Research Journal of Biological Sciences 3 (9): 989-992, 2008
ISSN: 1815-8846

Changing Recovery Discharge Method in Elderly Undergoing Cataract Surgery by TIVA in Nikoukari Hospital, an Ophthalmic Center

M. Parish, M. Oveisi, M. Niazi Ghazani, F. Moslemi and S. Rasooli
Department of Anesthesiology, Tabriz University of Medical Sciences, Tabriz, Iran

Abstract: While age increases, some procedures such as cataract are needed to be done as outpatient. Anesthesia should be such that the turn over of discharge is rapid. The objective of this study is to change recovery discharge method in elderly undergoing cataract surgery by TIVA in our hospital. Nightly patients in 2 groups more than 65 years old and ASA physical status II, III were studied. The induction of anesthesia performed with bolus dose of remifentanil 1 μg kg^{-1} and propofol 2 mg kg^{-1} and the intubation was done after cisatracorium 0.15 mg kg^{-1}. In group 1, for maintenance of anesthesia remifentanil 0.05 μg/kg/min and propofol 60-100 μg/kg/min were infused. In group 2, a mixture of N_2O+O_2 50% each and isoflurane 1.5% were given to the patients. The criteria to be discharged from recovery were recorded in 2 groups. The age and gender were equal in both groups. Some data like duration of the surgery, return of breathing and the extubation time made no difference in both groups. From the end of surgery to the time of discharge from recovery all data such as eye opening, stating name and the time of ability to discharge had significant differences between 2 groups ($p<0.0005$). Total 15 patients in TIVA group and 22 in group isoflurane received ephedrine. The results of this study show that the time of recovery discharge in TIVA group using remifentanil and propofol is more rapid than isoflurane. This could result to a better turn over in the operating rooms.

Key words: Anesthesia, cataract, TIVA, remifenfanil, propofol, isoflurane

INTRODUCTION

Life expectancy has increased considerably over the last few decades and accordingly so has the proportion of elderly patients requiring surgery and anesthesia. Simultaneously, an increasing number of surgical procedures such as cataract are performed on an outpatient basis. In order to avoid delays in the Post Anesthesia Care Unit (PACU) and the time to discharge from recovery, selecting an appropriate anesthetic method is very important (Kubitz *et al*., 2001). Ambulatory surgery has increased progressively in the last 10 years and the availability of new minimally invasive surgical techniques has resulted in an increased emphasis on expansion of day surgery. Together with the advancement in surgical techniques has been the availability of newer and better drugs with short onset and duration of effects, resulting in quick recovery and the possibility of earlier discharge from the hospital (Gupta *et al*., 2004). Rapid recovery resulted in most of the patients after the using remifentanil and propofol and they prefer this technique of anesthesia. In Nikoukari hospital, the cataract surgery consists the most number of operations and the large number of patients and delaying in rapid discharge of patients from PACU cause crowded operation room. Therefore, the anesthetic method that results in earlier discharge from PACU is regarded to be necessary. Remifentanil and Propofol by TIVA in comparison with the inhalation method in patient undergoing cataract surgery result in rapid discharge from PACU and are highly recommended. Regarding characteristics of remifentanil and propofol, the objective of this study is to change recovery discharge method in elderly undergoing cataract surgery by TIVA instead of routine inhalational method with longer duration of recovery.

MATERIALS AND METHODS

A clinical trial, randomized, prospective, double blind study was performed on ninety patients older than 65 with cataract and ASA class II, III in Tabriz Nikoukari hospital (an ophthalmic surgery center). Sampling was performed using (www.randomization.com) random convenience method and patients were divided into 2 groups (TIVA and Isoflurane). With $\alpha = 0.05$ and $\beta = 80\%$ the number of each group was 45. Patients with a history of addiction, muscular disease, antipsychotic drug use, severe ischemic heart disease, age more than 85 and those who had

Corresponding Author: M. Parish, Department of Anesthesiology, Tabriz University of Medical Sciences, Tabriz, Iran

difficulty in communication and patients who experienced reduction or increase of propofol more than 3 times during surgery were excluded from the study. In TIVA (Total Intra Venous Anesthesia) group continuous infusion of Intra Venous anesthetic drugs without inhalation gases used for anesthesia and maintenance. In both groups (TIVA and Iso) patients after undergoing cataract surgery, completely monitored (including ECG, NIBP, $ETCO_2$, SPO2, HR). After establishing an IV line, premedication with IV midazolam 0.03 mg kg^{-1} administered, ringer 5 mL kg^{-1} infused and patient preoxygenated for 3 min. After the induction of anesthesia with bolus dose of remifentanil 1 μg kg^{-1} and propofol 2 mg kg^{-1}, Cisatracorium 0.15 μg kg^{-1} min^{-1} administered and by monitoring with nerve stimulator and reduction of 4th twitch to 25% of first level, laryngoscopy and intubation was performed. For maintenance of anesthesia in TIVA group, propofol 60-100 μg kg^{-1} min^{-1} was infused (according to hemodynamic monitoring drug doses were increased or decreased). Five min before the end of surgery, propofol dose was reduced into half and stopped at the end but remifentanil infusion stopped at the end of surgery .In Iso group, for maintenance of anesthesia, a mixture of N_2O 50%+ O_2 50% + Isoflurane 1.5% was given to the patients. At the end of the surgery, N_2O and Isoflurane stopped and patient ventilated with O_2 100%. After relaxant reverse and returning at least 2 twitch from TOF with neostygmine 50 μg kg^{-1} and atropine 0.02 mg kg^{-1}, the patient extubated and transferred to recovery in both groups. In PACU, the observer who was unaware about the used method evaluated the patient every 2 min and when s/he reached more than 9 scores according to Alderet score table discharged from recovery. In TIVA group, when systolic blood pressure was decreased below 80 mm Hg or more than 30% of basic level, propofol dose was reduced into half and if there were no response after 1 min, 5 mg ephedrine was administered.

During the surgery, the frequency of need for ephedrine as a result of blood pressure decrease, atropine 0.01-0.02 mg kg^{-1} because of bradycardia (HR<50 for more than 1 min) or decreasing of 30% of recorded base HR were noted. In addition, anesthesia method levels (homodynamic increasing variables: base systolic BP>30%, HR>30%>1min) with increasing the propofol dose (30 μg kg^{-1} min^{-1} every 2 min) were controlled. The frequency of need for increasing propofol doses were recorded as well. In Iso group, during the surgery any unwanted homodynamic changes such as increase or decrease of systolic BP more than 30% of basic level or increasing of HR more than 30% were recorded. When anesthesia was light, elevated BP was treated with increasing isoflurane every 2 min and if there were no appropriate response after 3 min, bolus dose of propofol (0.3 mg kg^{-1}) was injected. At first, blood pressure decreasing was treated with reduction of isoflurane percent every 2 min and in case there were no appropriate responses after 1 min, ephedrine (5 mg) was injected. The frequencies of isoflurane alteration and administration of propofol and ephedrine were recorded. When the Heart Rate decreased (HR<50 bpm), for more than 1 min, atropine (0.01-0.02 mg kg^{-1}) was injected. Collected Data were analyzed statistically with descriptive methods (mean±standard deviation, frequency and percent). Mean differences tests for independent groups and chi-square test with SPSS/14.0 were done. In this study p-value lower than 0.05 was considered to be significant. For normal distribution we used Kolmogrov-smirnov test.

RESULTS

We studied variables in 2 groups (Remifentanil+ Propofol and Isoflurane) and the following outcomes were obtained. In both groups there were 4 patients with ASA class III and 41 patients ASA class II and there were no differences between groups. Twenty four patients (53.2%) in R+P group were female and 21 (46.7%) were male whereas in Iso group, 21 patients (46.7%) were female and 24(53.3%) were male and there were no significant statistical differences between them. The average age in R+P group was 73.28±4.80 versus 73.08±5.44 and the groups were equal. Some of the examined variables are mentioned in Table 1 and it shows that there were no statistical differences between 2 groups.

The time from extubation to sending the patient to recovery in R+P group was 5.48±2.65 min and in Iso group was 3.15±1.87 min. Therefore, the difference was significant ($p<0.0005$). The time from the end of the surgery to eye opening in R+P group was 11.86±5.83 min versus 18.31±5.76 in Iso group and there was significant difference between groups ($p<0.0005$). The time from the end of the surgery to stating name in R+P group was 14.35±5.84 min in comparison with 20.46±5.91 min in Iso group and again the difference was significant ($p<0.0005$). The time span from end of the surgery to the time that patients had the discharge criteria from recovery in R+P group was 17.60±6.35 and in Iso group was 24.28±6.23 min ($p<0.0005$). The time from extubation to the time of stating the name was 7.95±5.08 in R+P and 12.91±5.83 in Iso group ($p<0.0005$). The time from the end of the surgery to sending the patient to recovery was 11.44±3.60 in R+P and 10.37±3.57 in Iso group ($p = 0.16$). The time from eye opening after entering the recovery

Table 1: Variables before extubation and the end of the surgery

Variable	R+P* Group		Iso** Group		p-value
	Mean (min)	Range	Mean (min)	Range	
The time from beginning of induction and intubation	5.22±1.37	2-8	5.64±1.36	3-8	0.85
The time from intubation and beginning of surgery	4.95±3.01	1-13	4.22±2.58	1-14	0.21
The time from beginning of surgery to end	27.44±12.31	9-75	23.93±12.60	10-67	0.18
The time from end of the surgery to reverse	4.75±3.24	1-11	5.15±3.69	1-18	0.58
The time from end of the surgery to return of breathing	5.38±3.93	5-20	6.31±3.76	2-18	0.26
The time from end of the surgery to extubation	6.35±3.31	1-17	7.26±3.76	3-19	0.22

*Remifentayl+Propofol **Isoflurane

Table 2: Variables from the end of the surgery up to after recovery

Variable	R+P* Group		Iso** Group		p-value
	Mean(min)	Range	Mean(min)	Range	
The time from extubation to the time of sending patient to recovery	5.48±2.65	2-11	3.15±1.87	1-9	<0.0005
The time from end of the surgery to eye opening	11.86±5.83	4-27	18.31±5.76	7-30	<0.0005
The time from end of the surgery to stating the name	14.35±5.84	6-29	20.46±5.91	9-31	<0.0005
The time from end of the surgery to accessing the recovery discharge criteria	17.60±6.35	8-32	24.38±6.23	11-38	<0.0005
The time from extubation to eye opening	5.53±5.11	1-19	10.86±5.64	1-22	<0.0005
The time from extubation to stating the name	7.95±5.08	1-21	12.91±5.83	1-28	<0.0005
The time from end of the surgery to transferring the patient to recovery	11.44±3.60	5-24	10.37±3.57	4-21	0.16
The time of eye opening after entering to recovery	2.40±4.39	0-15	7.90±4.69	0-19	<0.0005
The time of stating name after entering to recovery	4.24±4.86	0-15	11.97±14.26	0-20	<0.001

*Remifentayl + Propofol **Isoflurane

in R+P group was 2.40±4.39 and 7.90±4.69 in Iso group ($p<0.0005$). The time of stating the name after entering the recovery was 4.24±4.89 in R+P and 11.97±14.26 min in Iso group ($p<0.001$). Because of the importance of these results, variables have demonstrated in Table 2.

During the surgery, 15 patients in R+P group received ephedrine or atropine. Eight patients (53.3%) received ephedrine 5 mg once, 2 of them (13.3%) received atropine 0.5 mg and ephedrine 5 mg, 2 patients (13.3%) atropine twice and 0.5 mg in each time and 1 patient received atropine twice, 0.5 mg each time and ephedrine 5 mg. Twenty two patients in Iso group had a need for ephedrine 5 mg and 15 (68.2%) of them received 5 mg once, 7 patients (31.8%) twice. There was no need for atropine in Iso group. There was need for decreasing or increasing of propofol dose in 14 patients in 9 of them (20% of all patients) propofol dose was decreased and in 5 (11.11%) was increased. The frequency of using propofol after induction was zero. In 21 patients of Iso group, the Isoflurane dose was decreased and in 18 of them (85.7%) once, in 2(9.5%) 3 times and in one patient (4.8%) 2 times had performed. There was no need for Isoflurane dose increasing in Iso group.

DISCUSSION

Remifentanil is a phenylpiperidine with μ-opioid agonist effects and unique pharmacokinetic properties (Ghiamat *et al*., 2006). The development of newer opioids has focused on increasing potency, reduced cardiovascular toxicity and pharmacokinetics that will enable them to be more readily titratable (Glass *et al*., 1993). Remifentanil's ester structure renders it susceptible to hydrolysis by blood and tissue- nonspecific esterases, resulting in rapid metabolism. Remifentanil, thus constitutes the first "ultra short" acting opioid for use in anesthesia (Egan *et al*., 2005; O' Hare *et al*., 2001). Propofol is the most frequently used intravenous anesthetic today and it is rapidly metabolized in the liver. The initial distribution half-life of Propofol is 2-8 min. When used for induction of anesthesia in briefer procedures, Propofol results in significantly quicker recovery and earlier return of psychomotor function (Fragen *et al*., 2005). In this study, we investigated the changing recovery discharge method in elderly undergoing cataract surgery by TIVA in our center. Like Kubitz *et al*. (2001) we selected patients with cataract, a minimally invasive procedure, serves as a model to focus on the effects of general anesthetic on patients recovery of psychomotor function in that other factors that might have an effect after major surgery, such as blood loss, hypercapnia, hypoxaemia and postoperative pain are eliminated or reduced to a minimum. Because we had selected special surgery and age group, the patients were in ASA class II, III and it was expected. As demonstrated in Table 1, from the time of induction to extubation there

was no significant difference between 2 groups. In this study, the time span from the end of the surgery to the time of extubation in R+P group was 6.35 vs. 7.26 in Iso group. Our results suggest that use of TIVA with remifentanil and propofol can be good alternative for BAL anesthesia especially because of quicker recovery and being more conscious and awake that result in earlier reaching the Alderet discharge criteria. This method can be used effectively in patients. It has fewer complications and there is no need for extra interventions. It is recommended to use TIVA with remifentanil without any fear in older patients. Remifentanil is a drug with low distribution half-life and its effects will stop with discontinuing the infusion. It is a very appropriate way in crowded operation rooms. This study demonstrated that patients in R+P method from the end of the surgery up to the discharge from PACU had no complications and reached the discharge criteria sooner. Further more; doing some movements after anesthesia needs complete drugs elimination or complex processes that involves receptors to central nervous system. Eye opening and stating the name shows that patients can analyze requests well and even give appropriate answers without any symptoms of sedation or confusion, therefore, they can discharge from PACU. Paying to the above mentioned results, we can trust to the TIVA method without any complication in older patients and operations less than 60 min.

CONCLUSION

According to the obtained results in this study it seems that the TIVA is a safe method in elderly in cataract surgery and results in rapid recovery and short duration of stay in PACU which helps to rapid turn over of recovery and operation rooms.

REFERENCES

Egan, T.D., C.F. Minto, D.J. Hermann, H.J. Lemmens, P. Fiset, C.L. Westmoreland, J.F. Hoke and P.S. Sebe, 2005. Intravenous Opioid Anesthetics. In: Miller R: Miller's Anesthesia. 6th Edn. Churchill Livingstone USA, 1: 403.

Fragen, R., P. Simons, I. Cockshott, E. Douglas, N.H. Kay, J.W. Sear, J. Upington, N. Mackenzie, I.S. Grant, V.A. Doze, L.M. Westphal, P.F. White and B. Kay, 2005. Intravenous Nonopioid Anesthetics. In: Miller's Anesthesia. 6th Edn. Churchill Livingstone, USA, 1: 324-326.

Ghiamat, M.M., R. Rohanifar and A.R. Jaffari, 2006. Total intravenous anaesthesia with remifentanil and propofol in 1,000 cases of ophthalmic surgery. Life Lines in Critical Care and Anaesthesia, 10: 12-16.

Glass, P.S.A., D. Hardman, Y. Kamiyama, T.J. Quill, G. Marton and K.H. Donn *et al*., 1993. Preliminary pharmacokinetics and pharmacodynamics of an ultra-short-Action opioid: Remifentanil (GI 87084B) Anesth Analg, 77: 1031-1040.

Gupta, A., T. Stierer, R. ZucKerman, N. Sakima, S.D. Parker and L.A. Fleisher, 2004. Comparison of recovery profile after ambulatory anesthesia with propofol, Isoflurane, Sevoflurane and Desflurane: A systematic Review. Anesth Analg, 98: 632-641.

Kubitz, J., J. Epple, A. Bach, I. Motsch, E. Martin and H. Schmidt, 2001. Psychomotor recovery in very old patients after total intravenous or balanced anesthesia for cataract surgery. Br. J. Anaesth, 86 (2): 203-208.

O' Hare, R.A., R.K. Mirakhur, J.E. Reid, D.S. Breslin and A. Hayes, 2001. Recovery from propofol anaesthesia supplemented with remifintanil. Br. J. Anaesth., 86 (3): 361-365.