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Comparison of the Efficacy of Propofol and Midazolam Each In Combination with Fentanyl as a Sedative Agent in Minor Oral Surgery- A Double Blind Study

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Abstract

Back ground and objectives: Intravenous conscious sedation, also referred to as parenteral or moderate sedation, is defined as a drug-induced depression of consciousness during which patients respond purposefully to verbal commands, either alone or accompanied by light tactile stimulation. No interventions are required to maintain a patent airway, and spontaneous ventilation is adequate, as well as cardiovascular function. In addition, patients must retain their protective airway reflexes, and be able to respond to and understand verbal communication. The drugs and techniques used must therefore carry a margin of safety broad enough to make loss of consciousness and airway control unlikely[1].

The aim of the study was to assess the efficacy of Propofol and Midazolam each in combination with Fentanyl as an intravenous sedative agent in minor oral surgical procedures.

Methods and Material: The present study was conducted on 60 adult patients of ASA Class I and II between the age group of 20 to 50 years; requiring minor oral surgical procedures. Patients were divided in to two groups of 30

patients each and one group was given Propofol and the other group Midazolam.

Oxygen was administered at the rate of 4 litres/minute followed by 100-µg of fentanyl delivered over 2 minutes for both groups. Comparison was made in terms of Pain at the site of injection, onset of action, cardiovascular and respiratory parameters, recovery, amnesia, side effects etc. Statistical analysis used:Chi-square, Fisher exact test, Fisher exact test, Student t test (two tailed)

Results: The therapeutic efficacy of both the groups was satisfactory. The Propofol group was less co-operative, but it was not up to clinically significant level. Pain during the injection of sedative was an adverse effect in Propofol group. The Propofol group was found to be superior sedating agent having rapid onset of action, predictability of action, profoundness of amnesia and faster recovery periods offering advantage of early patient discharge in day-care minor oral surgical procedures.

Conclusions: Propofol appears to be a safe and efficacious alternative to Midazolam, for use as an intravenous sedative agent in minor oral surgery.

Keywords: Intra venous sedation, Propofol, Midazolam, Fentanyl, Amnesia, Recovery.

Key messages: Propofol+ fentanyl combination is a superior sedating agent compared to midazolam+ fentanyl combination for day care minor oral surgical procedures due to rapid onset and predictability of action, profoundness of amnesia, and a faster recovery period, offering advantages early patient discharge and better patient compliance.

Introduction

The dental profession historically has been concerned with the problem of controlling pain and anxiety. The introduction and development of local anesthetic has largely eliminated pain from dental procedures [1'2]. The anxious patient may also exhibit peripheral manifestations of excessive sympathetic activity such as xerostomia, tachycardia, sweating and tremors which in some instances may lead to anxiety and apprehension induced arrythmias and vasovagal reactions.

The evolution of general anesthesia to its present state also permits almost complete relief from intraoperative pain and anxiety. Wide spread use of general anesthesia is limited by the risks associated with its use, the extensive training required, cost factors and long recovery period

Recognition of this as a serious problem had lead to the use of pharmacological and behavioral therapies to control both the aversiveness of the procedure and patient anxiety. The intravenous administration of variety of anesthetic agents to conscious patients has been prompted as providing optimal control of anxiety with minimal risk [3].

In conscious sedation, patients are capable of making purposeful responses to auditory and tactile clues, with maintenance of ventilatory and circulatory stability. In deep sedation, patients react only to painful stimuli, they regularly require airway support. At the level of general anesthesia, patients are unresponsive, and airway support is obligatory[18]

The most reliable method of conscious sedation is intra venous sedation because of its rapid and titratable results. The other methods to induce conscious sedation are inhalation sedation with nitrous oxide and oxygen and the less controllable forms of oral and intramuscular premedication. The disadvantages of the oral sedations are the variability of individual's response to the medications, delay in onset of action, prolonged duration of action etc.

Propofol, the short acting intravenous anesthetic agent, is used to achieve a different level of sedation nowadays. Some authors recommend the use of propofol as a sedative agent in short procedures. Propofol produces central nervous system depression that gives rise to an anesthetic effect that ranges from sedation to hypnosis [4]. It

has got antiemetic and antipruritic properties rapid onset of action, short duration of clinical effects, high clearance rate, minimal tendency for drug accumulation, no active metabolites and no analgesic effect.

Midazolam, the short acting barbiturate, is a sedative drug that exerts its action through the effect on GABA receptor in the brain, thus relieving anxiety. It is increasingly employed in outpatient oral and maxillofacial surgical procedures to produce anxiolysis and amnesia [5,6]. It has sedative, amnesic, and anticonvulsant effect. However, midazolam shows extensive hepatic metabolism that increases the risk of complications in patients with advanced liver disease especially with prolonged sedation.

Opioid analgesics like fentanyl can be administered with anesthetic agents to provide analgesia. It will decrease the discomfort associated with the administration of local anesthetic agent[4]. Opioids are also effective in altering the sensation and suppressing responses associated with certain manipulations such as elevation of a tooth that persist despite the achievement of a profound nerve block. As a sedative, opioids are less effective compared toother anesthetic agents. It also produces reduction in sympathetic tone, which results in slowing of heart rate by depression of the central vagal nucleus. This is beneficial in the anxious patient who has a relative tachycardia [4]. The advantages of fentanyl over other opioids include cardiovascular stability, lack of histamine release and relatively short duration of action [6]. Propofol or Midazolam can augment the sedation and ventillatory depression associated with co-administered opioid.

The aim of this study is to compare the efficacy of Propofol and Midazolam each in combination with Fentanyl as sedative agent in day care minor oral surgical procedures.

Aims and Objectives

The objective of the present study is to clinically evaluate the usefulness and toxicity by qualitative comparison between two combinations Propofol + Fentanyl and Midazolam + Fentanyl, as sedative agents for patients undergoing minor oral surgical procedures

Subjects and Methods

This study was conducted in the Department of Oral and Maxillofacial Surgery. The study included 60 adult patients of ASA Class I and II between the age group of 20 to 50 years, both male and females, requiring minor oral surgical procedures such as;

- Extraction of impacted tooth
- Multiple dental extractions
- Apicectomy
- Cyst enucleation
- Incisional and excisional biopsies
- Incision and drainage of the dental abscess
- Reduction and fixation of dentoalveolar fracture.

All the patients were subjected for a routine blood investigation, chest-ray, and electrocardiogram (ECG). A pre-anesthetic evaluation and physician's clearance were obtained for all the patients.A detailed case history, including past exposure to anesthetics, sedative agents, and previous surgical procedures were collected and recorded. The procedure was explained to the patients, and a written informed consent was obtained

Narcotic drug licence (ND V) was obtained from the Excise dept. to purchase, store and administer Fentanyl.

Selection criteria

- ASA class I and class II patients
- Patients within the age group of 20-50 years, both males and females. Patients with no history of sensitivity to any of the drugs on their constituents were included in the study.

Exclusion criteria

- The patient with history of psychiatric illness
- Chronic use of CNS depressants , anti-depressants or sedatives
- Alcohol abusers
- Morbidly obese patients
- Patients suffering from systemic complications / symptoms
- Pregnant or with history of anesthetic related complications
- Patients who had been given general anesthetic previously for dental procedures
- Surgical procedure which took more than 30 minutes

The study was approved by the ethics committee of our institution. All the patients were advised for a minimum of 6 hours of NPO. The surgical procedures including the administration of intravenous sedatives were explained to the patient and relative and an informed consent was taken. Presence of anaesthetist was there throughout the procedure

In the operating room the patient was monitored with three leads electrocardiogram, pulse-oximeter, and non-invasive blood pressure cuff (NIBP) for continuous monitoring of heart rate, oxygen saturation, blood pressure and respiratory rate. The patient was allowed to relax in the operation theatre for 10 minutes with constant reassurance following which the baseline parameters noted and recorded.

Drugs

A 20-gauge IV cannula was placed on the largest available vein on the hand. Oxygen was administered at the rate of 3-4 liters/minute via nasal cannula. Dexamethasone 8mg was given first through the IV cannula followed by 100-µg of Fentanyl delivered over 2 minutes. It is a double blind randomized study in which one group of 30 patients was given a combination of Propofol and Fentanyl and the other group Midazolam and Fentanyl. The patients were randomly selected by the anaesthetist for the purpose of administration of the sedative .The induction dose of Propofol was 0.5mg/kg and a dose of 30 µg/kg/minute was administered by syringe infusion pump as a maintenance dose. In Midazolam group Midazolam was given as a single dose at 40µg/kg and no maintenance dose was given instead 5% dextrose was administered by syringe infusion pump at the rate of 30 µg/kg/minute. Since Propofol is milky white in colour and dextrose is colourless, a green cloth covered the syringe infusion pump in all cases. The surgeon, assistants and the observers were blind about which medications were given to the patient for sedation. After the administration of the sedatives local anaesthesia was achieved with 2% lignocaine hydrochloride with 1:80000 adrenaline.

Onset of action: The onset of action was calculated by the time elapsed between induction and the onset of signs of the end point of sedation

This was calculated from the time of induction of anaesthetic agent to the loss of eyelash reflex. Apnoea was considered as the absence of spontaneous ventilation for more than 30 seconds; apnoea for more than 60 seconds was considered prolonged.

Duration of surgery

This was calculated from the time of first incision to the last suture placement, or till the end of the surgical procedure. Surgeries that had taken more than 30 minutes are excluded from this study.

Amnesia period and quality were evaluated with the help of post-operative questionnaire regarding surgical procedures

Patient co- operation

Co-operation score assessed the patient co-operation during the procedure.

I. Did the patient's movements during the injection of local anaesthesia or during the surgery interfere or delay the treatment?		
At 5 minutes	.....	[0]—No interfering movements. [1]---Minor movements, positioning remained appropriate [2]—Minor movements, patient had to be repositioned [3]---Movements grossly interfered with the procedure
At 15 minutes	.....	

II. To what extent did the patient verbalize discomfort during procedure?		
At 5 minutes	.....	[0]— No verbalization [1]—Some verbalization, but didn't indicate pain or discomfort. [2]—Some verbalization indicating pain or discomfort. [3] —Complained frequently during the procedure
At 15 minutes	.....	

III. Did the patient show nonverbal signs of discomfort?		
At 5 minutes	.....	[0]—Not at all. [1]—Slight discomfort, occasional grimaces. [2]—Moderate discomfort, feet/hands tensed, tears in eyes. [3]—Marked discomfort apparent during procedure.
At 15 minutes	.....	

Sum of the numbers next to each response and record as the score of 0 to 9.

Cooperation score

At 5 minutes: (I+II=III)
At 15 minutes: (I+II=III)

More the cooperation score, the patient will be less cooperative.

Amnesia

Amnesia was assessed with the help of postoperative questionnaire regarding surgical procedures and by presenting repeat visual and cutaneous tactile stimulation during surgery.

- For the visual stimuli, common objects were shown. (A hundred rupees currency note)

Amnesia was assessed after the surgery and just before the discharge by means of questionnaire regarding the remembrance of

- Receiving injection in to the mouth
- Details of the surgical procedure done. Eg: incision, drilling, extraction and suturing etc.
- Visual and cutaneous stimulation

Recall of venipuncture at the beginning of the procedure was used to assess retrograde amnesia.

Complete, partial or failure to recall any of these stimuli applied was used to grade amnesia as poor, moderate or good.

Recovery period was calculated from the end of the surgery to when the patient could walk in a straight line without support.

Oxygen saturation, heart rate, systolic, diastolic and mean arterial blood pressure and respiratory rate were continuously monitored and recorded. These parameters were recorded before induction, after induction, every 5 minutes intra-operatively and every 15 minutes post operatively for the first 45 minutes. Pain during the

injection of sedatives, the onset of action, post surgical amnesia, recovery period, and side effects were also noted and recorded by a blind observer. Patient cooperation during the surgery was evaluated using the cooperation score. Immediately after the end of the surgery the infusion pump and the supplemental oxygen administration was stopped and the patient was shifted to the recovery room with the patient monitor and the same observer continued to record the parameters. All the patients were kept nil per oral for 4 hours post operatively.

Side effects

- Pain at the site of injection of sedatives
- Head ache
- Drowsiness/ dullness
- Cough/hiccough
- Nausea/vomiting
- Restlessness

Discharge

Criteria set for safe discharge

- Orientation to place, person and time
- Stable vital signs for at least 60 minutes
- Ability to ambulate un assisted
- Ability to tolerate oral liquid
- Absence of significant pain and bleeding

The patients were discharged with the escort of an adult patient attendee.

Comparative study was made between the two groups including all the parameters involved like onset of action, pain during the injection of sedatives, oxygen saturation, heart rate, blood pressure, respiratory rate, patient co-operation, amnesia, recovery period and side effects to come to a conclusion about which combination is more efficacious.

Results

The study was conducted on 60 patients reported to the Dept of Oral and Maxillofacial surgery for minor oral surgical procedures. The patients were in the age group of 20 to 50 years, ASA I physical status both males and females.

The mean age of the patients in Group I (propofol group) was 28.53 years, 23 male 7 female patients with a mean weight of 59.23 kg . In Group II (midazolam group) the mean age of the patients was 29.2 years, 22male and 8 female patients with a mean weight of 61.37 kg . There were no statistically significant differences between the two groups in terms of basic characteristics.

Pain during the injection of the sedatives was reported by 9 patients (30%) in the propofol group whereas none of the patients in midazolam group complained of pain during the injection. This is statistically significant. (P=0.002) [Graph no. I]

The onset of action in propofol group was 88.50±25.02 seconds (range 60-150 s) and that of midazolam group was 108.00±48.79 seconds (range 45-150s). (p= 0.056). [Graph no: II]

The duration of surgery in propofol group was 25.2±6.23 minutes and that of midazolam group was 26.17±5.52 minutes with a range of 15 to 30 minutes in both groups. (P= 0.899).

The oxygen saturation (Mean±SD) before induction in propofol group was 97±1.41 (range95-99%) and that of midazolam group was 97.07±0.94 (range 95-99). (P=0.831). The average oxygen saturation remained above 98% in both the groups throughout the procedure. None of the patients in this study developed apnoea.[Graph no: III].

The heart rate (Mean±SD) before induction in propofol group was 73.33±10.27 (range57-93 beats/minute) and

that of midazolam group was 83.67±12.47 (range 60-100 beats/minute) (P=0.001) In both the groups the heart rate decreased from the baseline value after the administration of sedatives. Following administration of local anesthesia the heart rate increased from the base line value in both the groups and this increased heart rate remained throughout the procedure. The maximum increase in heart rate in propofol group was at 10 minutes intraoperatively (Mean± SD79.6±15.24) and that of midazolam group was at 20 minutes intraoperatively (Mean±SD 88.54±11.34). Post operatively the heart rate decreased near to the baseline value in both the groups. None of the patients developed cardiac arrhythmias. [Graph no: IV].

The Systolic blood pressure (Mean±SD) before induction in Propofol group was 124.77±6.87 (range110-138mmHg) and that of Midazolam group was 122.1±8.50 (range range105-138mmHg)(P=0.187). In both the groups the systolic blood pressure decreased from the baseline value after the administration of sedatives. Following administration of local anesthesia the systolic blood pressure increased from the base line value in both the groups and this increased systolic blood pressure remained throughout the procedure.

The Diastolic blood pressure (Mean±SD) before induction in propofol group was 82.2±7.17 (range71-96mmHg) and that of midazolam group was 78.47±7.11 (range 63-91mmHg). (P=0.070). In both the groups the diastolic blood pressure decreased from the baseline value after the administration of sedatives and the decreased diastolic blood pressure was maintained throughout the procedure.

The mean arterial blood pressure (Mean±SD) before induction in propofol group was 96.17±6.59 (range84-110mmHg) and that of midazolam group was 93.37±6.95 (range 79-104mmHg). (P=0.115). [Graph no: V] In both the groups the mean arterial blood pressure decreased from the baseline value after the administration of sedatives and the decreased blood pressure was maintained throughout the procedure.

The respiratory rate (Mean±SD) before induction in propofol group was 17.5±1.48 (range15-22 cycles/minute) and that of midazolam group was 18.40±1.57 (range 15-21 cycles/minute)(P=0.026)[Graph no: VI]. In both the groups the respiratory rate decreased from the baseline value after the administration of sedatives. The decreased respiratory rate was remained throughout the surgical procedure. None of the patients in the study group had respiratory rate less than 14 cycles/minute.

Patients in the propofol group were significantly less co-operative than midazolam group at both 5 and 15 minutes intra operatively. [Graph no: VII, VIII]

The recovery time (Mean±SD) in propofol group was 26±7.12 (range15-40 minute) and that of midazolam group was 49.50±22.34 (range 30-90 minute), which was statistically significant. (P<0.001). [Graph no: IX]

None of the patients in both the study groups developed retrograde amnesia. In propofol group the anterograde amnesia was good for 5 (16.7%), moderate for18 (60.0%) and poor for 7 (23.3%) patients whereas in midazolam group it was 12 (40.0%), 13 (43.3%) and 5 (16.7%) respectively. Statistically significant good anterograde amnesia in midazolam group was reported when compared to propofol group (P=0.045). [Graph noX].

Statistical Methods

Chi-square and Fisher exact test have been used to test the homogeneity of sex distribution and Student t test has been used to test homogeneity of Age & weight distribution. Chi-square and Fisher exact test have been used to find the significance of proportions of Pain at the site of injection of sedatives and retrograde amnesia between both groups. Student t test (two tailed) has been

used to find the significance mean pattern of study parameters between the groups . Statistical software namely SPSS 11.0 and Systat 8.0 were used for the analysis of the data.

Discussion

Conscious sedation is a minimally depressed level of consciousness that retains the patient's ability to maintain an airway independently and continuously and respond appropriately to physical stimulation and verbal command. It is produced by pharmacologic and nonpharmacologic methods or a combination of it. Conscious sedation allows outpatient surgery for many anxious patients who otherwise would require general anesthesia[1, 6,24].

This study examined four measures of therapeutic efficacy; onset of action, amnesia, pain reaction, and patients co-operation and three measures of clinical toxicity; cardiovascular impairment, respiratory depression and liability to side effects.

Injection of Dexamethasone produces relief of postoperative pain by decreasing the intraoral swelling following oral surgical procedures.

Bennet J [4](1999) stated that narcotics decreases the discomfort associated with administration of local anesthesia during oral and maxillofacial surgical procedures. Opioids provide the strong advantages of profound analgesia and sedation with minimal cardiovascular effects [6]. Although the addition of an opioid will increase the potential for respiratory depression, with additional oxygen supplementation and prudent monitoring this is not problematic[13].

Pain during the injection of Propofol was a complication found in this study. Nine patients (30%) in the Propofol group complained of pain during the injection whereas none of the patients in Midazolam group complained of it. But once it was explained to the patient that it was normal to have pain along the vein during administration, they didn't complaint again. In a study conducted by Rodrigo C et al (2004) on patient controlled sedation with Propofol in minor oral surgery, 18 patients (34.6%) complained of infusion pain at the start of infusion. Pain during injection of Propofol is noted more frequently when administered in the small caliber veins in the dorsum of the hand. Cooling, diluting or mixing with lidocaine may reduce the incidence of pain [6]. No venous sequale with administration of Midazolam usually occurs [10].

For Midazolam and opioids, the speed of onset is sufficiently slow that neither drug provides an ability to rapidly deepen the anaesthetic effect without resulting in an over sedation [4]. Midazolam has rapid onset of action (15-89 seconds) [9,24]. In the current study the onset of action in Propofol group was 88.50±25.02 seconds (range 60-150 s) and that of Midazolam group was 108.00±48.79 seconds (range 45-150s).

Arterial oxygen desaturations have always been a significant cause of concern during minor oral surgical procedures, under local anaesthesia alone or in combination with sedatives. In our study the oxygen saturation (Mean±SD) before induction in Propofol group was 97±1.41 (range95-99%) and that of Midazolam group was 97.07±0.94 (range 95-99). (P=0.436). The average oxygen saturation increased from the baseline value in both the study groups after the administration of sedatives and remained above 98% throughout the procedure. The drugs used in this study Propofol, Midazolam and Fentanyl are known to cause respiratory depression and oxygen desaturations. Many authors recommended administration of supplemental oxygen during sedation to prevent oxygen desaturations [2,6,9,11,13,17] .The increased oxygen saturation after the administration of sedatives in this study was due to addition of supplemental oxygen. Similar results have been obtained for several researchers

[12,14.16,17,22,23,]. Dionne RA et al [2](1981) stated that stimulation from surgery and administration of local anaesthesia in oral surgical procedures increases the oxygen saturation.

In our study, Fentanyl was administered over 2 minutes followed by Propofol or Midazolam. Hass DA [6](2001) stated that chest wall rigidity occurs if Fentanyl is given rapidly.

None of the patients in this study developed apnoea. Meyers CJ et al [11] (1994) reported no incidence of apnea with Propofol sedation in third molar surgery. Tucker MR et al [9](1986) reported no incidence of apnea after Midazolam sedation with or with out Fentanyl for out patient oral surgical procedures. In a similar study conducted by Parworth LP et al [14](1998) there was 4% incidence of apnea in Propofol group and 6% in Midazolam group. The difference may be due to the use of increased dose of sedatives in their study. Further clinical studies will be required to differentiate the effect of dosage and rate of infusion on apnea.

Bennet J [4](1999) stated that when Propofol is administered a central sympatholytic effect blunts the barostatic reflex resulting in increased heart rate. Meyers CJ et al [11] (1994) reported 13.9% increase in heart rate after deep sedation with Propofol. In a study conducted by Parworth LP et al [14](1998) to compare Propofol and Midazolam each in combination with Fentanyl for third molar surgery, there was significant increase in heart rate at 10 and 15 minutes intraoperatively in both the groups. Rodrigo C et al [12] (1995) reported a slight increase in heart rate following injection of local anaesthesia during patient controlled sedation with Midazolam.

Propofol produces 20 to 30% decrease in blood pressure due to venodilatation[4,25,27,]. Strauss RA et al [15](1998) stated that hypotension after induction is a common event with Propofol, which can be attributed to a decrease in systemic vascular resistance. Johns FR et al[16] (1998) reported a non- significant decrease in blood pressure, which ranged from 2 to 8 mmHg with Propofol sedation. All benzodiazepines including Midazolam produces minimal effect on the cardiovascular system, with a slight decrease in arterial blood pressure secondary to a decrease in peripheral resistance [6]. Rodrigo C et al[12] (1995) reported a slight fall in blood pressure following the onset of action of sedative during patient controlled sedation with Midazolam. Fentanyl possess cardiovascular stability, it produces minimal changes in blood pressure¨Fentanyl has the potential to decrease systemic vascular resistance producing hypotensive effects [14,26].

In the current study the systolic blood pressure decreased from the baseline value after the administration of sedatives in both the groups. Following administration of local anaesthesia with adrenaline the systolic blood pressure increased from the base line value in both the groups and this increased systolic blood pressure remained throughout the procedure. In both the groups the diastolic blood pressure decreased from the baseline value after the administration of sedatives and the decreased diastolic blood pressure was maintained throughout the procedure. The difference in heart rate and blood pressure was not clinically important and no intervention was required. In a similar study conducted by Parworth LP et al [14](1998) both the groups exhibited statistically significant decrease in diastolic blood pressure at 5,15 and 20 minutes period and significant drop in systolic blood pressure at 5 minutes period.

Propofol can depress the mean arterial blood pressure [6,25,27]. Midazolam also produces significant drop in mean arterial blood pressure. In the present study the mean arterial blood pressure decreased from the baseline value after the administration of the sedative and this decreased

value remained through out the procedure. This was statistically significant but clinically non significant.

Dose and rate dependant ventillatory depression is associated with Propofol. Midazolam cause significant respiratory depression[23,24]. Opioids depress respiration seen as a decrease in rate of breathing. This is due to dose-dependent decrease in response of the respiratory centre to carbon dioxide [6,13,21,22]. When small doses of Fentanyl are given, the respiratory depression lasts for 5 to 15 minutes.

In the current study the respiratory rate decreased from the baseline value after the administration of sedatives in both the groups. The decreased respiratory rate was remained throughout the surgical procedure. The difference was not clinically significant and no intervention was required. This may be due to the administration of supplemental oxygen in all patients before administration of the sedatives and due to the slow administration of Fentanyl. None of the patients in the study group had respiratory rate less than 14 cycles/minute.

Patients in the Propofol group were significantly less co-operative than Midazolam group at both 5 and 15 minutes intra operatively. In a similar study conducted by Parworth LP et al [14](1998) the mean co-operation score of Propofol group was significantly more than Midazolam group indicating less patient co-operation in Propofol group (more the score, less the patient co-operation). This increased score in Propofol group was due to the increased talkativeness of patient. In a study conducted by Rodrigo C et al (2004) on patient controlled sedation with Propofol in minor oral surgery, 18 patients (34.6%) were talkative after administration of Propofol. However, differences in the co-operation scores cannot be explained by differences in pharmacokinetics between the two sedative techniques.

Recovery is rapid with Propofol sedation [4,11,17,22,25,27]. A high clearance rate and minimal tendency for drug accumulation contribute to this rapid recovery. Midazolam compared to Propofol is usually associated with a more prolonged recovery of cognitive function, which may be compounded by excessive postoperative sedation and amnesia[4]. Propofol's major advantage is its rapid recovery, with more clear headness compared to other sedative agents [6]. In a study conducted by Thomson PJ et al [5] (1993) on recovery from Midazolam sedation in third molar surgery, 85% (17 patients) fully recovered from sedation at 60 minutes. In the present study the recovery time (Mean±SD) in Propofol group was 26±7.12 (range15-40 minute) and that of Midazolam group was 49.50±22.34 (range 30-90 minute), which was statistically significant. (P<0.001).

Gelfman SS et al [8](1978) found that no retrograde amnesia occurs with Diazepam Fentanyl sedation. Midazolam has got good anterograde amnesia [8,20]. Parworth LP et al [14](1998) found that anterograde amnesia was greater for Midazolam, Fentanyl combination compared to Propofol, Fentanyl in third molar surgery. In a study by Sivasubramanietal there was higher incidence of amnesia in midazolam group compared with Dexmeditomidine group[20]. In another study by kumar et al found that Propofol Fentanyl combination is a superior sedating agent compared to Midazolam Fentanyl combination due to its rapid onset of action, profoundness of amnesia and fast recovery period offering early patient discharge and better patient compliance.[19].

In the current study none of the patients in both the study groups developed retrograde amnesia. In Propofol group the anterograde amnesia was good for 5 (16.7%), moderate for18 (60.0%) and poor for 7 (23.3%) patients whereas in Midazolam group it was 12 (40.0%), 13 (43.3%) and 5 (16.7%) respectively. Statistically significant good anterograde amnesia in Midazolam group was reported when compared to Propofol group (P=0.045).

Conclusion

The design of the present study permitted qualitative assessment of Propofol and Midazolam each in combination with Fentanyl as a sedative agent in minor oral surgical procedures. The ideal anaesthetic agent should provide rapid onset of action, stable-operating conditions, and profound intraoperative amnesia while ensuring rapid recovery without much complications.

There were no significant differences in either patient demographics or surgical characteristics between the two groups. The Propofol group was less co-operative than the Midazolam group. Pain during the injection of sedative was a significant adverse effect in Propofolgroup,but once it was explained to the patient that it was normal to have some pain along the vein during administration, they didn't complain again.

Cardiovascular parameters remained stable throughout the procedure in both study groups and no intervention was required. Recovery was faster in the Propofol group than the Midazolam group. The degree of anterograde amnesia was greater for Midazolam group.

Based on this study the following conclusions are made.

1. Cardiovascular parameters and respiration were well maintained in both the study groups.
2. No incidence of apnea was noticed with both the study groups.
3. Pain during the injection of Propofol was a side effect noticed.
4. Midazolam clearly showed better amnesic properties.
5. Propofol group was less co-operative than Midazolam group but this was not clinically significant.
6. Midazolam group showed slow recovery than Propofol group restricting and wasting the productive time of the patient.
7. Qualities such as short plasma half-life period, profound amnesia and absence of postoperative nausea and vomiting make Propofol a better choice for sedation.

Propofol is a fast acting, safe and easily controllable sedative agent with rapid recovery. This offered the advantage of early patient discharge and better patient compliance.

Summary

On the basis of this study Propofol+ Fentanyl appears to be a safe and efficacious alternative to Midazolam + Fentanyl for use as an intravenous sedative agent in minor oral surgical procedures due to its rapid onset of action, reliable sedation, good operating conditions, stable vital signs, profound amnesia and rapid recovery with practically nil adverse effects, offering advantage of early patient discharge and better patient compliance.

However, further extensive double-blind studies over a larger population are required to accord Propofol+ Fentanyl group as ideal sedating agent combination in the day care oral surgical procedures.

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