SAFETY: CSF flow is controlled by the desired intracranial or intra-abdominal pressure (ICP or Pcsf in mmHg). When pressure alarm limits, the CSF flow is restricted to the pre-selected max. flow rate (Pcsf). With standard settings, pressures below zero are generated (no aspiration), but with advanced settings, a weak negative pressure can be tolerated. LiquoGuard® even allows such a pressure as target.

WORKLOAD REDUCTION: There is no drip chamber and thus no need for time consuming manual height adjustments. Also, no calibration of the pressure sensor is needed, since it is already delivered pre-calibrated.

MOBILITY: CSF pressure measurement (ICP/Pcsf) and drainage is continued during transportation of the patient.

VERSATILITY: Continuous documentation of pressure and CSF volume helps in decision making for permanent CSF shunting, analyzing effects of medications, and calculating CSF flow. The recorded data can be examined online using the "history" tab, or they can be exported to USB stick, printer, patient monitor, or PC.

The LiquoGuard® alarm concept requires that alarms are always noticed by responsible staff.
CSF flow

Since 2006, LiquoGuard® (Liquor = German for CSF) is available on the European market as well as many countries outside Europe. In 2011, we are introducing the new and improved LiquoGuard® 7, which adds many features for your comfort and safety. The procedure, however, remains the same: simultaneous drainage and pressure measurement, compactness, portability, reduced nursing workloads and enhanced mobility: a versatile medical tool.

SAFETY: Common problems of conventional external CSF drainage systems are excess level adjustment of the drip chamber (e.g. during patient movement, CSF engorgement, and adjusted to the lumbar catheter level using a specially designed fixation device for maximal patient comfort and mobility.*

WORKLOAD REDUCTION: LiquoGuard® by design does not need any height adjustments (unlike drip chambers), thus saving time and allows the existing staff to focus on other essential tasks. The integrated documentation function reduces the nurses workload even further.

MOBILITY: Thanks to powerful Li-ion rechargeable batteries, the system is independent of external power supply. LiquoGuard® 7 is portable, weighs about 1.6 kg (3.5 lbs), and can be attached to poles and tracks by means of a bracket.

VERSATILITY: Besides CSF drainage in trauma patients, LiquoGuard® 7 is also used in NPH diagnostics. Sustained low pressure, shortening of CSF flow intervals! How LiquoGuard® 7 enhances patient safety in conventional ventricular CSF drainage, collapsed ventricles and catheter occlusions are most frequent issues. LiquoGuard® 7 supports early identification of both situations. When the drained ventricle is collapsed, pressure pulsation is usually lost and CSF flow periods are shortened. During catheter occlusions, the measured pressure drops below Pset. CSF flow stops and pulsation is also lost. LiquoGuard® 7 monitors the CSF pressure pulsation and thus supports the user in detecting catheter occlusions and other pathological situations such as collapsed ventricles. LiquoGuard® 7 features refined alarm criteria, further reducing unnecessary alarms.

How LiquoGuard® 7 enhances patient safety in NPH diagnostics: When the drained ventricle is collapsed, pressure pulsation is usually lost and CSF flow periods are shortened. During catheter occlusions, the measured pressure drops below Pset. CSF flow stops and pulsation is also lost. LiquoGuard® 7 monitors the CSF pressure pulsation and thus supports the user in detecting catheter occlusions and other pathological situations such as collapsed ventricles. LiquoGuard® 7 features refined alarm criteria, further reducing unnecessary alarms.

VERSATILITY: LiquoGuard® 7 is the worldwide first CSF management system permitting a safe discharge with preselected CSF flow. In NPH diagnostics, LiquoGuard® 7 supports the further insertion of an intracranial monitor (ICP) to avoid spinal perfusion pressure drops below Pset, CSF flow stops and pulsation is also lost. LiquoGuard® 7 monitors the CSF pressure pulsation and thus supports the user in detecting catheter occlusions and other pathological situations such as collapsed ventricles. LiquoGuard® 7 features refined alarm criteria, further reducing unnecessary alarms.

VERSATILITY: The LiquoGuard® sensor unit is easily fixed and attached to the lumbar catheter level using a specially designed fixation device for maximal patient comfort and mobility.*

WORKLOAD REDUCTION: To time consuming manual adjustment of exact CSF flow rate.

MOBILITY: The LiquoGuard® sensor unit is easily fixed and attached to the lumbar catheter level using a specially designed fixation device for maximal patient comfort and mobility.*

SAFETY: Conventional CSF drainage may lead to uncomfortable and occasionally uncontrollable under drainage, leading to intracranial hypotension, collapsed ventricles or subdural haematoma. LiquoGuard® 7 offers an additional alarm option to watch the drained volume.

How LiquoGuard® 7 enhances patient safety in NPH diagnostics: When the drained ventricle is collapsed, pressure pulsation is usually lost and CSF flow periods are shortened. During catheter occlusions, the measured pressure drops below Pset. CSF flow stops and pulsation is also lost. LiquoGuard® 7 monitors the CSF pressure pulsation and thus supports the user in detecting catheter occlusions and other pathological situations such as collapsed ventricles. LiquoGuard® 7 features refined alarm criteria, further reducing unnecessary alarms.

VERSATILITY: Besides CSF drainage in trauma patients, LiquoGuard® 7 is also used in NPH diagnostics. Sustained low pressure, shortening of CSF flow intervals!

REVOLUTIONARY APPROACH TO VENTRICULAR CSF MANAGEMENT

How LiquoGuard® 7 works:

LiquoGuard® 7 is the first CSF management system permitting a safe discharge with preselected CSF flow. The system determines CSF pressure (through two independent pressure transducers, one using diaphragm converters, 2 microcontrollers, separate (diaphragm and LED) display, the tube set and fixed to the patient on the level of the fourth lumbar. Thus, the CSF pressure flow is a good approximation to the intracranial pressure (ICP). For direct ICP measurement, LiquoGuard® 7 allows connection of an additional parenchymal or catheter tip sensor. This makes sense e.g. with frequent catheter occlusions or if collapsed ventricles may occur. After preprocessing the derived target pressure (i.e. target or alarm limit), CSF flow is automatically controlled to keep the pressure within a corridor around t.*

LiquoGuard® 7 offers an additional alarm system, which adds many strong options. A closed system works with affordable base price and strong options:

- Reduced weight, smaller size, Li-on recharging lead battery, decreased motor noise
- Touchscreen with intuitive user interface
- Improved alarm criteria, new alarm “flow rate”
- Highly improved connectivity including connections to USB-stick, parenchymal ICP or catheter tip sensor, printer, internet (for development and device diagnostics)
- Improved recording and documentation and subsequent analysis possible
- Integrated bag holder, improved fixation bracket for poles and tracks

THE 7 ADDITIONAL ADVANTAGES OF LiquoGuard® 7

ADVANTAGES

- Integrated system
- Affordable base price
- Many strong options
- Easy manipulation
- Mobile
- Easy integration in current setup
- Integrated documentation possibility
- Simple and easy use

How LiquoGuard® 7 enhances patient safety in conventional ventricular CSF drainage, collapsed ventricles and catheter occlusions are most frequent issues. LiquoGuard® 7 supports early identification of both situations. When the drained ventricle is collapsed, pressure pulsation is usually lost and CSF flow periods are shortened. During catheter occlusions, the measured pressure drops below Pset. CSF flow stops and pulsation is also lost. LiquoGuard® 7 monitors the CSF pressure pulsation and thus supports the user in detecting catheter occlusions and other pathological situations such as collapsed ventricles. LiquoGuard® 7 features refined alarm criteria, further reducing unnecessary alarms.