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Translated from Spanish

Urine test predicts risk of severe dengue

Detecting early which dengue patients may develop severe forms remains a challenge for healthcare systems. A recent study proposes a practical solution: a urine test capable of anticipating the risk of complications before the most obvious clinical signs appear.

The test was developed by researchers at Nanyang Technological University (NTU) in Singapore, who demonstrated that certain urinary markers allow for a more accurate estimation of the likelihood of progression to severe conditions.

The finding, published in the journal *Open Forum Infectious Diseases*, could help improve clinical decision-making and reduce both unnecessary hospitalisations and high-risk cases that are not detected in time.

The challenge of predicting severe dengue

Dengue fever, transmitted by the *Aedes aegypti* mosquito, affects millions of people each year, primarily in tropical and subtropical regions. In most cases, it causes fever and malaise, and patients recover without complications.

Between 2% and 5% of those infected progress to severe forms, which can include bleeding, organ failure, and risk of death. Identifying these patients is difficult because the initial symptoms are similar in most cases, and serious complications often appear when the fever begins to subside, reducing the window for intervention.

What the test detects and how it improves the prognosis

The method is based on measuring two proteins in urine: NGAL and suPAR. NGAL increases during inflammatory processes, and suPAR reflects activation of the immune system; together they act as indicators of a more intense response from the body.

The NTU team observed higher concentrations of these proteins in dengue patients, especially those who developed severe forms, and designed a test to quantify them and estimate the risk of complications.

The study, led by Dr. Andrew Teo and Associate Professor Yeo Tsin Wen, compared samples from infected people with those from healthy individuals and found that measuring these biomarkers predicts severity three to four times better than traditional criteria.

Currently, the World Health Organization (WHO) uses warning signs—such as severe abdominal pain or bleeding—to guide hospitalisations, but these indicators depend in part on clinical interpretation. The new approach provides objective measures that complement these criteria and facilitate more informed decisions.

Impact on hospital management and patient follow-up

One of the main benefits is the optimization of hospital management: during outbreaks, uncertainty leads to preventive hospitalisations that overload services, while some high-risk cases may go undetected. This test would help reduce both problems, avoiding unnecessary hospitalisations and prioritising those who require care.

Because it is non-invasive—using urine instead of blood—it is easier to implement in different settings, even outside of hospitals, and can be repeated throughout the course of the disease to monitor its evolution and adjust clinical management.

In high-demand situations, such as epidemics, this type of monitoring can make all the difference, allowing for more confident decisions about who needs intensive surveillance and who can recover at home, and even enabling home monitoring strategies when health centres are overwhelmed.

Perspectives, validation, and next steps

Independent experts highlight the potential of this finding to transform dengue management, especially in resource-limited regions. The identification of biomarkers in urine represents a significant step toward more accessible diagnostic tools.

The NTU team is now working on a combined test that measures these proteins along with viral components in a single sample, which would facilitate both diagnosis and risk assessment and monitoring.

These results will need to be validated in larger studies before being incorporated into clinical protocols, but if confirmed they could improve the response to outbreaks.

Developing simple and accessible tools to anticipate complications is essential in diseases like dengue: detecting earlier, intervening better and using resources more efficiently are the goals that drive this advance, with a direct impact on public health.

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