A standardised protocol reduces post-lumbar puncture headache after cerebrospinal fluid extractions

- **The use of a standardized protocol significantly reduces headache after lumbar puncture, one of the most common side effects of this test, based on the analysis of more than 1,100 punctures.**
- **Improving the tolerability of lumbar puncture is key to advancing research in preclinical stages of Alzheimer's and has been possible thanks to the commitment of the ALFA cohort volunteers.**
- **The study, published in *Nature Scientific Reports*, has had the participation of 724 cognitively unimpaired adults of the longitudinal ALFA cohort of the BBRC, with the support of the "la Caixa" Foundation.**

Barcelona, 09 de febrero de 2026- Researchers at the Barcelonaβeta Brain Research Center (BBRC), research center of the Pasqual Maragall Foundation, together with Hospital del Mar Research and its research center (HMRIB), have published in *Nature Scientific Reports* the results of a **standardised protocol** to reduce and control headache, the most frequent complication after a lumbar puncture. Lumbar puncture is a key test in neurology, because it allows the collection of **cerebrospinal fluid (CSF)**, a sample that is particularly valuable in the context of neurodegenerative diseases for analysing **biomarkers** relevant to brain health and, in particular, for research and clinical practice.

In Alzheimer's research, CSF biomarkers are essential for better understanding the disease at very early stages, even **before symptoms appear**, and for advancing prevention strategies and the development of treatments. In this context, the research team has evaluated a protocol which reduces one of the most common side effects of lumbar puncture: **headache**, a type of pain that may appear transiently after the procedure.

"Lumbar puncture is an essential test for advancing the study of Alzheimer's biomarkers in CSF, and minimising the discomfort of this test is key. Standardising each step, from hydration up to the type of needle and rest, allows us to reduce headaches and make this procedure more bearable, especially when large-volume extractions are needed," explains **Dr. Oriol Grau**, Leader of BBRC's Clinical Research and Risk Factors for Neurodegenerative Diseases Group and co-author of the study.

The key contribution of the ALFA cohort volunteers

The work was conducted with cognitively healthy people from the ALFA cohort, promoted by "la Caixa" Foundation, and was made possible thanks to the **participation and commitment of individuals who, voluntarily,** make preventive research into Alzheimer's disease viable.

The study analysed **1147 lumbar punctures performed on 724 participants** in the ALFA study, following a standardised protocol combining: controlled hydration (500 ml of 0.9% saline solution intravenously), use of a non-traumatic, 22G pencil point needle; CSF collection (13.5–15 ml) without negative pressure; and 45 minutes of supervised rest after the procedure.

As shown in the results, with this protocol, the incidence of headache after this test was **9.6% at 24 hours and 4.7% at 7 days**. For those people who did experience headache, it was almost always a **mild pain** (95.5% of cases at 24 hours, 87% at 7 days), and there were no reports of **severe cases or complications** requiring a blood patch (a procedure in which the patient's own blood is injected to seal a possible cerebrospinal fluid leak), or hospitalisation.

"The application of a standardized protocol has made it possible to reduce serious complications to 0 after cerebrospinal fluid extraction after lumbar puncture," adds **Dr. Antonio Montes**, head of the Pain Unit at Hospital del Mar and researcher at its research institute and corresponding author of the study.

Because this is an **observational study** that **does not include a control group**, researchers contextualise the improvement of this protocol by comparing its results with existing literature. Specifically, when reviewing **three similar studies**, the reported post-dural headache rates were **24.8%**, **11.9%**, and **9%** at 24 hours; additionally, more severe events were reported in those studies, such as hospitalisation (2.5%) or the need for a blood patch (1.4%), while no complications of this type were observed in this study.

The exploratory analysis also found that, at 24 hours, headaches were more frequent in individuals with a history of chronic pain, a low or very high body mass index, and when the puncture was conducted at lower lumbar levels.

"In addition to safety, we care deeply about ensuring that our participants have the best possible experience. A clear, reproducible protocol makes clinical practice easier, improves follow-up, and helps ensure that, if headaches do occur, they can be easily managed with standard measures and without complications," explains **Anna Soteras**, Director of BBRC's Clinical Operations Facility and co-author of the study.

The study stands out for its **large sample size**, the systematic application of a homogeneous protocol, and a structured follow-up at 24 hours and at 7 days. However, the authors point out that the absence of a control group and the fact that the study was conducted in such a specific context, with a relatively limited age range, may limit the generalisation of the results in other settings and populations.

Improving the tolerability of lumbar punctures is no trivial matter: it is a key condition for being able to continue advancing preventative research. Having more standardised protocols with fewer complications helps **reduce fear and makes it easier for more people to agree to undergo this test more confidently**. This is particularly relevant, because cerebrospinal fluid provides essential information about Alzheimer's biomarkers, and it allows for earlier and better answers to scientific enquiries which, with the passage of time, may translate into more accurate diagnoses and more effective prevention strategies.

Reference article: Pérez-García G. et al. Protocol to avoid post-dural puncture headache after large-volume cerebral spinal fluid extraction in a prospective observational memory clinic study. Scientific Reports (2026) 16:1931. DOI: 10.1038/s41598-025-31634-6.

Alzheimer's disease in numbers

It is currently estimated that Alzheimer's disease and neurodegenerative diseases affect 900,000 people, a figure that translates to one in ten of those over 65 years of age and a third of those over 85. These diseases are one of the main causes of mortality, disability, and dependency. If an effective cure is not found and life expectancy continues to increase, the number of cases worldwide could triple by 2050, exceeding one and a half million people in Spain alone, a situation that could lead to the collapse of healthcare and care systems.

About the BarcelonaBeta Brain Research Center and the Pasqual Maragall Foundation

The BarcelonaBeta Brain Research Center (BBRC) is the research centre of the Pasqual Maragall Foundation, supported by the "la Caixa" Foundation since its creation, dedicated to the prevention of Alzheimer's disease and the study of cognitive functions affected in healthy and pathological aging. BBRC research focuses on the preclinical phase of Alzheimer's disease, the period before the first symptoms appear, when changes in the brain associated with the disease already occur. The BBRC has more than 100 professionals dedicated to contributing to the forefront of research into Alzheimer's disease and other neurodegenerative diseases.

The Pasqual Maragall Foundation is a non-profit organization founded in April 2008 in response to the commitment made by Pasqual Maragall, former mayor of Barcelona and former president of the Generalitat de Catalunya, when he publicly announced that he had been diagnosed with Alzheimer's disease. The Foundation's mission is to promote research to prevent Alzheimer's disease and offer solutions that improve the quality of life of those affected and their families.

The Pasqual Maragall Foundation has the support of more than 100,000 members and of:

Press contacts

Communication department of the Pasqual Maragall Foundation
Barcelonaβeta Brain Research Center
Clara Civit
ccivit@fpmaragall.org
93 316 90 90/ 690 10 98 45

Communication Agency
ATREVIA
Esther Seró / Cristina Campabadal
esero@atrevia.com / ccampabadal@atrevia.com
667 63 29 09 / 644 24 11 67

Communication Area of "la Caixa" Foundation
Andrea Pelayo/ Montse Dalmau
apelayo@fundaciolacaixa.org
mdalmau@fundaciolacaixa.org
618 12 66 85/ 659026457