



Synonyms of Fraser Syndrome

- Cryptophthalmos-Syndactyly Syndrome
- Cryptophthalmos Syndrome
- Cyclopism
- Fraser-Francois Syndrome
- Meyer-Schwickerath's Syndrome
- Ulrich-Feichtiger Syndrome

Understanding Fraser Syndrome

A look at how Fraser Syndrome – a rare, non-sex linked genetic disorder – causes a wide range of abnormalities, particularly vision loss.

Compilation: Leonard Lau and Yvonne Tan; Photo: stock.xchange

A very rare* genetic disorder occurring in less than one of every 100,000 births, Fraser Syndrome was first described by a Canadian geneticist, C R Fraser, in 1962.

Inherited as an autosomal recessive* genetic trait, the causative gene for Fraser Syndrome (FRAS1) has recently been localised to 4q21. About 15% of cases were born to parents of the same lineage.

Affecting both sexes, Fraser Syndrome is distinguished principally by these congenital abnormalities:

- Cryptophthalmos - partial or complete fusion of the eyelids
- Syndactyly - webbed fingers and/or toes
- Genital malformations
- A sibling who is also affected with Fraser

Syndrome (the syndrome has a recurrence risk of 25% among siblings)

A child is diagnosed with Fraser Syndrome if he or she presents at least two of these four major characteristics. Cryptophthalmos is present in 93% of cases, whereas syndactyly occurs in 54% of the affected population.

The diagnosis is also arrived at when the child has at least two major attributes and one minor attribute, or at least four minor attributes.

Minor attributes include anomalies of the nose, ears (malformations of the middle and outer ear that may result in hearing deficit) and larynx, oral clefts, umbilical hernia, renal agenesis (absence or incomplete

development of the kidney), skeletal anomalies and mental delay.

Associated Symptoms

Due to multiple malformations of different body organs, a child with Fraser Syndrome is likely to suffer from at least partial visual, hearing or speech impairment, among other symptoms.

Another co-morbidity found in most children with Fraser Syndrome, intellectual impairment is mainly caused by hydrocephaly (an abnormal amount of water within the brain) or malformation (in some cases even absence) of one of the brain cavities.

Abnormalities of kidneys, lungs and digestive system are also quite common in patients. Renal malfunctions in affected infants may include improper development (dysplasia), underdevelopment (hypoplasia) or absence of one or both kidneys (unilateral or bilateral renal agenesis).

The most serious and life-threatening abnormalities associated with Fraser Syndrome are those of the kidneys and the

larynx. Lack of kidney function or blockage of the larynx is usually the cause of death for those who are stillborn or die within the first year of infancy.

25% of affected infants are stillborn, while 20% die before the age of one year from renal or laryngeal defects. If these anomalies are not present, the life expectancy is almost normal.

Although complications of the Fraser Syndrome are manifested as secondary conditions, symptoms or other disorders, the distinction between symptoms and complications is unclear or arbitrary in many cases.

Moving On

Fraser Syndrome is caused by specific gene mutations, which alter the death of normal cells to the extent of generating overgrowth of certain tissues, leading to fused eyelids and fused fingers or toes as mentioned above. There is no known method of prevention except genetic counselling.

Surgery and other forms of corrective

treatment are often required for those surviving Fraser Syndrome-affected children. Thanks to advances in genetic counselling technologies, medical professionals nowadays find it more effective in carrying out the diagnosis, prenatal treatment and management of Fraser Syndrome.

Ultrasonographic diagnosis of the syndrome is now feasible at 18 weeks gestation. It can be made if two of the following signs are present:

- Microphthalmia - one eye being abnormally small
- Syndactyly
- Enlarged echogenic lungs
- Oligohydramnios - deficiency in amniotic fluid during pregnancy

Following clinical diagnoses, patients, parents and caregivers alike are rendered proper support and assistance in comprehending the medical facts of the syndrome, understanding the way heredity contributes to it, and making the best possible adjustments to it.

* Ophanet, a consortium of European partners, currently defines a condition rare when it affects one person per 2,000.

* A pattern of inheritance in which both copies of an autosomal gene must be abnormal for a genetic condition or disease to occur. An autosomal gene is a gene that is located on one of the non-sex chromosomes. When both parents have one abnormal copy of the same gene, they have a 25% chance with each pregnancy that their offspring will have the disorder.

Sources:

- "Multiple Congenital Anomaly/Mental Retardation (MCA/MR) Syndromes: Fraser Syndrome", Jablonski's Multiple Congenital Anomaly/Mental Retardation (MCA/MR) Syndromes Database
- National Organization for Rare Disorders
- Online Mendelian Inheritance in Man
- Orphanet
- TheFetus.net
- WrongDiagnosis.com