Why did this happen?
When children are conceived the genetic material is copied in the egg and sperm that makes a new child. The biological copying method is not perfect and occasionally random rare changes occur in the genetic code of children that are not seen in the DNA of their parents. This happens naturally and is not due to your lifestyle or anything you did to cause a change in the GATAD2B gene.

In 6 out of 8 children with GATAD2B syndrome who have been described and in whom the parents were investigated, the change in the GATAD2B gene occurred out of the blue (de novo) in the child. One mother was found to carry the same change in the GATAD2B gene as her child. In another child the mother carried the change in some of the cells of her body, but not all. Doctors call this mosaicism. The mother had no developmental problems or learning difficulties herself.

A spontaneous change in the GATAD2B gene cannot be prevented. No environmental, dietary or lifestyle factors are known to cause a spontaneous change in the GATAD2B gene. No one is to blame when they occur and nobody is at fault.

Can it happen again?
The risk of having another child affected by a rare gene disorder depends on the genetic code of the parent. If neither parent is found to carry the change in the GATAD2B gene, the chance of having another child with GATAD2B syndrome is very low. Nonetheless, there is a small chance that some of the egg cells of the mother or some of the sperm cells of the father carry the change in the GATAD2B gene (germline mosaicism). This means that parents who are not found to carry the change in the GATAD2B gene still have a very small chance of having another child with GATAD2B syndrome. If the genetic analysis of the parents of a child with GATAD2B syndrome shows that one of them carries the same variant, the chance of it happening again is much higher. Each family situation is different and a clinical geneticist can give you specific advice on the chance of recurrence in your family and, if applicable, options for testing regarding future pregnancies.
What is GATAD2B syndrome and how is it caused?

GATAD2B syndrome is a condition in which children have developmental delay and/or intellectual disability. GATAD2B syndrome occurs when one of the two copies of the GATAD2B gene has lost its normal function. This can be caused by a spelling mistake in the gene or the loss of (a part of) one copy of the gene as a result of the deletion of the part of the chromosome on which the gene is located. GATAD2B syndrome was first described in 2013.

Genes are instructions which have important roles in our growth and development. They are made of DNA and are incorporated into organised structures called chromosomes. Chromosomes therefore contain our genetic information. Chromosomes are located inside our cells, the building blocks of our bodies.

The GATAD2B gene is important in the development and maturation of the brain. This is why GATAD2B syndrome is primarily associated with developmental delay and/or intellectual disability.

Families say ...

“She can’t talk, but does communicate. She takes your hand and has her own language.” 18 years old

“Maaike is forty years old and her mobility is good. She can’t ride a bike by herself.”

Medical concerns

Low muscle tone (hypotonia)

Six children with GATAD2B syndrome had low muscle tone. In some children muscle tone improved as they got older. Low muscle tone can result in a delay in reaching certain developmental milestones such as sitting, rolling, crawling and walking. It may also contribute to potential feeding difficulties.

Epilepsy

Three out of 10 children with GATAD2B syndrome had epilepsy. They showed a type of seizure in which they lose consciousness for a brief moment (seconds). This may cause them to abruptly stop what they are doing and not respond to their surroundings. Sometimes they show automatic movements in their faces or hands. Doctors call this absence epilepsy. Absence epilepsy is suspected in a fourth child with GATAD2B syndrome.

Hearing and vision

Four out of 10 children had strabismus (squint). Two children are longsighted (hypermetropic). Two other children possibly had difficulties distinguishing depth. One of these two children has difficulties seeing in the dark. Yet another child was hypersensitive to light. Hearing appears normal in most children. One child is hypersensitive to sounds and has high frequency hearing loss.

Management recommendations

Children with GATAD2B syndrome should be followed up by a general paediatrician who can oversee care so that development and behaviour can be monitored and the best help in the form of physiotherapy, occupational therapy, speech therapy, and behavioural therapy can be given.

Sources and references

The information in this guide is drawn from what is known about children with GATAD2B syndrome from the medical literature. Articles that have been used are: Willemsen 2013 and Hamdan 2014. In addition, a number of parents of Dutch children with GATAD2B have participated in the development of this guide by filling out a questionnaire about their child.

Development and behaviour

Growth and feeding

Growth appears normal in children with GATAD2B syndrome. Two out of 10 children had growth at the 5th per centile, which means they belonged to the smallest 5 per cent (out of 100 children, 95 were taller). Two children had a large head circumference (macrocephaly).

Five children have difficulties swallowing, of whom 4 dribble. One girl also had constipation. Two other children are said to have feeding difficulties. Another child suffered from gastro-oesophageal reflux (in which feeds return readily up the food passage) until she was 1½ years old.

Sitting, moving and walking

Children with GATAD2B syndrome show a delay in reaching developmental milestones such as sitting and walking. Six children who could walk, learned how to walk at a mean age of 27.5 months (range 18 – 36 months).

Speech

Most children with GATAD2B syndrome have a delay in speech development. Two children did not speak and 3 children spoke only single words. Children often understand more than that they are able to express.

Learning

All children with GATAD2B syndrome have intellectual disability or learning difficulties. This is usually severe. However, there are differences. One mother of a child with GATAD2B syndrome was found to carry the change in the GATAD2B gene. She experienced learning difficulties as a child.

Behaviour

Children with GATAD2B syndrome can be happy and upbeat. But behavioural problems are common. Some children show autistic features, hyperactive behaviour, self-mutilation or aggressive behaviour. Three children had sleeping difficulties. Three children have a high threshold for pain.

Can it be cured?

There is no cure as the effects of the genetic change took place during your baby’s formation and development. However, knowing the diagnosis means that appropriate monitoring and treatment can be put in place for your child.

How many people have this condition?

Up to now, 6 children with a defect in the GATAD2B gene have been reported in the medical literature. This guide is based on information about 10 individuals with a defect in the GATAD2B gene, including 5 of the 6 children previously described in the medical literature.

With the increasing use of the latest ‘gene sequencing’ technology, it is expected that more people will be diagnosed with this condition over the next few years.

Most children with GATAD2B syndrome have:

- Developmental delay and/or intellectual disability
- Low muscle tone (hypotonia) during childhood
- Behavioural problems.

More information on these and other features is given in this guide.

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