Advances in models for early prediction of migraine and other chronic conditions

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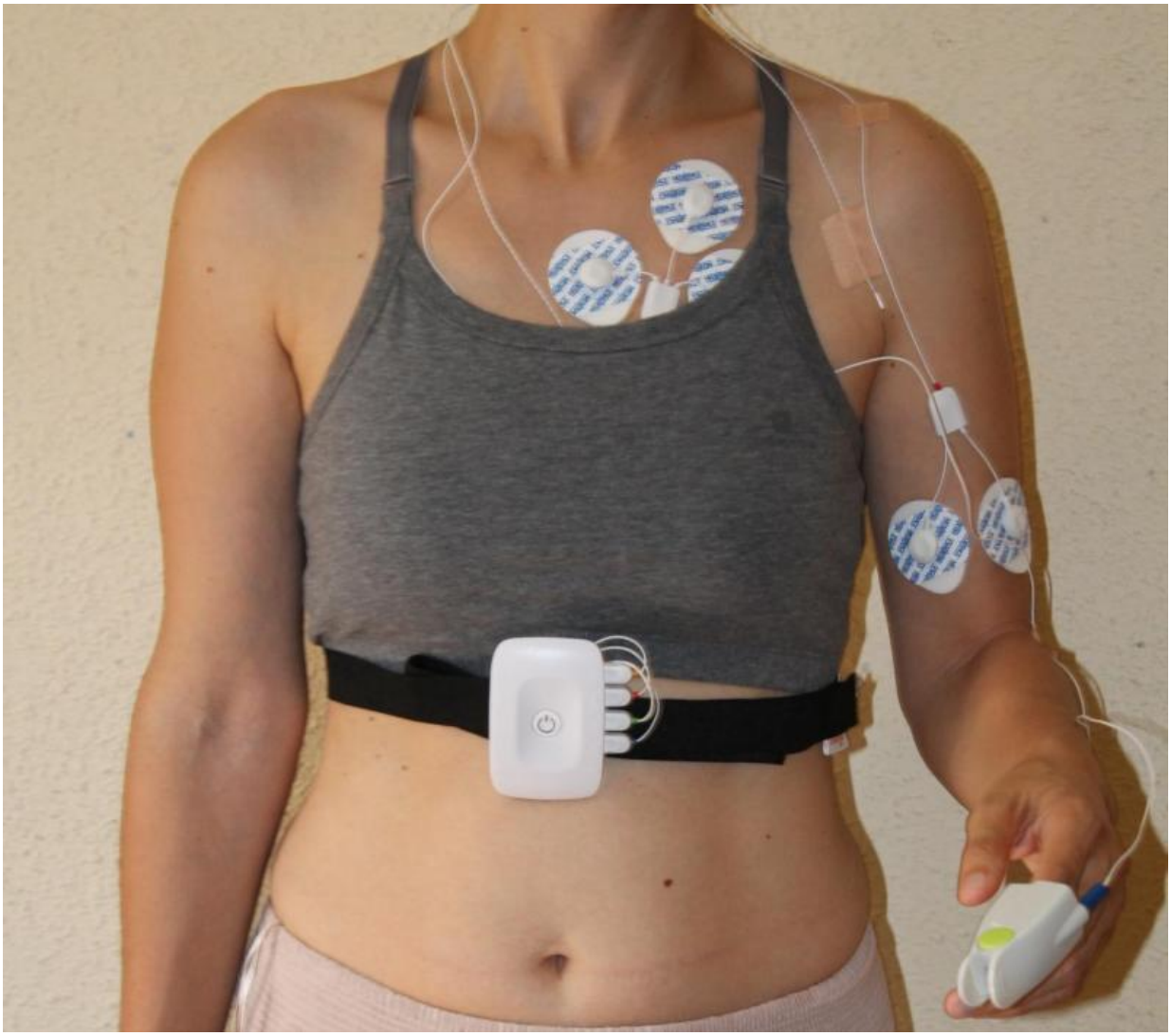

Non-intrusive ambulatory monitoring. Credit: Josué Pagán

Researchers from Universidad Politécnica de Madrid and Universidad Complutense de Madrid have developed a methodology early prediction of crises in chronic diseases, such as migraines.

During the study, the researchers managed to decrease the time for early detection of migraines to 40 minutes using a non-intrusive wireless body sensor network. This is rapid enough to anticipate drug intake, thus preventing or lessening pain. The methodology could also be used for other chronic diseases.

Migraine is a primary headache disorder that affects around 15 percent of the European population and generates high costs to public and private health care systems. The prediction of this type of event will allow doctors to act and mitigate pain according to the pharmacokinetics of current treatments.

This pilot study aims for early detection of the onset of migraines using a non-intrusive wireless body sensor network (WBSN). The researchers used a commercial ambulatory monitoring device for controlling the biometric variables of skin surface temperature, sweating, heart rate and oxygen saturation. Preliminary studies showed the feasibility of these predictive modeling techniques in migraines. The researchers, who work along with the headache unit from the Hospital Universitario de la Princesa de Madrid, have developed techniques that predict migraine onset up to 10 minutes sooner than existing models.

The use of sensor networks is increasingly frequent, but they can still have errors. Ambulatory monitoring is subject to sensor losses, data failure, disconnections and so on. The researchers wrote, "By using the methodology proposed, the prediction can be adjusted to a compromise between the conservative (quality prediction) and the daring (prioritizing the time of advance and increasing the uncertainty), all this depending on the feasibility of the sensor at every moment." The results of this pilot

study suggest that these models could be adapted to the characteristics of each patient.

This new methodology could be applied to other chronic conditions with symptomatic crises in which a prediction of the event would allow doctors to make decisions that mitigate their effects, for instance, in the ambulatory monitoring of patients admitted for stroke who are at risk of having another one.

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