

Technology offer: Innovative device for treatment of intracerebral or intraventricular hemorrhages or hematomas

Project Status

- **Proof of concept published; DOI:** [10.3390/jcm10040563](https://doi.org/10.3390/jcm10040563)
- **Catheter-based ultrasound-thrombolysis used in small clinical trial**

Benefits

- **Combined therapy of drainage, active substances and ultrasound**
- **Flexibel catheter-system offering drainage, flushing, ultrasonic probe pressure sensor and monitoring**
- **Personnel and material costs savings**

Patents

- **Active patent family in EP, US, JP and CA**
- [EP3228266B1](https://patents.google.com/patent/EP3228266B1) Patent already granted
- **Granted claims broadly cover key features of a final instrument**

Offer

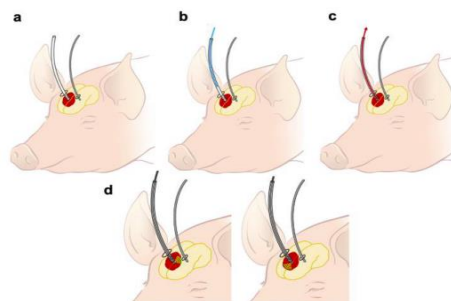
- **The technology can be licensed or assigned**
- **Collaborations regarding further development welcome**

Scientists from University Medical Center Mainz (Germany) have successfully developed an innovative medical device for treatment of intracerebral or intraventricular hemorrhages or hematomas (ICH, IVH) at the same time minimizing negative side effects.

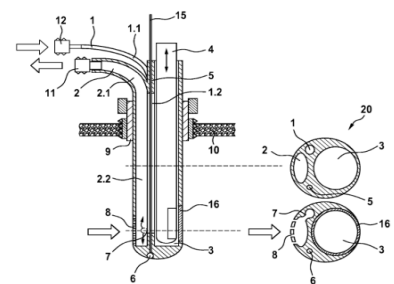
The catheter-based system includes an ultrasonic-mediated imaging system and a pressure sensing means in the application of ultrasonic in the treatment of ICH or IVH. Within one device a catheter for flushing fluids (e.g. pharmaceutically active substances) into the hemorrhages is combined with a drainage catheter, an ultrasonic probe and a pressure sensor. A ultrasonic probe duct integrates either an ultrasonic probe or a stylet enabling quick freehand navigated placements of the ventricular catheter.

A proven effective treatment for ICH and IVH is of very high medical need: ICH counts for 8 to 13 % of all strokes world-wide, it is estimated that the annual incidence of ICH is 10 to 30 cases per 100.000 persons, accounting for about 2 million strokes annually worldwide. This condition is fatal in 30 to 50 % of all occurrences, and the majority of survivors have significant motor and cognitive disabilities. Spontaneous ICH is also associated with IVH in 40 to 50 % of all cases. IVH is associated with mortality rates of 30 to 80 %.

Common catheter-based systems that apply ultrasonic treatment are not optimized for efficient treatment of ICH or IVH and are laborious and expensive. Placement, guidance and blockade of the catheters remain a problem. A rapid drainage of fluid and debris is crucial for hematoma lysis/thrombolysis of ICH or IVH but self-flushing systems can hardly be positioned or navigated to the puncture site efficiently. Only the innovative new device is optimized to remain intracerebrally and intraventricularly for a prolonged period of time to mediate drainage and act as monitoring system. For clinics the invention saves personnel and material costs.



Schematic illustration of the experimental setup during proof of concept



Invention illustrated in patent

A proof of concept has been conducted and published in the [Journal of Clinical Medicine](https://doi.org/10.3390/jcm10040563). The catheter-based ultrasound-thrombolysis has been successfully used in a small clinical trial in order to enhance recombinant tissue plasminogen activator (rtPA)-fibrinolysis, for the treatment of spontaneous ICHs. The results demonstrate that a significant hematoma reduction of approximately 60% is possible by a single application of the combined treatment of 1 mg rtPA and ultrasound, which is more than doubled compared to the use of rtPA and ultrasound alone. The combined therapy of drainage, rtPA and ultrasound is a safe and effective technique for hematoma-reduction and protection of the perihematomal tissue in regard to ultra-early effects.

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