, HSP is thought to be under-diagnosed as mild cases (which go undiagnosed). A percentage of people with HSP mutations, quoted in some places as high as 25%, do not show symptoms ever. Misdiagnosis – commonly as Multiple Sclerosis, Cerebral Palsy or Primary Lateral Sclerosis – is not uncommon. Total numbers affected are consequently likely to be significantly underestimated.

Symptoms

HSP is most commonly characterised by muscle stiffness, spasm and weakness in the legs. Most frequent onset is in early adulthood (2nd to 4th decade) but can be as late as the 50's or even later for some. A lesser onset peak is in children under 6 years old. Onset symptoms are commonly the occasional stumble, trip or fall while walking due to the foot 'dragging' somewhat and the toes catching. An awkward gait also develops. Some reflexes may become exaggerated and the arches of the feet may increase in height.

Progression of the disease often results in the need for a cane or walker and more severe cases ultimately require a wheelchair. A wide variety of symptoms are observed across cases and over time given the degenerative nature of the disease. Now that so many gene mutations have been identified as causing HSP, it may explain some of the variation in both symptoms and severity between cases. The majority of individuals with HSP have a normal life expectancy.

Less common symptoms include urinary urgency. Even less commonly, the upper limbs and voice can be affected, particularly in severe, early onset cases. In rare, 'complicated' forms it can be accompanied by other neurological symptoms including optic neuropathy and retinopathy (eye diseases), dementia, mental retardation, ataxia (lack of muscle control), icthyosis (skin disorder), peripheral neuropathy (commonly tingling or numbness in hands or feet) and deafness. Many other diseases can also possibly complicate the symptoms of HSP if present.

Cause

HSP is a genetic, inherited or hereditary disease – that is, it is passed on from generation to generation. It is caused by abnormal variations (mutations) in the genes that may be passed on from an affected parent to the unborn child in their DNA (genetic material).

The number of genes identified has increased, and many more discoveries are to be expected. Multiple mutations have also been identified. Any of these identified mutations can cause HSP. Specifically, they cause the production of too much or too little of either the normal protein or another protein that cause nerve damage through degeneration of the corticospinal tracts. The long nerves (axons) are prevented from doing their critical job of controlling the muscles. Hence HSP is classed as an expanding group of rare inherited neurological movement disorders. They belong to the group of Motor Neuron Diseases (MND).

See http://www.emedmd.com/content/motor-neuron-diseases

Although most HSP is inherited from parents, this is not always the case. When a genetic disease occurs without any family history or genetic defects in the parents, the disease is called a "sporadic" genetic disease. The cause is usually a random gene mutation that occurred somewhere in the development of the unborn child. In this way, rare cases of HSP are possible even if neither parent has an HSP mutation. It is an explanation of how the disease occurred in the first place. In such cases, the risk of a reoccurrence in a second child is very low, but genetic testing is the only reliable way to check whether or not the parents have an HSP mutation, even if neither of them has any HSP symptoms.

Genes & Heredity

'Autosomal dominant' (AD) HSP is the predominant form of the disorder, accounting for 70-80% of all cases. It occurs when the child inherits the defective gene from a parent and this defective gene dominates the normal corresponding gene from the other parent. The probability of hereditary transmission to the child if one parent has HSP is 50% for (AD)HSP.

So, a dominant or strong defective gene will need only one copy to cause disease, but a weak defective gene will need two copies, one from each parent, to cause disease (known as recessive).

The term “carriers” is often used to describe people who have a single copy of a weak defective gene, and do not show any HSP symptoms. If two parents who are both “carriers” have children, there is a chance that they will pass on the genetic defect to their children. The combination of genes given to the child will decide whether the children are unaffected and have normal genes (25%), are carriers themselves (50%), or develop the disease (25%). Only those children unlucky enough to inherit two copies of the weak, defective gene will develop the disease. This type is referred to as ‘autosomal recessive’ (AR) HSP.

Is there a cure for HSP?

At present there is no cure for HSP, nor any way to reverse the disease nor halt its’ progress.

Instead, medical care consists of therapies targeted to each individual’s specific symptoms. That includes physical therapy to maintain muscle tone, range of motion and flexibility, medications to address spasticity, and sometimes orthotic devices to deal with foot and ankle problems.

Some HSPers report benefits from treatments as diverse as ankle / foot surgery where tendons are relocated.

Occupational therapy and antidepressants are often useful for maintaining quality of life. Genetic testing is available, and genetic counseling is important

Read more at LIVING WITH HSP .

Research

Research towards a cure is now a major focus, with fundraising for it a bottleneck globally and an urgent need in any possible way.

There is also a lack of sufficient information available on management and treatment of symptoms to maintain mobility and quality of life for HSPers, another area badly needing research funding.

Understanding HSP in more depth

- https://hspersunite.org.au/about-hsp/what-is-hsp/ On this website you will find a lot of information about HSP and research
- https://sp-foundationorg.presencehost.net/understanding-pls-hsp/hsp.html
- https://sp-foundationorg.presencehost.net/understanding-pls-hsp/heredity-and-genetics.html
- https://sp-foundationorg.presencehost.net/understanding-pls-hsp/treatments.html

- On this website is a link to a HSP booklet in PDF format that you can download. It covers the basics of HSP and contains a lot of useful information in plain English, non-medical language… definitely worth a read!
- Another good resource on this website is a dictionary of useful words related to HSP called Words to Know, also in PDF format that you can download. It includes a multitude of both common and technical/medical terms and provides a ready reference to help understand more about the condition.
-
- https://rarediseases.org/rare-diseases/hereditary-spastic-paraplegia
- https://www.ucl.ac.uk/cnr/docs/nhnninfo/Spasticity_information_for_patients
-
- https://www.uclh.nhs.uk/PandV/PIL/Patient%20information%20leaflets/Managing%20Spasticity.pdf
-
- http://www.nhs.uk/conditions/foot-drop/Pages/Introduction.aspx Find out about foot drop, a muscular weakness or paralysis that makes it difficult to lift the front part of your foot and toes.
-
- http://www.nhs.uk/conditions/Incontinence-urinary/Pages/Introduction.aspx
-
- http://www.brainandspine.org.uk/fatigue-and-neurological-conditions
-
- http://www.nhs.uk/Conditions/social-care-and-support-guide/Pages/mobility-equipment-wheelchairs-scooters.aspx
-
- https://www.flexyfoot.com/
-
- Browse around the Australian website and check out the RESOURCES section.
- Our German colleagues have an excellent resource on their website (go to English).
- Dr. John Fink of the University of Michigan, a recognised authority on HSP, has published widely on the condition. He has authored a comprehensive overview of HSP that is updated from time to time.
- Wikipedia, the online encyclopaedia, also provides a good overview of HSP.
- Following article of the Medscape-site is an excellent 'one-stop shop' for learning about HSP. It is divided into the following sections:
    - Overview
    - Differential Diagnoses & Workup
    - Treatment & Medication
    - Follow-up
    - Multimedia
- https://www.nature.com/scitable/definition/nonsense-mutation-228