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Case Study

Comparing Consumed Sevoflurane with Intravenous Propofol for Maintaining Sedation in Patients Undergoing The surgery

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ABSTRACT

Introduction : Currently, endoscopic procedures performed under sedation hold a significant position. Under sedation, study conditions are ideal. The aim of this study is to evaluate the anaesthetic effectiveness of intravenous versus inhalation methods for maintaining sedation in endoscopy patients.

Materials and methods : 32 patients, ASA I–III, both sexes, ages 18–80, receiving a diagnostic colonoscopy were included in this long-term, randomised clinical trial. The patients were randomly assigned to one of two groups. Both groups received intravenous induction with propofol (2–2.5 mg/kg); Group A was kept sedated with a propofol infusion (1-2 mg/kg /min); Group B was sedated by inhaling 2 vol% sevoflurane through a nasal cannula that supplied oxygen.

Results : The two methods were carried out without any recorded complications; of the 15 patients in group A, only 13 needed a rescue bolus again, and the recovery period was 12 minutes. With a 7-minute wake-up period, group B comprised 17 patients, of whom 35% needed a salvage bolus.

Conclusion : Both anaesthetic methods worked well and were safe; patients who received sevoflurane in the endoscopic unit's recovery had a 50% shorter stay. Patients who were given propofol alone showed deeper anaesthesia and needed fewer rescue boluses. Both the patients and the gastroenterologists showed signs of satisfactory comfort with both procedures.

Keywords : *Colonoscopy; Endovenous; Inhalation; Propofol; Seda-tion; Sevoflurane*

Background

Nowadays, sedation-assisted endoscopic procedures play a significant role in the diagnosis and management of digestive system pathologies. Sedation makes it possible to create the best conditions for investigation and study, improve control over the process, lessen the patient's sympathetic response, and significantly shorten the amount of time needed. It also makes the patient much more cooperative and relaxed, enabling the operator to perform a more thorough examination. Colonoscopy, also referred to as lower digestive endoscopy, is an outpatient procedure that involves the endoscopic exploration of the large intestine from the anus to the ileocecal valve [1]. Because of this, it is critical to use an anaesthetic technique that includes fast-metabolizing drugs, easy elimination, and the lowest possible incidence of complications, allowing the patient to be discharged early. The most widely used anaesthetic technique is intravenous; however, even though it works well, it has a number of side effects that are not good for the patient. As a result, the use of the inhalation route has recently been considered as a viable alternative to maintain effective sedation. One of the many advantages of using it is that we can wake up more quickly after Now that the study is complete and has fewer systemic implications, it will be even simpler to do, which will benefit the patient, the gastroenterologist, and the anesthesiologist.

The intravenous route is typically used far more frequently in sedation protocols outside of the operating room (particularly when performing digestive endoscopy studies). As the preferred hypnotic medication, propofol has emerged as the most often utilised in the execution of this kind of surgery in recent years. This is because of its high safety margin in terms of the

heart and lungs, which provides the patient with a better safety profile and fewer reported side effects. Nevertheless, prolonged infusions of this medication or infusions exceeding 4 mg/kg/hour have been reported to have harmful effects on the body, resulting in hyperlipidemia states and a condition known as Propofol Infusion Syndrome, which is a critical state marked by bradycardia, rhabdomyolysis, metabolic acidosis, hyperlipidemia, hepatomegaly, and hepatic steatosis [2], with the ensuing multiorgan failure that may result in the patient's death; Furthermore, mishandling of propofol resulting from the use of soybean oil and egg phospholipid as a vehicle in its preparation has been linked to cases of septicemia. These substances can serve as a breeding ground for bacteria if not handled correctly and in accordance with manufacturer's instructions. Given that endoscopic procedures in gastroenterology, particularly colonoscopies, necessitate extended periods of time for their proper execution, the administration of a halogenated agent—in this case, sevoflurane via inhalation—is suggested to show that it is a cost-effective means of maintaining sedation without observing the complications. This is where the significance of conducting such a study lies in the fact that it is intended to provide another safe method for both the patient and the gastroenterologist, allowing the latter to complete the procedure with a high degree of satisfaction. As previously mentioned with the prolonged use of propofol infusions, this study improves the quality of life for all parties involved: users and medical personnel in the endoscopy unit.

From a medical perspective, this work is critical because it ensures increased safety for medical staff and frees the gastroenterologist from having to halt the study when propofol dosages reach their maximum, thereby preventing complications that may arise later. Conversely, the anesthesiologist is an additional resource that can be utilised when administering sedation outside of the operating room, particularly in patients who have a history of known hypersensitivity to any propofol component, such as the egg. Being an alternative to the traditional intravenous route and a safe therapeutic option would be an additional benefit for the institution. To illustrate the application of the inhalation route as a secure and practical substitute in the In the context of anaesthetic treatment for patients requiring lengthy procedures in ambulatory endoscopic units, the non-limitation that denotes the use of a single sedative technique and the ensuing availability of this single drug—propofol, in most cases—would be preferred.

Digestive endoscopic diagnostic procedures rank among the most common procedures performed at the Centro Médico Docente La Trinidad, with longer turnaround times for more complicated cases. Due to the risk of achieving toxic doses of propofol, this forces the procedure to be stopped frequently, preventing the gastroenterologist from finishing the entire study. Despite not being the inhalation technique, which is frequently used for sedation, De la Torre and collaborators conducted an experimental and prospective study in which they attempted to compare the features of the traditional colonoscopy sedation technique with intravenous propofol and an inhalation with sevoflurane [3].

Chun Hui Lan, on the other hand, and colleagues compared the use of nitrous oxide with and without sedatives during upper gastrointestinal endoscopies in order to lessen patient discomfort and subsequent complications. The authors draw the conclusion that the studies were more accurate in terms of diagnosis, they took noticeably less time to complete, and both patients and operators reported feeling more at ease with this technique in those deeply sedated patients in whom they used the nitrous oxide mixture in addition to intravenous sedatives. However, more complications were reported in these cases [4], which suggests that the hypnotic component must be used in addition to the agent to ensure analgesia in these patients. be given more weight because the patient and the patient both place a higher value on it. Physician, but instead obtain a medication that enables us to accomplish the intended outcome without the drawbacks associated with their usage and the administration of two or more anaesthetic medicines in the treatment of patients, particularly in outpatient settings.

Objective

to evaluate the effectiveness of endo-venous versus inhalation anaesthesia in maintaining sedation in patients undergoing lower gastrointestinal endoscopy.

Specific objectives

- Assessing the patients' hemodynamic variability between the two methods
- Establish the length of the study; • Determine whether rescue boluses are necessary to prevent anaesthetic superficialization; Use both methods to document adverse reactions in patients having lower gastrointestinal endoscopies.

- Establish the patient's wake-up time following maintenance suspension.
- To evaluate the gastroenterologist's degree of satisfaction with the anaesthetic technique; • To qualitatively evaluate the comfort level of the patient following sedation

Materials and Methods

Research design

This is a clinical, prospective, longitudinal, unicentric, and simple blind study.

Working universe

Following the application of inclusion and exclusion criteria, patients admitted to the Endoscopy Unit of the Gastroenterology Service of the Centro Médico Docente La Trinidad will be randomly divided into two groups.

Description of the variables

Dependent variables : include hemodynamic behaviour, study duration, oxygen saturation, rescue bolus requirements, awakening time, and patient and operator satisfaction with sedation methods used during the investigation. Analgesic efficacy of the inhalation versus the endovenous technique is also evaluated.

Independent variables: Propofol, sevoflurane, and lower gastrointestinal endoscopy. With a dichotomous qualitative measurement scale, they are qualitative variables. Population (age and sex). predicative (ASA definition of physical state), operative, respiratory, and hemodynamic.

Sample selection

An estimated sample size of 32 patients was obtained using convenience sampling.

Selection criteria

Criterion of inclusion: Patients who are going to have diagnostic colonoscopies and who are between the ages of 18 and 80, who meet the physical status I, II, and III requirements as defined by the American Society of Anesthesiology (ASA), have signed an informed consent form.

Exclusion criteria: Allergy or hypersensitivity to some of the study's reference medications; patients with established liver disease; suspicion or confirmation of pregnancy; antecedent or risk of malignant hyperthermia; less than eight hours of fasting; patients with mental illness or psychic disorders that make it difficult for them to understand the study; and patients with life-threatening illnesses for which the study cannot be conducted.

Procedure

The authors visited the Gastroenterology Service Endoscopy Unit CMDLT, where the patients listed (Graph 1) were chosen for the colonoscopy procedure that met the inclusion criteria and did not have any exclusion criteria. After being informed about the study, the procedure to be performed, and any potential complications, those who consented to participate signed an informed consent form officially including them in the study. The sample was split into two large groups using the closed endlope technique in a random, standardised manner: group A consisted of patients who received the full intravenous sedation technique with propofol, and group B consisted of patients who were sedated using a combination of techniques, including an intravenous induction with propofol and inhalation maintenance. With sevoflurane, this selection was done at random. After the study group was chosen, non-invasive standard monitoring (blood pressure, ECG, oxygen saturation) was carried out, and oxygen was administered via nasal cannula at a flow rate of l/min. Based on the group that was chosen, the anaesthetic procedure was then initiated. In contrast, group B was induced with in-travenous propofol at a dose of 2–2.5 mg/kg and maintained with sevoflurane at a concentration of 2 vol% through a nasal cannula with an oxygen flow of 2 l/min. Group A (control) was administered propofol during the induction at a dose of 2–2.5 mg/kg, and it was done the maintenance with the same drug in infusion of 1-2 mg/kg/min; Vital signs were recorded before the administration of propofol, at 5 minutes, at 10 minutes, at the end of the study, and whether or not the appearance of any complication caused by the administration of anaesthetics. If a patient showed signs of anaesthetic superficiality (increase of more than 20% of its hemodynamic variables or voluntary movements of the patient that would make hard the realisation of the study), a bolus of propofol at 1 mg/kg was administered. The infusion of propofol, or sevoflurane, as the case may be, was started to reverse anaesthesia as soon as the gastroenterologist reached the ileocecal valve with the colonoscope. This process measured the duration from the point at which the anaesthetic was stopped to the point at which After

regaining consciousness, the patient was able to speak clearly. Following this, a survey was administered to the patient and the gastroenterologist to gauge their level of satisfaction with the anaesthetic procedure and the study.

Statistical analysis

There will be two kinds of analysis employed. First, there is the graph-ic analysis, which is based on frequency histograms, bar graphs, and sector diagrams; second, there is statistical significance or validation, which is based on a proportional comparison using the Z test. Bolus: For two proportions, there was no difference between the two groups. Z = or less than 1,431668. Two tails, 0, 1522388, P (T< or =). P test: 0 out of 25. Age, sex, and number did not differ between the two groups. Variance and average are comparable. There is no difference in the diastolic, systolic, or media pressure; the two groups' average and variance are comparable.

Results

Group B (propofol plus sevoflurane) was made up of 17 patients, while group A (propofol only) included 15 patients, of which 60% were ASA II patients and 40% were ASA I patients. 65% ASA II and 35% ASA I (Table 1); both methods showed hemodynamic stability prior to, during, and following the procedure, and neither technique showed any significant respiratory complications during the study. (Table 2, Graphs 2-4); however, compared to group A, which received only propofol, where a lower percentage of patients (13%) required rescue boluses, group B had a lower anaesthetic depth because 35% of the patients needed to use rescue boluses with propofol to allow the study to continue (Graph 5). Group B, however, spent less time in the wake. the length of stay in the recovery area of the endoscopy room by roughly 50% (Graph 6); 100% of patients and operators expressed satisfaction with both techniques; the study was completed on average in 15 minutes, with no significant differences between the two groups (Graphs 7, 8). of their patients with an average of 7 minutes vs. group A (propofol) with an average of 12 minutes.

Discussion

An excellent candidate for anaesthetic management through the administration of pharmaceutical agents that help reduce anxiety and prevent discomforts during the procedure is a patient undergoing diagnostic or therapeutic endoscopy studies. Consequently, the length and intricacy of the endoscopic studies conducted have grown dramatically in the last few years. Because of this, it's critical to perform them on a patient who is more cooperative and at ease, as well as one who is hemodynamically stable, to ensure that the colonoscopy is a painless exploration [3].

In the recent history of medicine, there has always been a quest for the perfect anaesthetic. What is currently needed is the use of efficient medications that enable the creation of a sufficient sedation plan with few or no side effects, ensuring both the patient's and the surgeon's comfort throughout the study.Propofol is an anaesthetic medication that was created with the intention of meeting these standards. When administered in sufficient amounts via intravenous injection and handled by skilled professionals, it can produce a state of sedation that meets the needs of the previously mentioned areas, particularly when a colonoscopy is being performed [5]. Because of this, it is now the most commonly used anaesthetic medication for ambulatory procedures. area due to its great margin of hemodynamic safety; nevertheless, due to the major consequences that have been reported following prolonged use, the use of the inhalation route has been considered an effective alternative strategy for maintaining sedation during endoscopic tests. Propofol is no longer the only medication used for these objectives because to the ongoing renewal and research in anesthesiology in recent years, and its exclusivity is gradually eroding. Recent publications have documented a number of medicines, both inhaled and intravenous, with positive outcomes in these indications for the majority of them [6]. According to Gupta et al., the differences in early recovery durations between the various anaesthetics were negligible when it came to inhaled anaesthetics [7]. From a statistical perspective, every demographic feature in the patient group in this investigation was homogeneous, allowing for a sufficient analysis. Regarding the length of the study, our findings deviate from those of Lan and colleagues, who discovered that patients who received inhalation anaesthesia with N2O required ten minutes less time to complete the procedure than patients who were deeply sedated intravenously [8]. No discernible differences were found between the two groups' average study durations in our study, which was roughly 15 minutes for each. This is most likely because sevoflurane, the inhalation agent we use, has very different pharmacokinetic and metabolic characteristics and produces a greater degree of sedation. compared to Lan et al.'s inhaled anaesthetic N20. De

La Torre et al. observed a minor elevation in heart rate during colonoscopy in individuals receiving sevoflurane inhalation anaesthesia in relation to the hemodynamic variables. The superficiality of the anaesthetic approach and the patient's suffering during the treatment are the modifications associated with this phenomena [3]. The groups examined in this experiment did not see any notable hemodynamic alterations. When patients are sedated with sevoflurane, rescue boluses with intravenous propofol at a dose of 1 mg/kg are used as an intravenous support for individuals who exhibit anaesthetic superficiality during the research [8]. Regarding this, our findings resemble those of discovered by De La Torre et al. because the patients in the group represented by patients sedated by sevoflurane inhalation needed more boluses—about 35% more—than the patients in the group sedated by intravenous. This superficiality lack of aesthetic appeal is closely linked to the examiner's method of performing colon rectification procedures [3]. According to Ghatge S. et al., sevoflurane is a safe, effective medication with a low risk of nausea and vomiting [9].

It is noteworthy to discuss the findings of Cohen et al. and Wemli et al. concerning the adverse effects that occurred with both anaesthetics, including arrhythmias, hypotension, and SO2 desaturation. These findings did not indicate statistically significant differences between the study groups, with hypotension being the most commonly reported complication in both groups [6, 10]. Unlike Cohen et al., we did not observe any significant hypotension in our study groups during the procedure. Finally, we would like to draw attention to our findings as well as those of López and colleagues, which allowed the author to confirm that propofol and sevoflurane are medications with a sufficient safety profile that support adequate spontaneous ventilation and shorten patients' recovery stays. However, our study yielded somewhat different results because the patients who were sedated with sevoflurane as opposed to those receiving intravenous propofol, resulting in the patient's and the endoscopist's contentment and well-being [11]. Similarly, Faga et al. discuss the safety of propofol in patients with cirrhosis undergoing endoscopic retrograde cholangiography and colonoscopy [12].

Conclusion

The study revealed that both anaesthetic techniques were safe and effective, with no changes in the time of realisation [13]. Patients who received inhaled sevo-flurane after sedation awoke considerably faster than those who only received propofol, resulting in a 50% shorter stay in the recovery area. Compared to the group that received sevoflurane, which was used in 35% of cases—double the number of patients when compared with the group that only received propofol during the induction and maintenance of sedation—only 13% of patients in the former group needed rescue boluses, indicating a much deeper anaesthetic level. In summary, all patients exhibited a satisfactory degree of satisfaction with both methods, suggesting that sevoflurane is a viable approach for sedation during lower gastrointestinal videodiagnostic procedures.

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