Dangerous swelling in babies linked to mutated gene

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Credit: Anna Langova/public domain

Scientists have discovered a new gene mutation that causes potentially fatal swelling in unborn and newborn babies. Identifying the gene is the first step toward a future diagnostic test and targeted treatment for this condition.

Geneticists at St George's, University of London found that people inheriting a defect in the PIEZO1 gene from both their mother and father are at more risk of developing non-immune hydrops fetalis (NIHF). This condition frequently leads to miscarriage or death of the baby shortly after birth through a build up of fluid in two or more vital parts of the unborn baby's body, such as the lungs and abdomen.

Those babies with NIHF who survive clear the retained fluid and initially are unaffected by the condition. However, these babies may later develop a condition called Generalised Lymphatic Dysplasia (GLD) which is characterised by serious swelling in areas such as the face, limbs or genitals as well as internal organs such as the lungs or intestines.

Professor Sahar Mansour, lead clinician for the study and clinical geneticist at St George's, said: "Hydrops fetalis affects 1 in 1,000 babies. Many of these babies die either in the womb or shortly after birth. Some of the causes of this condition are already known, but in approximately 50 percent of cases, the cause is never identified.

"Our publication describes mistakes in the PIEZO1 gene as a cause of hydrops fetalis. Babies who survive the period immediately after birth frequently do well, although they may later in childhood develop other areas of swelling, medically referred to as lymphoedema.

"The PIEZO1 gene appears to be crucial for the maturation of the lymphatic system. Understanding this maturation process will lead to better, more targeted treatment of hydrops fetalis and lymphoedema."

To the scientific community, the study is significant as it is the first time the PIEZO1 gene has been linked to the development of the lymphatic system, which is crucial for the control of swelling both before and after birth. Previously this gene has been recognised for its importance for red blood cell stability and as a genetic cause for a type of anaemia.

The findings are a result of a study screening the DNA of six families with 10 affected individuals. Lead researcher, Dr Pia Ostergaard, senior lecturer in Human Genetics at St George's said: "Our study followed six unrelated families who have had children with GLD and reported cases of hydrops fetalis.

"What is characteristic for the affected children is that NIHF and childhood onset of swelling in the face and all four limbs is frequent. Some of the children become extremely unwell with acute swelling of the face due to bacterial infection which must be treated promptly. This is another important

new finding for GLD."

More information: "Novel mutations in PIEZO1 cause an autosomal recessive generalized lymphatic dysplasia with non-immune hydrops fetalis." *Nature Communications* 6, DOI: 10.1038/ncomms9085

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