Prospective Comparison of Patient State Index (PSI) Between Propofol Sedation and Intravenous Conscious Sedation During Colonoscopy

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The number of colonoscopies performed in the United States of America have been on the increase (1,2). They have produced expected results by reducing the number of colonic cancers. However, there have been reports of increased incidence of aspiration in patients undergoing colonoscopy with propofol based sedation.(3) It is commonly believed that depth of sedation is greater in patients sedated with propofol compared to intravenous conscious sedation and is a factor responsible for an increased incidence of aspiration. There are no studies that have measured the depth of sedation objectively.

Methods

After obtaining the institutional review board approval, 45 consenting adults (26 males, 19 females) were studied. In addition to the American Society of Anesthesiologists recommended minimum monitoring, depth of sedation was monitored with a SEDline electroencephalograph based monitor that displays patient state index (PSI). A RAD 87 monitor was used for additional respiratory monitoring. The dose and the timing of the sedative medications were independent of the PSI values. The nurse anesthetist (in case of propofol based sedation) and the gastroenterologist (in patient's receiving intravenous conscious sedation) were blinded to PSI. Intravenous conscious sedation was provided with fentanyl, midazolam and occasionally diphenhydramine. A dedicated research assistant watched the SEDline monitor during the entire procedure. The PSI scores were noted at the time of unresponsiveness (coincided with the colonoscope insertion), scope removal and when the patient was appropriately responsive. In addition, the time spent in various sedation spectrum (PSI scores of 0-25, 25-50, 50-75 and 75-100) were retrieved from the stored data.

Results

Of a total of 45 adults studied, 23 patients received gastroenterologist guided sedation (Midazolam-Fentanyl +/-Diphenhydramine, Group S) and the remaining 21 patients received propofol based sedation (Group P) administered by a certified nurse anesthetist (CRNA). Both groups were statistically comparable in demographic parameters (Mean age, gender, weight, ASA physical status). The mean baseline SEDline scores were comparable in both Group P & S. (92.28±7.95 and 89.45±12.13) [p=0.35]. Although, dosing of sedative medications in all patients was guided by the clinical responsiveness and aimed to achieve minimum patient movement, SEDline scores at scope insertion were significantly lower in Group-P in comparison to Group-S (52.24±24.40 vs 72.78±18.62 respectively) [p=0.004]. Similarly, SEDline scores when patients became responsive to verbal commands were also significantly lower in Group P in comparison to Group S (62.33±19.13 vs79.14±15.09 respectively) [p<0.001]. The data were also analyzed for the duration spent at various sedation spectra (based on PSI, classified as above). Patients In group P spent significantly longer percentage of time at deeper levels of sedation (0-50) in comparison to group S [p>0.01].

Conclusions

Across all stages of the procedure, patients undergoing colonoscopy with propofol based sedation were significantly deeply sedated than patients undergoing the same procedure with intravenous conscious sedation.

References

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