

**SCOT (Smart Cyber Operating Theater) project:
Advanced Medical Information Analyzer for Guidance of the Surgical Procedures**

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At present, the nuances of the clinical practice are usually recorded by the medical staff themselves. The same individuals also control the information considering the patient, who is the object of their activities. Such an approach may create a problem for reliable and objective evaluation of the collected data by the independent observers, which may be particularly important in cases of disclosed malpractice. It is evident, that if treatment-related morbidity is encountered, the investigation of the case should precisely reveal the cause of the complication since otherwise it could not be effectively avoided in further clinical practice. Meanwhile, the solution of this problem may be seemingly facilitated by currently available information technologies (IT) based on the telemedicine and advanced data processing.

Our group is currently working on the development and testing of the computer-aided system for objective evaluation of the neurosurgical practice. It is based on the constant monitoring, recording, and archiving of the variable intraoperative and perioperative data, which are co-registered relatively to time within the same surgical procedure, and relatively to stage of surgery between different surgical procedures. This information is evaluated postoperatively by the independent observer with reliable and objective assessment of the various surgical manipulations and actions and their influences on the subsequent clinical course of the patient. Such analysis might be particularly helpful for:

- identification of the exact cause of complications and their avoidance during further surgeries;
- creation of the best possible surgical plan, based on the variable medical information of the particular case and previous experience, with objective prediction of consequences of the various surgical manipulations and nuances of the postoperative management;
- selection of the most optimal treatment strategy based on the prediction of the clinical course of each particular patient with an emphasis on short- and long-term prognosis as well as on the quality of life;
- getting the informed consent with the use of the most objective and reliable information.

The system will provide an opportunity for fast extraction of the required medical information from the archive. Moreover, comparison of the clinical data of the particular patient with the similar information extracted from the previous surgeries, which is certainly should undergo co-registration and averaging, can provide a chance to reveal violation of the normal intraoperative course, whether it is caused by human errors, organizational flaws, or technical malfunction, and timely avoid its negative results. Finally, the system will permit objective evaluation of the quality of medical service, its optimization and standardization. The latter seems to be of particular importance, since may potentially diminish the role of the clinical experience and skills of the individual doctors, as well as their familiarity with the use of various medical tools and equipment.

In conclusion, incorporation of the advanced medical information analyzer into everyday clinical practice may result in significant increase of its safety and reliability.