

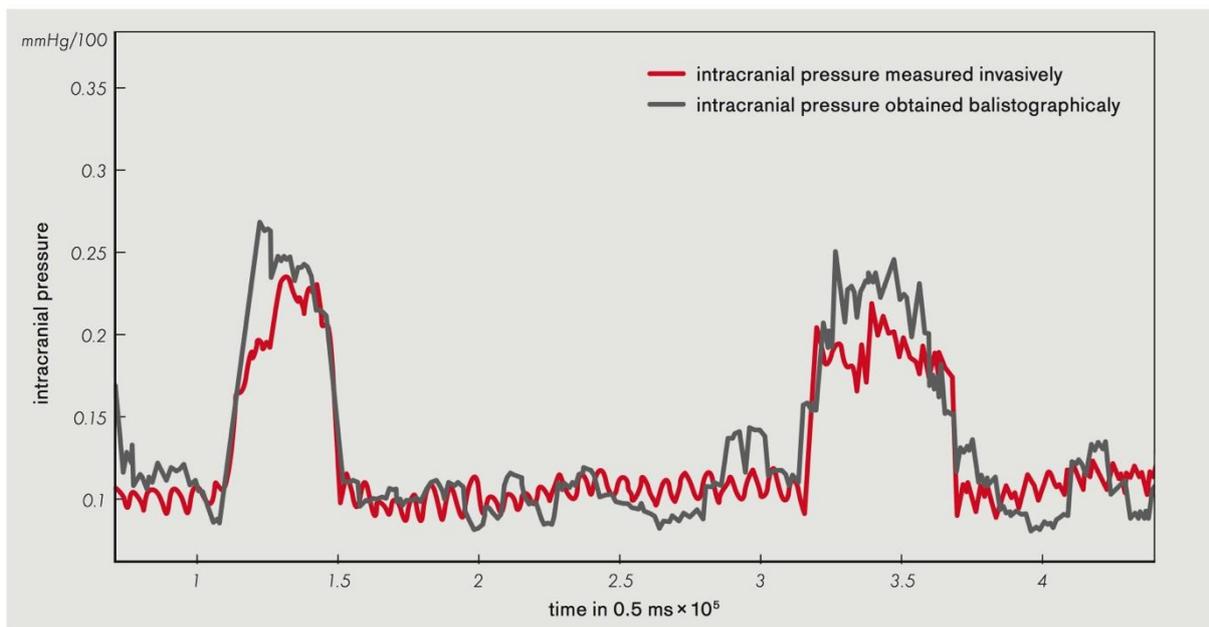
## LINET introduces groundbreaking method for monitoring intracranial pressure

13 October, Prague – **A team comprising developers from LINET Group SE and leading Czech neurosurgeons from Military University Hospital Prague and University Hospital Hradec Králové have succeeded in creating innovation that can greatly simplify work in intensive care and critical care units. Since the fall of last year, the team of researchers has been testing a cutting-edge method for monitoring intracranial pressure and will be presenting its findings to experts during the international congress of the European Society of Neurosurgical Societies (EANS) currently underway in Prague.**

Experimental preclinical monitoring was conducted on several live pigs in collaboration with the First Faculty of Medicine of Charles University in Prague. The efficacy of the new noninvasive method was compared with values obtained through the use of a standard invasive parenchymal sensor, which currently represents the only reliable means for obtaining intracranial pressure readings.

Verification was conducted in a wide range of intracranial pressure values, and the animals were in a state simulating that of an ICU patient, i.e., under general anesthesia and connected to a ventilator.

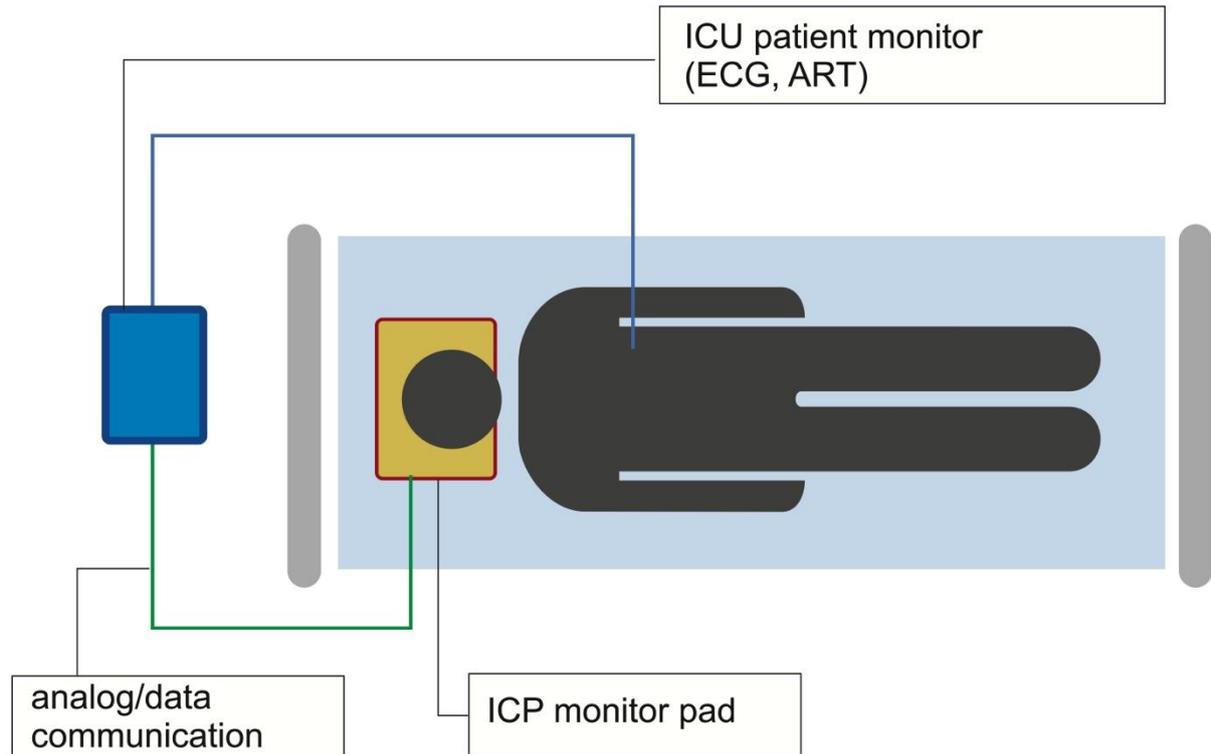
*"The testing has demonstrated that we are capable of achieving results with this noninvasive method that very closely resemble those obtained through the standard method. We tested sudden catheter-induced pressure changes as well as pressure changes of a more gradual nature. The best correlations were achieved primarily in situations where the changes in pressure were slow; those are the most significant from a clinical-practice point of view,"* explains Dr. Ondřej Bradáč, M.D., of Military University Hospital Prague.



**Comparison of results measured invasively and noninvasively**

The noninvasive intracranial pressure measuring device uses a standard patient monitor, the same type commonly found in ICUs for EKG and invasive arterial pressure monitoring.

LINET Group Development Manager Dr. Tomáš Holkup, Ph.D., explains the noncontact monitoring concept: *"Intracranial pressure is monitored thanks to a special sensor pad developed by LINET that connects to the patient monitor. The pad is placed under the patient's head to measure mechanical vibrations. Intracranial pressure values are then determined using the so-called Windkessel Analogy Hemodynamic Model."*



**Sensor pad wiring diagram**

Monitoring of intracranial pressure is an intrinsic aspect of care for patients who are unconscious and at risk of brain swelling – typically, those who have suffered serious head injuries. If the pressure of the cerebrospinal fluid is too high, circulation is restricted in the brain and damage can occur. Therefore, it is crucial that intracranial pressure is monitored at all times. With the traditional invasive method of pressure monitoring by means of parenchymal sensor, an opening must be drilled in the skull, and, in addition to general complications, there is always the risk of intracranial hemorrhage and/or infection. The invasive method is also more prone to inaccurate readings resulting from sensor malfunction or misplacement. Noninvasive monitoring would practically eliminate the potential for such problems.

Experts see another important benefit in the simplicity with which noninvasive monitoring can be conducted – the sensor pad is simply placed beneath the patient's head and connected to a standard patient monitor.

*"In consideration of its ease of use, it is foreseeable that the noninvasive method will even be used to monitor patients who are at risk of increased intracranial pressure, yet are not suitable candidates for the invasive monitoring method due to complications that could arise during sensor placement. The noninvasive method would also offer economical benefits. At a cost of approximately one thousand dollars apiece, disposable invasive sensors are expensive, and the placement procedure itself involves additional operating costs,"* says Dr. Ondřej Bradáč, M.D.

The latest results indicate that an initial prototype for practical clinical application and testing can be expected in a matter of months. In the event that additional testing is successful, commercial application will follow in the course of next year.

### **LINET Group**

LINET Group is Europe's largest producer of hospital and nursing care beds. The holding, with headquarters in the Dutch city of Dordrecht, was established in 2011 by the owners of the Czech company LINET and the German manufacturer wissner-bosserhoff after a twenty-year strategic partnership. Annually, LINET Group produces over 66 thousand beds and manufactures mattresses and other equipment for hospitals, social care institutions, and stationary nursing care units. To date, more than one thousand prestigious university hospitals and ten thousand nursing care institutions in over 100 countries throughout the world have chosen the sophisticated, high-quality

solutions of the LINET brand. LINET Group operates several of its own sales subsidiaries throughout Europe and has additional subsidiaries in South America and the USA; furthermore, it has an extensive network of partner distribution companies. The holding currently employs approximately 900 people. Learn more at [www.linnet.com](http://www.linnet.com).

### **Military University Hospital Prague**

Since its establishment in 1938, Military University Hospital Prague has maintained a position as one of the most prestigious medical institutions in the Czech Republic. In 1994, the hospital was opened to the civilian population when it was transformed into a public-benefit organization under the Ministry of Defense. The hospital provides medical care both to the citizens of Prague's 6<sup>th</sup> municipal district as well as to citizens throughout the nation in a broad range of subspecializations. Furthermore, it serves as a training, teaching, and treatment facility for members of the Czech Republic's armed forces, assessing the medical condition of active service men and women as well as that of applicants.

With the exception of pediatrics, obstetrics, cardiac surgery, and burn treatment, Military University Hospital Prague provides patients with a comprehensive range of medical services that fully comply with international standards for quality and safety. Its clinics and accredited departments offer undergraduate and postgraduate education in the hospital's principle specializations, namely those of neurosurgery, abdominal surgery, gastroenterology, diabetology, ophthalmology, otolaryngology, and infectious diseases. Currently, the hospital comprises nine clinics (surgery, neurosurgery, internal medicine, otolaryngology, ophthalmology, oncology, anesthesiology and resuscitation, musculoskeletal injury, and infectious diseases) and over 20 specialized departments with a total of 664 beds, of which 469 are for standard care and the remainder for follow-up care. Military University Hospital Prague also provides medical care to several dozen war veterans.

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