Cerebral palsy may be hereditary

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Cerebral palsy is a neurological developmental disorder which follows an injury to the immature brain before, during or after birth. The resulting condition affects the child's ability to move and in some cases also causes mental retardation, epilepsy or impairmed vision and hearing. There are several sub-groups of CP and the degree of symptoms varies greatly from group to group and from person to person.

It was previously believed that most CP cases were caused by lack of oxygen at birth. However, more recent research has shown that probably only ten per cent of all cases are caused by delivery conditions.

A new study shows that some of the risk for CP can be traced to the child's relatives and may be caused by hereditary factors.

Sketched Norway's family tree

Researchers used data from the Medical Birth Registry of Norway for everyone born in Norway between 1967 and 2002. Together with anonymised data from the Central Population Registry of Norway, they also figured out how these people are related, giving the researchers an overview of several thousand Norwegian siblings, parents, aunts, uncles and cousins.

In order to establish which of these people have CP, researchers linked their data with the Norwegian social insurance scheme which in part issues cash benefits to people with various types of chronic disease. Beneficiaries are listed with their specific diagnosis in the scheme's registry.

"The data we receive are anonymised, so we cannot identify individuals," said Mette Tollånes, the study's lead author.

Amongst approximately two million children, the researchers identified 3,649 who were diagnosed with CP.

Signs of heredity

The researchers saw clear signs that CP may be inherited.

If parents had twins and one child was diagnosed with CP, then it was 15 times more likely that the other twin would have CP too, compared with all the families in the study.

If parents had one child with CP, it was almost nine times more likely that the next sibling also hadthe same diagnosis. If the child was a half-sibling, then the probability was lower but still about three times higher

than average.

If at least one parent had CP, then it was about six times more likely that the child also had the diagnosis.

The researchers believe that this kind of clustering within families may be due to heredity, either directly or through an inherited vulnerability to (unknown) environmental factors.

"The closer a child is related to someone with CP, the greater the probability that he or she will have the condition. We have seen this kind of pattern for other diseases where multiple genetic and environmental factors work together as a cause for disease," Tollånes said.

Search for cause goes on

Although this study shows that genetics play a role in CP, much is still unknown about what actually causes the condition. Despite the fact that maternity care in Norway has improved, the percentage of births leading to a CP diagnosis has remained stable.

The researchers are now collaborating with colleagues in Denmark to find the reason for this.

The CP-study "MOBAND" aims to chart several environmental factors which might increase the risk of CP, e.g. parents' weight, diet during pregnancy, smoking and caffeine-intake, infections during pregnancy, and premature birth.

The study uses data from two major cohort-studies—the Norwegian Mother and Child Cohort Study, and the Danish National Birth Cohort study. A total of 200,000 pregnancies in Norway and Denmark were followed, and participants have provided researchers with detailed

information on their health and lifestyle. In this study, data were linked tothe Danish Patient Registry and the Norwegian CP-registry to chart which of the children are living with CP.

The Norwegian Mother and Child Cohort Study

The Danish National Birth Cohort study

The BMJ study on heredity and CP is based on data from the Medical Birth Registry and the Norwegian social insurance scheme, and therefore uses a quite different data set from the MOBAND study. The fact that the two studies use such differing data sets enables researchers to explore possible CP-causes from multiple angles. The conclusions also become more robust.

"Researchers like to see similar results from several studies in order to find them credible," said Tollånes .

More information: M. Tollånes et al.: "Familial risk of cerebral palsy: population based cohort study." *BMJ* , DOI: 10.1136/bmj.g4294

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