

# LIQUOGUARD®

## FULLY AUTOMATED CSF PRESSURE MEASUREMENT AND DRAINAGE

A healthy human adult has about 150 ml cerebrospinal fluid (CSF = in German "Liquor"), which is reproduced and reabsorbed several times a day. CSF production and reabsorption is autoregulated by a complex mechanism to allow enough blood perfusion and oxygen supply to the brain. If this regulation mechanism, breaks down, e.g. after operations or accidents, LiquoGuard® is used to measure the CSF pressure continually and fully automated and guarantee the drainage of the excess CSF.

- Maximised patient safety by means of sophisticated alarm concept and minimised infection risk
- Easy to transport, patient can thus move freely around
- Intuitive operation
- Permanent data recording
- Easily connected to most commercially available drainage catheters



### Clinical CSF management

Irregularities in the CSF circulation are caused for example by severe trauma, subarachnoid hematoma, shunt infections, normal pressure hydrocephalus or in post-surgery treatment. The vitally necessary therapeutic measures carried out by the LiquoGuard® are applied at the head ("ventricular") or back ("lumbar") The number of external CSF drainages is roughly estimated to be 30-40,000 p.a. in Germany and 130-140,000 p.a. in the USA.

# LIQUOGUARD®

LiquoGuard® is a revolutionary medical device that simultaneously measures pressure and drains CSF. The device substitutes the traditional dripping chamber with a closed system with dual pressure sensors and an electronic controlled peristaltic pump. After preselection of the desired averaged intracranial pressure (ICP), the CSF flow is automatically regulated to make sure the ICP continuously stays within a corridor around the desired value.



## ■ Cost/ time saving

By eliminating the dripping chamber, the necessary chore of frequent, time-consuming height adjustments is eliminated. Often, the sophisticated safety concept may even enable the doctor to responsibly make the decision to move the patient from an intensive care unit (ICU) into the (supervised) normal care area.

## ■ Nongrid operation possible

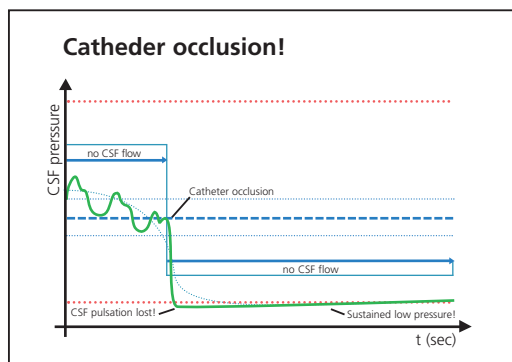
LiquoGuard® enables greater patient mobility, because strong batteries allow the reliable functioning of the system during transport or individual patient movements.

## ■ Further possibilities for analysis

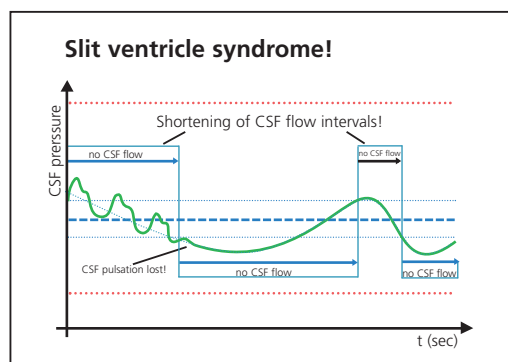
The permanent data recording of CSF pressure and flow supplies data for a variety of analysis. For example data may be used to help decide about shunt indications, judge medication effects, calculate CSF flow as well as ventricular compliance.

## Maximised patient safety

The permanent electronic data recording supports users in early identification of most frequent reasons for problems.



During catheter occlusion, measured pressure drops below  $P_{set}$ , CSF flow stops and pulsation is also lost.



During a slit ventricle condition, pulsation is usually lost and CSF flow periods are shortened.

For enhanced safety the system is equipped with two pressure transducers, two microcontrollers and two alarm displays. In addition, the two detection chains are supervising each other; any inconsistencies in the measured values, sensor malfunctions and drifts lead to alarms.



A Product of

Möller Medical GmbH & Co. KG  
Wasserkuppenstrasse 29 - 31  
D - 36043 Fulda  
Tel: +49 (0) 661 941 95 0  
Fax +49 (0) 661 941 95 90  
E-mail: [info@moeller-medical.com](mailto:info@moeller-medical.com)  
[www.moeller-medical.com](http://www.moeller-medical.com)