KJA
Korean Journal of Anesthesiology

Editorial
pISSN 2005-6419 • eISSN 2005-7563

Redesigning an anesthesiology resident training program to improve practical procedure competency

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Educational excellence is the driving force when preparing a competent physician; thus, the quality of an anesthesiology residency training program is a pivotal determinant of the quality of patient care. Pressure to increase accountability during resident training and restricted duty hours have forced a change from traditional training by apprenticeship to a more rigid system. The anesthesiology resident should attain minimum standards of competency for practicing as an anesthesiologist over the course of their residency training.

The main objectives of resident teaching in the current era are to standardize the learning outcome and individualize the learning process [1]. Therefore, numerous trials for teaching [2], assessing [3,4], and documenting the competency [5] of residents in a large number of procedures during residency training have been implemented and teaching quality has been evaluated [6]. In the context of practical skills, exposure to a predetermined time in a clinical subspecialty and a target number of cases does not guarantee competence in that clinical area [7]. There are large variations in total experience and case load among anesthesiology residents, even when they share the same rotation program [5]. In addition, some residents gain competence quickly, while a few never do; thus, there is a need to match the level of teaching to the individual resident, rather than relying on the duration of exposure to certain procedures.

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Korean J Anesthesiol 2017 April 70(2): 118-119
https://doi.org/10.4097/kjae.2017.70.2.118

In this issue of the *Korean Journal of Anesthesiology*, Weil et al. [8] report the use of a learning curve cumulative sum (LC-CUSUM) test to measure three anesthetic skills quantitatively (tracheal puncture, thoracic epidural analgesia, and fiberoptic nasal intubation), which are expected to be mastered during a single 6-month rotation. The CUSUM analysis is a statistical technique to discriminate deviations from a predetermined failure rate. CUSUM score starts at zero and each consecutive failure or success in a procedure changes the accumulated failure score. Specifically, success is indicated by a decrease in CUSUM and failure by an increase. Plotting CUSUM on a graph shows the times of acceptable and unacceptable performance and trends in achievement [9]. Thus, it provides a continuous quantitative evaluation of practical capability when a resident becomes proficient in a new skill, specifically during the predetermined learning period of a procedure [10]. The usefulness of CUSUM as a measurement of competence in various areas of anesthesiology has been tested [11-13]. Notably, Weil et al. [8] reported that most residents did not achieve competency in three anesthetic skills with a significant degree of differences in cases and success rates among residents attained. These results demonstrate that an arbitrary number of attempts or training time may not be appropriate as a marker of training-adequacy due to individual training variations. A quantitative approach to resident training is now required, necessitating re-examination of the methods for training and assessing anesthesiology residents to provide learning opportunities for the specific competencies required by practicing anesthesiologists. By employing CUSUM analysis as quality control [9,10], competency-based medical education [2], and innovative competition-based simulation approaches [4] have been widely tested to evaluate the efficacy of an anesthesiology residency training program. Prompt adoption and application of advanced teaching and assessment programs are required.

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