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Translated from Spanish

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A urine test can predict the risk of developing severe dengue fever, according to a new study

The analysis allows for the detection of early signs associated with more severe cases of the disease. Details of a tool that would help prioritise care in high-demand settings.



Identifying which dengue patients may develop severe forms of the disease is one of the biggest challenges for healthcare systems. A new study offers a potential solution: a urine test capable of predicting the risk of complications before the most dangerous signs appear.

The breakthrough was developed by researchers at Nanyang Technological University (NTU) in Singapore, who were able to demonstrate that certain markers present in urine allow for more accurate prediction of the disease's progression.

The finding, published in the journal *Open Forum Infectious Diseases*, could improve clinical decision-making and reduce both unnecessary hospitalisations and missed cases.

The challenge of predicting severe dengue

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

However, between 2% and 5% of cases progress to severe forms, which can include bleeding, organ failure and risk of death. Identifying those in this group is difficult, as the initial symptoms are often similar in all patients.

Furthermore, the most serious complications usually appear when the fever begins to subside, which reduces the window of opportunity for preventive intervention.

What the test detects and how it improves the prognosis

The proposed method is based on the analysis of two proteins present in urine: NGAL and suPAR.

NGAL is a protein that increases in situations of inflammation, while suPAR is associated with the activation of the immune system. Simply put, both function as warning signals indicating that the body is undergoing a more intense process.

Researchers observed that these proteins appear in higher concentrations in dengue patients, especially those who develop severe cases. Based on this information, they designed a test that measures these levels and estimates the risk of complications.

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

Currently, the World Health Organization (WHO) uses a series of warning signs—such as severe abdominal pain or bleeding—to determine which patients should be hospitalised. However, these indicators depend in part on clinical interpretation and can vary among healthcare professionals.

The new approach provides objective data that complements these criteria and allows for more informed decisions.

Impact on hospital management and patient follow-up

One of the main benefits of the test is its potential to optimise hospital management. In many outbreaks, uncertainty leads to the hospitalisation of patients who could recover at home, putting pressure on healthcare systems.

At the same time, some high-risk cases may not be detected in time. Incorporating this analysis would help reduce both problems: avoiding unnecessary hospitalisations and prioritising care for those who truly need it.

Furthermore, it is a non-invasive method, as it uses urine instead of blood, which facilitates its implementation in different environments, even outside of hospitals.

Another advantage is the ability to repeat the test throughout the course of the illness. This allows for monitoring the patient's progress and adjusting the treatment according to changes in their condition.

In high-demand scenarios, such as epidemics, this type of monitoring can make all the difference. Doctors could more confidently decide which patients require intensive care and which can continue their recovery at home.

It even opens the door to home monitoring strategies, a key tool when health centres are overwhelmed.

Perspectives, validation, and next steps

Independent experts highlighted the potential of the finding to transform dengue management globally. The identification of biomarkers in urine represents a significant advance, especially in regions where resources are limited.

The NTU team is now working on a more comprehensive test that would measure these proteins, along with viral components, in a single sample. This would facilitate not only risk assessment but also the diagnosis and monitoring of the infection.



As these results are validated in larger studies, they could be incorporated into clinical protocols and improve the response to outbreaks.

Developing simple and accessible tools to anticipate complications is key in diseases like dengue. This test demonstrates how combining basic research and clinical application can translate into concrete improvements in patient care.

Detecting earlier, intervening better, and using available resources more efficiently: that is the goal driving these kinds of advances, with a direct impact on public health.

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