Josep Rodiera, Head of Anesthesia Department of Centro Médico Teknon, Barcelona

Under the concept of perioperative medicine, anesthesiologists, working with new technologies and new devices, will have more control of a patient’s care before, during, and after surgery. The approach will make for more personalized, safer care, and it could transform the practice of anesthesiology.

The stereotype of an anesthesiologist with a stethoscope around his neck could soon be replaced by a doctor, in the operating room, wearing augmented reality glasses while networked to every device in the room.

Dr Josep Rodiera, a MD and PhD, anesthesiologist, with a master’s degree in bioengineering, heads the anesthesia department at Centro Médico Teknon, a leading private hospital in Barcelona, Spain, and part of the Quirónsalud medical group Fresenius-Helios.

Q: How is anesthesia evolving?
Most consider the anesthesiologist as the person who puts patients to sleep and wakes them up. But the practice of anesthesia is expanding. As a cross cut-specialty, anesthesia is uniquely positioned to lead the development of ‘perioperative medicine’ — that means preparing the patient for surgery and taking care of them throughout the procedure.

Q: How do you prepare patients before surgery?
A concept that is changing is that the patient has to be an active participant. As an athlete should be prepared for a marathon, so the patient should be prepared for surgery. That may mean eating enough protein, not smoking, doing some physical activity, and using some apps to train their brain. For example, there can be problems with the cognitive reserve of people over 55 or 60 in the post-operative period. Playing some Sudoku or with an iPad trains your brain, so you can have more cognitive reserve.

Q: How does information technology enter in this perioperative process?
Our perioperative approach aims to integrate all actions in a program through custom-made software. It makes possible a safe and efficient data transmission and a greater traceability from pre-anesthetic evaluation to patient discharge.

Q: And what happens in the operating room?
In the intraoperative phase, based on our own SAM — Smart Anesthesia Management—concept created by the University of Washington, we are implementing a pilot project that aims to interconnect all the devices that interact with the patient.

This system will be able to predict possible situations that could arise. It catches information from the electronic patient record and the monitoring of the patient. It can identify which patient is in the operating room and what we are doing with the machines. For example, when we put a patient under anesthesia, our target is a sleeping patient, but, when we are bringing them out our target is an awake patient. The system could recognize that and automatically change alarms. If the patient is recovering from the anesthesia and we forget to do something or the patient is not ready to wake, our SAM could recognize that situation and send a message to the anesthesiologist saying: “You cannot wake the patient because ...”.

This SAM will have the knowledge of thousands of anesthesiologists and will be based on the experiences of thousands of patients in similar situations with similar characteristics to the patients in our operating room.

Q: How do you bring IT and anesthesia together?
It is necessary to have a multidisciplinary group: physicians, nurses and, increasingly, biomedical engineers. An example of the value of this extraordinary team’s contribution is the development of a special software to manage preoperative care and anesthesia planning.

With their contribution, we would like to develop an easy programming language, based on the principle of IFTTT (If This, Then That) with the idea that anesthesiologists can use words that are commonly used in medicine, programming their own alarms or their own recommendations into the SAM. We have this in our pilot project with our own patients, but the result is that in the future many anesthesiologists can add their own knowledge to the system. We can share data and information about our patients to improve the experience in the operating room. That really makes the patient safer.

Q: How do you manage all this?
We have a lot of machines in the operating room and you need to have some device to communicate between them. Augmented reality devices, such as Google Glass, are easy and comfortable to wear in the operating room, and they place critical information in front of your eyes. With them we are able to maintain continuous communication with the operating room devices. We believe that augmented reality could be something that in future we use commonly in the operating room.

Q: You’ve also invented something called a TOFCuff?
Yes, the TOFCuff is a device that can monitor the level of neuromuscular block. The neuromuscular block is a common practice in anesthesia. It makes the patient absolutely relaxed, so the surgeon has the best conditions to do the operation. Afterwards we have some medication to reverse the effect but is necessary to monitor that. I modified a standard blood pressure cuff and incorporated some electrodes inside so we can monitor the neuromuscular block. An advantage is that all anesthesiologists are trained to use a blood pressure cuff. This product now is selling in Europe, Japan and many other countries, and is pending FDA approval to be sold in the United States.

Q: How does all this change safety and the patient’s experience?
We make a more personalized treatment for the patient and increase safety. Errors are minimized and the decisions we are making may be based on the experience of thousands of other patients. The care is tailored for that patient. It’s not standard; it’s specific to them.
Farewell to Traditional Anesthesia

Perioperative Medicine, surgical prehabilitation and new technologies are changing the way we work in operating rooms.

“A multidisciplinary approach allows us to tackle complex biomedical innovation projects to make progress in the search for solutions to offer better health care”

Centro Médico Teknon, Quirónsalud Fresenius-Helios group, is a leading hospital in the Spanish private health care sector

Centro Médico Teknon is run according to a rigorous culture of quality management aimed at providing the best treatment and patient satisfaction, with the highest standards of safety, all of which has earned it the prestigious accreditation from the US Joint Commission International.

With the support of Fundación Quirónsalud that actively promotes clinical research and innovation, health training programs and social action, the Department of Anesthesiology is able to develop its own innovation and educational activities.

“Our RD&I department is made up by physicians and biomedical engineers working together in new tools and processes that facilitate and help to improve the safety and quality of care”

From a treatment perspective, the Department of Anesthesiology performs more than 36,000 anesthetic procedures per year. This is clearly an achievement if accompanied by a better understanding of the need to improve, innovate and use new technologies to perform a better practice of medicine.

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