Sedation Spectrum in Patients Undergoing Advanced Gastrointestinal (GI) Endoscopic Procedures With Propofol

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Introduction

In spite of federal drug administration's (FDA) refusal to allow gastroenterologists to administer propofol, the enthusiasm has not died down. One of the core reasons for this refusal was that titration of sedation using propofol is difficult due to 300-400 percent pharmacokinetic/pharmacodynamic (Pk/Pd) variability. SEDLine (Masimo Inc., CA,USA) has been validated as electroencephalography (EEG) based tool to target and titrate sedation. We obtained the patient state index (PSI) data of patients sedated to appropriate clinical end points (using propofol) while undergoing advanced upper GI endosopy, with a view to find the depth of anesthesia during these procedures.

Methods

After institutional review board, fifty patients undergoing advanced upper GI endoscopic procedures were studied. The conduct of sedation (provided by 3 CRNA's from a pool of 12, supervised by an attending anesthesiologist) was allowed to continue as per the standard hospital practice, wherein bolus and infusion rates were titrated to desired clinical endpoints (lack of response to scope insertion/manipulation, loss of eyelash reflex and preservation of spontaneous ventilation). Routine monitoring as recommended by ASA was applied in all patients and the output was used to ensure patients safety. Patient state index (PSI), as measured by SEDLine was observed during the entire procedure by a dedicated research assistant. However, anesthesia providers were blinded to this data and as a result sedation levels were not titrated based on PSI.

Results

Fifty patients (23 Females and 27 males) of mean age 60.58 ± 13.91 years and mean BMI 27.81± 6.87 Kg.m-2 were studied over a period of 3 months (June-Aug 2013). PSI data was analyzed to obtain the percentage of time spent by each patient at various sedation spectra (0-25, 25-50, 50-75, 75-100). Of the total duration of sedation, 25.81 ± 24.88 % (1/4th) of the time, patients were under-sedated (PSI of 50-75) as recorded by SEDLine scores. Deep anesthesia (PSI <25) was recorded for 6.68 ± 16.79 % of total time. Only 38.02 ± 30.34% of total time was spent in optimal sedation range when sedation was titrated using subjective clinical assessment. The SEDLine scores validated for various stages of sedation/anesthesia are shown in figure 1. Only 2 patients had fall in oxygen saturation to less than 95 percent during the procedure and both were very brief. Both of these events occurred at PSI score range of 75-100.

Conclusions

The current study has some important implications. Firstly it further strengthens the argument that for effective sedation, propofol should only be administered by anesthesia providers, at least in the setting of GI endoscopy. As the patients spend significant amount of time in deep general anesthesia, non-anesthesia providers should desist from using propofol for these procedures.

Secondly, these patents should be clearly informed (during consenting) that for varying periods of time while asleep, they will be under general anesthesia including deep general anesthesia.

Finally, by using novel monitoring tools like SEDLine, sedation can be titrated to objective endpoints. Certainly, periods of deep sedation and under-sedation can be reduced, although cannot be eliminated. This might eventually improve procedural safety, acceptability and ease of endoscopy.