Propofol — a safe and effective sedative for endoscopy

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Background: Propofol has recently been reported to be a safe sedative for endoscopy. Methods: One hundred consecutive patients more than 18 years of age undergoing an endoscopic procedure were included in the study. The risk of sedation was calculated using the American Society of Anesthesiologists risk class. Pregnant women, patients opting to undergo endoscopy without sedation, and those allergic to any sedative, eggs or soybeans were excluded. A trained nurse administered propofol under the supervision of an anesthesiologist. Vital parameters, including oxygen saturation, were measured before and during the procedure. Time taken for full sedation, quantity of propofol used, duration of the procedure, time taken for recovery from sedation, and any complication during or after anesthesia were recorded. The patients scored quality of sedation, perception of pain and any memory of the procedure. Results: Eighty-four patients were in ASA risk class I and II and the remaining 16 were in a higher ASA risk class. There was no difference in vital sign measurements during the endoscopic procedures as compared to baseline values. None of the patients had any complication. More than 90% of patients did not report any pain and had complete amnesia for the procedure. Conclusion: Propofol is a safe and effective sedative for endoscopic procedures. [Indian J Gastroenterol 2003; 22: 56-58]

Key words: Gastroendoscopy, meperidine, midazolam, sedation

 Benzodiazepines, alone or in combination with an opioid, are the most widely used agents for sedation in endoscopic procedures. 1 This combination is generally well-tolerated; its significant drawbacks include a several-minute delay in onset of effect,2 persistence of sedative effect prolonging hospital stay,3 and morbidity and mortality due to respiratory depression.4 Up to 15% of patients have been shown to be dissatisfied with sedation during colonoscopy.5

An ideal sedative agent for endoscopic procedures should have a rapid onset of action, be short acting, should produce complete amnesia, and be safe. Propofol, which has been used for several surgical procedures, has a more rapid onset of action,6 has shorter recovery time7 and induces amnesia comparable to midazolam—meperidine combination.8 A few reports on the use of propofol for sedation during gastrointestinal endoscopic procedures have appeared.9,10,11 The present study was planned to prospectively assess the safety of propofol for various endoscopic procedures.

Methods

This prospective study included patients above 18 years of age undergoing upper gastrointestinal endoscopy (UGIE), colonoscopy or endoscopic retrograde cholangiopancreatography (ERCP). Pregnant women, patients opting to undergo a procedure without sedation, and those with history of allergy to any sedative, eggs or soybean were excluded. Patients belonging to American Society of Anesthesiologists (ASA) risk class I to V were included in the study. Written consent was obtained from the patient or the nearest relative. The study conformed to terms of the Helsinki Agreement.

Before and during the endoscopic procedure, pulse rate, blood pressure and oxygen saturation were recorded and monitored; ECG was monitored throughout the procedure. During the procedure, all patients received supplemental oxygen (4 L/min) through a nasal cannula. A trained nurse under the supervision of an anesthesiologist administered a titrated dose of propofol, i.e., an initial bolus of 30-40 mg followed by boluses of 10-20 mg each as per requirement. The anesthesiologist monitored the progress to sedation by recording appearance of the following sequence of clinical signs: increased talking, drooping of eyelids, muscle relaxation and loss of eyelash reflex. The time to complete sedation was recorded.

Time taken for procedure and time from onset of sedation to recovery were recorded. The following events were considered as complications: heart rate below 50 beats per minute, fall of oxygen saturation to below 90% on 4 L/min of supplemental oxygen, fall of blood pressure to less than 90/50 mmHg, and need for mechanical ventilation.

After the procedure, patients were transferred to the recovery area and vital signs and oxygen saturation were monitored till full recovery, i.e., when the patient responded readily to name, with clear opening of the eyes (no ptosis). Patients were asked to complete a satisfaction questionnaire, which included questions on quality of sedation, perception of pain during the procedure, and any memory of the procedure. The patients
were discharged once their blood pressure and heart rate returned to within 20% of the baseline value. Oxygen saturation exceeded 90% on room air, and the patient was able to walk without support.

Statistical comparison was done using the t test.

Results

Of the 100 consecutive patients included (age range 19-91 years, mean 45; 69 men), 68 underwent UGIE, 21 colonoscopy and 11 ERCP. The mean time taken for the three procedures was 5.3 min (range 2-22), 13.1 min (6-40) and 29.9 min (10-30 min), respectively. Eighty-four patients were in ASA class I and II, 14 were in ASA class III and one patient each in ASA classes IV and V.

For UGIE, mean propofol dose was 126 mg (range 80-230); the mean doses for colonoscopy and ERCP were 160 mg (80-200) and 190 mg (140-360), respectively. Pulse rate, and systolic and diastolic blood pressures did not change after propofol (Table 1). None of the 21 patients who underwent colonoscopy could change their position themselves when asked to. The time for full recovery after the procedure was 16.9 min (range 8-22) for UGIE, 25.1 min (15-30) for colonoscopy and 32.6 min (25-50) for ERCP. No patient had any complication.

In the patient-satisfaction survey, 98 (98.8%) patients reported complete amnesia of the procedure, 7 (7%) had mild discomfort during the procedure and 97 (97%) reported the quality of sleep as very good (Table 2).

Discussion

Propofol has been used at our institution during the last 3 years on more than 10,000 patients undergoing endoscopic procedures, without any major complications. The results reported here are of a prospective study on the use of propofol in this setting, probably the first such report from India.

Randomized controlled trials have shown better sedation and early recovery along with cost-effectiveness with the use of propofol as compared to a combination of midazolam and meperidine in patients undergoing colonoscopy or ERCP. Significant adverse events during the procedure, such as hypotension, hypercapnea, bradycardia and hypoxemia were similar in the propofol and midazolam/meperidine group in both the studies.

Our study confirms the safety of propofol for endoscopic procedures.

The risk of respiratory depression with propofol is highlighted by the fact that even during conscious sedation with propofol, an 81% decrease in hypoxic ventilatory drive has been reported along with frequent hypoxic episodes when patients breathe room air. But this side effect occurs with other sedating agents too. Accordingly, the use of supplemental oxygen for endoscopic procedures is recommended. Rex et al studied adverse reactions to propofol in 2000 patients undergoing various endoscopic procedures and found five episodes of oxygen desaturation to <85%; four of these seemed to be related to excessive administration of propofol and were treated with brief (<1 min) periods of mask ventilation.

The commonest side effect of propofol is pain in 33%-50% of the patients when the drug is injected into small veins. In the present study, pain and tinging were reported by 40% of patients. Though propofol has no analgesic effect, only 7 of 32 patients undergoing colonoscopy or ERCP required post-procedure injection of diazepam sodium to control pain.

Compared to other sedatives, propofol reduces the duration of stay in the endoscopy unit. In the study by Vargo et al, all patients who received propofol were fit for discharge within 30 min of the procedure, compared with fewer than 20% patients in the standard sedation group. Patient satisfaction in terms of sedation and painless endoscopic procedures has been reported in more than 90% of patients. In the present study also, 92% of patients had no pain, had total amnesia for the procedure, and had good quality of sleep. The maximum recovery time was only 50 min.

An important aspect of our study was the use of propofol in 16 patients in ASA class III, IV and V. Our results suggest that propofol may be safe in such patients too. Propofol causes deep sleep and this can...
progress to frank anesthesia; the person administering the drug should be capable of reverting this phase. Loss of perception of pain with propofol may be a disadvantage during colonoscopy since pain is an important indicator for impending colonic rupture. In fact, one early study reported a high rate of perforation with propofol use during colonoscopy. It is important for the endoscopist to be aware of this problem and not push the colonoscope blindly.

Another important issue is the cost associated with propofol, since it can be administered only by trained medical professionals. At our center, propofol administration adds Rs. 500 to the cost of the procedure.

We believe that the use of propofol will have a major role in popularizing endoscopic procedures but will also necessitate greater care to prevent adverse outcomes.

References

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