Advantages

✓ Direct, simple, and economic point-of-care determination of cholinesterase activities

✓ Whole blood testing

→ one drop of blood (10 µl) per test

✓ The result is available after only 5 minutes

✓ Comfortable handling via touchscreen

✓ Portable due to the use of Li-Ion battery technology

✓ Integrated barcode reader for patient IDs

✓ Export of data via USB

Presentation of the results

CE   IVD

201805/EN

DR. F. KÖHLER CHEMIE
Pharmaceuticals

LISA-CHE
Point-of-care measurement of cholinesterase activity

Portable point-of-care device for the activity determination of acetyl- and butyrylcholinesterase

DR. F. KÖHLER CHEMIE
Pharmaceuticals

Measuring ChE-activities – Why?

Since 1959, the measurement of cholinesterase activity is used in patients with organophosphate poisoning.

In recent years, it has been shown that the neurotransmitter acetylcholine, acting as a parasympathetic messenger, regulates the body's immune response via the cholinergic anti-inflammatory reflex. This reflex controls the release of proinflammatory cytokines and, thus, neuroinflammation.

Furthermore, it was shown that the activities of cholinesterases can serve as biomarkers, for example

- for the detection of a postoperative delirium
- in systemic inflammation
- as a predictor of the mortality in patients with extracorporeal membrane oxygenation

Measurement of cholinesterase activity for neuroinflammation and delirium

When to measure?

1. Pre-anesthetic interview (→ base value)
2. Pre-operatively
3. After admission to ICU

Optional: perioperatively

Delirium detection[1,2]

1. Hyperactive delirium

a) Strong hyperactive type: • relatively easy to identify
b) Moderate type: • Measure BChE activity
• Methods for delirium detection (e.g. CAM-ICU)

2. Hypoactive delirium

a) Moderate type: • Measure BChE activity
• Methods for delirium detection (e.g. CAM-ICU)
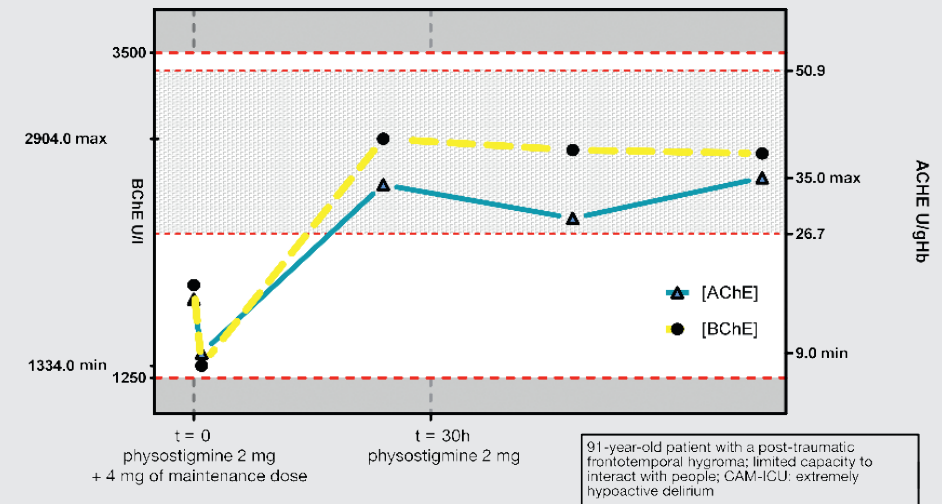b) Strong hypoactive type: • Measure BChE activity

Interpretation of BChE values[3]

BChE activity > 2000 U/l: Normal range
BChE activity < 2000 U/l: Increased attention necessary
BChE activity < 1500 U/l: Suspected neuroinflammation/delirium
→ Additionally, if possible: Methods for delirium detection (e.g. CAM-ICU)

Source references:
[1] Maldonado JR, Acute Brain Failure: Pathophysiology, Diagnosis, Management, and Sequelae of Delirium, Crit Care Clin. 2017 Jul;33(3):461-519.
[2] Cerejeira J et al., Low preoperative plasma cholinesterase activity as a risk marker of post-operative delirium in elderly patients, Age Ageing. 2011 40(5):621-6.
[3] Performance assessment by Dr. Franz Koehler Chemie GmbH

An example: AChE and BChE in a patient with hypoactive delirium

91-year-old patient with a post-traumatic frontotemporal hygroma; limited capacity to interact with people; CAM-ICU: extremely hypoactive delirium

Barth, E. (2014). Anticholium® (physostigmine) as a therapeutic option in ICU patients with postoperative delirium and vigilance deficiency with cognitive dysfunction. Poster from DIVI, Hamburg

The graph shows the AChE- and BChE activities of a patient with a hypoactive delirium, who was treated with physostigmine (**ANTICHOLIUM®**) because of altered ChE-activities. Within one hour after the treatment, no delirium could be observed. 24 hours after the treatment, the AChE- and BChE activities were in the normal range.