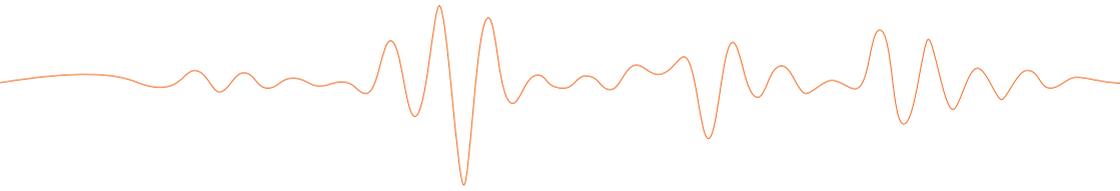


PROLIRA[®] DELTASCAN

revolutionizing detection & monitoring for delirium



Early detection



Objective



Accurate



Monitoring delirium

**The longer a delirium lasts,
the worse the outcome for the patient.**

**Rapid diagnosis and timely treatment
are important.**

DELIRIUM ON THE REGULAR NURSING WARD



WHAT IS DELIRIUM AND WHY IS OBJECTIVE DETECTION & MONITORING ESSENTIAL?



75% of delirious patients have a hypoactive or silent delirium.

This group of patients is not detected by the current screening instruments¹.

Delirium (also called acute confusion or acute brain failure) is a complication that occurs in approximately 33% of the hospitalized elderly patients¹. This confusion develops over a short period of time (usually within several hours or days), can fluctuate in severity during the course of the day and always has an underlying physical cause². Delirium can cause a lot of suffering and increases the risk of a poor outcome for the patient. This is particularly the case for people suffering from a hypoactive (or “silent”) delirium, because this subtype of delirium is diagnosed less frequently. Delirium is stressful and can cause terrifying thoughts or hallucinations, for example a person can feel that he is being held captive or may see things that are not really there. It can also cause stress and fear in family members and carers.

Patients suffering from delirium have a higher risk of a longer spell in hospital, higher mortality, a higher risk of cognitive damage during and after hospitalisation and higher healthcare costs³. The current screening instruments, such as the DOSS, are subjective and appear to be inadequate in daily practice. Only 12% to 35% of the delirious patients are detected¹.

WHAT ARE THE PROVEN EFFECTS OF DELIRIUM ON THE REGULAR NURSING WARD?

Delirium is the most common complication following a surgical procedure in elderly patients. The effects of delirium on the nursing ward are significant. Recent research demonstrated that:

- 15-25% of elderly patients will develop a delirium after major surgery¹.
- 50% of elderly patients will develop a delirium after surgery that poses a high risk for delirium, such as trauma surgery¹.
- failure to detect a delirium and consequently being delirious for a longer period, is associated with worse outcomes for the patient^{1,4}.
- a visible deceleration on the EEG (Delta waves) is associated with worse outcomes for the patient⁵.

Suffering from delirium is associated with:

- an 8-fold higher risk of developing dementia in elderly patients over the age of 85 years⁶.
- cognitive damage in the year after hospitalisation in more than 50% of the patients⁴.
- a 1.5-fold higher risk of death in the year after hospitalisation⁴.
- a deterioration in daily functioning⁴. In particular, elderly and vulnerable patients who were able to function independently before hospitalisation have a high risk of admission to a nursing home following a delirium.
- a doubling of the time spent in hospital⁷.
- a higher risk of complications (extubations, falling, bed sores) and consumption of care^{1,3}.

EEG: A PROVEN BIOMARKER FOR DELIRIUM

We have developed Prolira-DeltaScan to detect delirium more frequently and at an earlier stage. DeltaScan is an objective medical instrument based on a single-channel EEG signal (Electro-encephalography). EEG is a proven biomarker for delirium⁸. EEG is increasingly cited as a reliable tool for delirium detection⁹.

The result of the DeltaScan is a parameter for delirium. A DeltaScan Patch is applied to the patient's head to perform the measurement and removed again after the measurement. The result is visible immediately after the measurement, which takes a few minutes and is presented on a scale of 1 to 5, with 1 being "very unlikely" and 5 being "very likely" delirium. This allows for improved (>90% accuracy) and earlier (average 1-1.5 days) detection of delirium in comparison to the current practice in which questionnaires are used¹⁰.

The single-channel EEG, produced using the DeltaScan, shows a clear difference between a delirious and non-delirious patients⁸. Delirium is characterised by strong and strongly decelerated waves in an EEG^{5,8,11}. These waves are called polymorphic Delta waves (see Figure 1). These waves are not present if there is no delirium (see Figure 2).

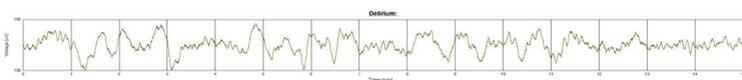


Figure 1: Not healthy / Delirium

EEG produced using DeltaScan

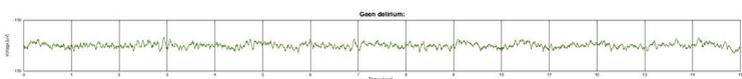


Figure 2: Healthy / No delirium

EEG produced using DeltaScan

Publications

Previous research has revealed that the DeltaScan effectively detects delirium and that brain signals are already disrupted before the delirium is clinically visible. This means that a DeltaScan often allows for earlier detection of delirium than the current screening instruments.

Delirium detection using EEG: what and how to measure.

Van der Kooi et.al.

Chest. 2015, Jan;147(1):94-101

Recognition of Delirium in Postoperative Elderly Patients: A Multicenter Study.

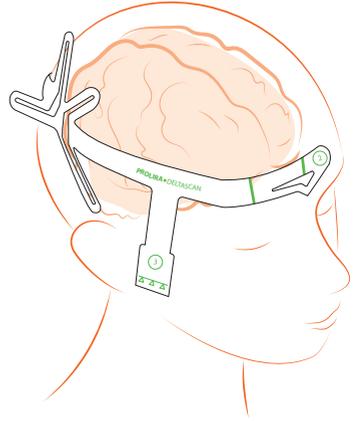
Numan et.al.

*Journal American Geriatric Society
2017, Sep;65(9):1932-1938.*

Delirium detection using relative delta power based on 1 minute single-channel EEG: a Multicenter Study.

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*British Journal of Anaesthesia
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Prolira BV
Padualaan 8, 3584 CH Utrecht,
The Netherlands
www.prolira.com