MedicalXpress

New hope for 'bubble baby disease'

September 13 2017

Babies born with Severe Combined Immune Deficiency (SCID) syndrome are defenceless against bacterial and viral infections that would be virtually harmless to most healthy people. If untreated, SCID is often fatal within a baby's first year of life.

Research led by the University of Hong Kong has resulted in a new testing regime that could speed up the diagnosis of SCID, allowing more infants to receive life-saving treatment within a critical timeframe.

For the best chance of survival, infants with SCID should be treated as soon after birth as possible, and preferably within three-and-a-half months. However, poor recognition of SCID by front-line doctors is leading to delays in diagnosis, later treatments and poorer outcomes.

The authors of a recent study, published in open-access journal *Frontiers in Immunology*, have developed a "checklist" of potential SCID markers: a family history of early infant death, persistent candidiasis (often presenting as persistent thrush), Bacillus Calmette-Guérin (BCG) infections, and low absolute lymphocyte counts. "Flagging" an infant showing any one of these four factors would allow potential SCID patients to be fast-tracked for further tests and treatment.

Many countries - including much of Asia and the UK - do not test for SCID in their newborn health-screening programmes, with front-line doctors often left to diagnose the fatal condition. By using this checklist, the authors believe that identification, and hence treatment, of SCID patients will be possible much sooner.

Without a working immune system, newborns with SCID are highly vulnerable, and many will repeatedly visit doctors with serious and recurring infections before being diagnosed.

"The recognition of SCID by doctors is poor in Asia, resulting in delayed diagnoses that jeopoardize the chance of treatment success," explains lead author Professor Yu Lung Lau, who focused his research on Asian and North African patients. "We wanted to see if we could identify any clinical features that would help doctors to diagnose SCID earlier."

The study of 147 patients looked at how long it took for doctors to diagnose SCID, relative to the age the babies were first brought to their doctors, and what symptoms they had.

They found that it took an average of two months for babies to be diagnosed, and that the average age at diagnosis was four months old - beyond the critical age for treatment (which is usually stem cell transplants or gene therapy) to begin.

As the researchers examined the data, four SCID "markers" emerged. Taken in isolation, none helped reduce the time taken for a diagnosis. However, 94% of the patients studied showed at least one of the four factors.

"Family history of early infant death due to infection was useful to aid earlier diagnosis, but it was not due to doctors realizing the importance of the family history, but rather due to the family taking the child to see the doctors earlier," says Lau. "This demonstrates the failure of our medical training and systems in using family history to aid earlier SCID diagnosis."

Candidiasis emerged as one of the most common infections. Unfortunately, as thrush is relatively common in all infants, its presence

actually slowed down the time to diagnosis.

Complications from the BCG vaccination also appeared frequently, and over 88% of the patients in the study had a very low absolute lymphocyte counts (ALC).

"Our main recommendation is to perform lymphocyte subsets for any infant with one or more of the following clinical features: family history, persistent candidiasis, BCG infections and ALC less than 3x10^9/L", explains Lau. "This would confirm the diagnosis of SCID, if present".

For the time being, newborn screening remains out of reach in much of Asia, so education of front-line doctors and parents is key.

"Our recommendations may help earlier diagnosis of SCID, and need to be communicated to doctors as well as to ordinary citizens, who can then urge the doctors along our recommendation," concludes Lau.

More information: Anderson Dik Wai Luk et al, Family History of Early Infant Death Correlates with Earlier Age at Diagnosis But Not Shorter Time to Diagnosis for Severe Combined Immunodeficiency, *Frontiers in Immunology* (2017). DOI: 10.3389/fimmu.2017.00808

Provided by Frontiers