Learning Curve of New Intraoperative Neuromonitoring Service
Osama Elsayed Shams MD, MHPE, DTQM
Department of Clinical Neurophysiolog
King Abdullah Medical City, Makkah, Saudi Arabia

Intraoperative neuromonitoring (IONM) is becoming a standard of care in progressively increasing number of surgeries. It is not always feasible to have well trained IONM team for the surgeons performing these types of surgeries. In that case, healthcare facilities may be left with a single option of investing in its clinical neurophysiology service to provide IONM. Our center can be a model for such relatively common situation. Its learning curve and strategy in making IONM service available for highly qualified surgeons are presented here.

Providing competent IONM service requires not only a powerful theoretical background that is usually available in case of experienced neurophysiologist, but also technical competency that is really demanding. Observing enough episode of high quality IONM supported by discussions with experts provided the bases for our team basic technical competency. Fig 1 describes the variations of the 50 case observed by our team in Lahey Clinic, Boston and National Guard Hospital, Riyadh. Based on these variations, our team decided to limit the scope of our new IONM service to spinal surgeries.

Fig 1: Variation of the 42 Observed Cases

Learning curve for IONM service is complex and implies all teams participating in the service. In our center, sharing anesthetics effects on recorded responses with anesthesia team paid off gradually as increasing rate for using total intravenous anesthesia (TIVA) (fig 2). Ketamine was also introduced to anesthesia protocol with reduced tendency to use bolus dose of anesthetics.

Fig 2: Using TIVA for Anesthesia

Surgical team gradually developed the routine of merging IONM into their procedures. They gradually paid more attention to IONM alerts and recognized how to best use different modalities like screw stimulation, trans cranial motor stimulation and root stimulation.

IONM team arranged with surgical team to start by monitoring simple cases and gradually increase complexity of monitored cases (fig 3).

Fig 3: Increasing Complexity of Monitored Surgeries

Frequency and type of technical troubleshooting were major issues affecting monitoring process. Mixing cables, 60Hz noise, and stimulation failure gradually vanished over time. Amplifier saturation remained an issue due to technical limitation in our IONM system.

Setup time from the first needle to baselines gradually decreased (fig 4) with using better team dynamics and technical tips. Setup in parallel with anesthesia after intubation significantly improve d setup time.

This review is limited by the number of monitored cases. We plan to continue evaluating our performance to provide a case study that might help making IONM available in an increased number of centers.