



Personalized medicine: the paradigm shift in medicine mandating lifelong learning

Lifelong learning process is recommended for all health care providers, while emphasis is always on the routine procedures or the most frequently used parts of knowledge (1). As anesthesiologists encounter drug administration more than any other specialty in medicine, this field seems to be partly neglected in continuing medical education.

Personalized medicine is introduced in recent decades in the need of tailoring therapeutic measures to ensure optimizing patient care. Pharmacogenetics play an essential concept in precision medicine, involving both diagnostic and therapeutic fields. These new notions are readily accepted as engaging research topics in anesthesia, and added to textbooks as well; mostly as complementary data or ideas for further studies. However, anesthesia is one of the specialties facing the different responses to the medications on a daily basis, and some of the infamous historical aspects of personalized medicine started from this discipline. Some notable examples rising the concept of gene polymorphism are malignant hyperthermia following exposure to halogenated anesthetics and/or succinylcholine, or, prolonged apnea following succinylcholine administration, or porphyria exacerbation after anesthesia induction using sodium thiopental.

Ruano and colleagues introduced one of the most practical approaches related to opioid administration in anesthesia based on pharmacogenetic differences in two of the well-known receptors in humans linked to opioid efficacy and toxicity (2). They described groups of people with distinct function of proteins involved in opioid pharmacokinetics (cytochrome P450 2D6) and dynamics (cytochrome P450 2D6) and detailed probable reaction of each group of patients to perioperative opioids. The authors recommended a guideline on how to predict the response of each patient to this class of medications

based on their genetic composition and the prevalence of insufficient analgesia or the development of dependence. Interestingly, 48% of normal population are predicted to be in the category of patients with subnormal OPRM1 or CYP2D6, which are explained to be in need for dose adjustment or different opioid selection! The number is impressive and warns us about our daily routines: are we putting our patients in danger of dependence while some other are challenging inadequate pain management and discomfort?

The above study is one of many, which indicate novel surveillance on the topics selected for continuing medical education and/or must be recommended to working anesthesiologists who may not be familiar to these progressive concepts.

A number of other so-called clinical studies have been presented in this issue of JAMA in which some other aspects of differences in subcellular anesthesia has been noted as well; including the study by Nashibi and colleagues, which looks at choosing anesthetic agents from "personalized medicine" view. In fact, even simple decisions such as the choice of maintenance anesthetics could affect our patients substantially. Selecting isoflurane or propofol seems to have unlike influence on antioxidants, offering further options based on patient's underlying situation or surgical trauma and the extent of stress response (3). Alternatively, the study by Khalili and colleagues suggesting personalized biomarkers of therapeutic monitoring for personalized therapies. In addition, their study quotes that some adjuvant medications may as well serve to improve some of the patients' state of inflammation or decreasing the inflammatory responses resulted from the surgery itself, although, it should be considered wisely that such effects are prominent in just a specific population or in particular situations (4).

On the other hand, Beheshti Monfared and colleagues have discussed a patient with psoriasis undergoing CABG from cellular and molecular perspective of disease (5). These are just examples of an ongoing huge trend denoting a paradigm shift in medicine, which has started a couple of years ago (6).

The above studies just as samples of many, indicate novel surveillance on the topics selected for continuing medical education and/or must be recommended to working anesthesiologists who may not be familiar to these everyday progressive concepts. Personalized medicine incorporates many aspects of patient care; all can be of interest for any hands-on anesthesiologist; though, drug administration seems to be one of the most comprehensible and applicable fields to start with leading to further steps, which open a many new horizons and impressive turning points to our conventional practice of medicine including anesthesiology and perioperative medicine.

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