INNOVATION PARTNERSHIPS
UNIVERSITY OF MICHIGAN

Transepidermal Water Loss as an Anaphylaxis Monitoring Tool

TECHNOLOGY NUMBER: 2022-036

OVERVIEW

Transepidermal water loss (TEWL) as an early detection method for anaphylaxis

- A safe and specific method to monitor outcomes during an oral food challenge
- Utilizes an existing and reproducible technology to measure transepidermal water loss

BACKGROUND

Food allergy (FA) afflicts nearly 5.6 million children in the United States per year and may lead to food anaphylaxis, a potentially fatal whole-body allergic reaction. Anaphylaxis causes the immune system to release a flood of chemicals that can cause decreased blood pressure as well as narrowing of the airways. Signs and symptoms include a rapid, weak pulse, a whole-body skin rash, and nausea with vomiting. The resulting fear of FA in children translates to unnecessary food avoidance which impedes proper nutritional intake and causes intense anxiety for parents and their children.The most common methodologies for evaluating children for FA include assessing skin sensitivity to allergens or measuring blood test components, each of which are associated with false positive rates of more than 30%. The most accurate method for measuring FA is an oral food challenge (OFC) where a child eats the food that may cause anaphylaxis while being monitored for a reaction and treated safely by an allergist. However, in very young children the lack of expressive language delays anaphylaxis symptom detection, impacting challenge cessation and potentially anaphylaxis severity. Therefore, a need exists for an easy and reproducible method for early detection of FA-related anaphylaxis.

INNOVATION

Researchers at the University of Michigan have proposed the measurement of transepidermal water loss (TEWL) as a means to detect the onset of anaphylaxis which causes profound blood vessel dilation creating water loss through the skin. TEWL is already the most widely used objective measurement for assessing the barrier function of skin, with a testing approach that detects the quantity of condensed water that diffuses across a fixed area of stratum corneum to the skin surface per unit time. An existing food allergy oral food challenge biorepository pipeline that includes clinical and biological data will be used to measure TEWL continuously during clinical food allergy oral food challenge resulting in both anaphylaxis and no reaction. First, skin barrier parameters will be defined by assessing threshold that predict anaphylaxis and compared to temporal symptom reports during an oral food challenge. Then, stopping rules will be developed and then deployed in a pilot clinical trial of oral food challenge evaluating whether such stopping rules reduce anaphylaxis incidence or severity over current standard-of-care. Overall, this technology will allow the use of oral food challenge with TEWL-based outcome

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Category
Diagnostics
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measurements to be a definitive marker of childhood food allergy and will improve safety of the oral food challenge.