Induction of Anesthesia with Propofol in Urological Outpatient Surgery

Y.	Yeshayahu	Katz ^a
B.	Beno	Rozenberg ^a
B.	Boaz	Moskovitz ^b
Z.	Zina	Greenberg ^a
J.	Jesmond	Birkhan ^a

Departments of ^aAnesthesiology and ^bUrology, Rambam Medical Center and Faculty of Medicine, Technion-Israel Institute of Technology, Haifa, Israel

Key Words

Barbiturates
Intravenous anesthesia
Outpatient urologic surgery
Propofol

Abstract

Propofol (Diprivan) in a new formulation, a short-acting intravenous anesthetic, was used as an induction agent for short urological procedures. Forty unpremedicated patients were treated with either propofol or thiopental in a randomized study. The onset of anesthesia and duration of apneic period were prolonged and the decrease in systolic blood pressure was more profound in the propofol group. Heart rate was less stable and recovery time was longer in the thiopental group. Other parameters, such as quality of anesthesia, acceptability of the drug or rate of side effects, were similar in both groups. These results suggest that propofol in a new formulation is a suitable agent for short urological procedures in outpatient surgery.

Yeshayahu Katz, MD, Department of Anesthesiology, Rambam Medical Center, POB 9602, Haifa 31096 (Israel)

Introduction Materials and Methods

Outpatient surgery is an important part of the present urological practice, and it is likely to increase in the current financial climate. Because anesthesia is a limiting factor in the actual duration of each procedure, a search for an ideal anesthetic with properties such as rapid, smooth induction, good quality of maintenance, lack of side effects and rapid recovery is still underway [1]. Propofol, a substituted phenol (2,6-diisopropylphenol) has been shown to have attractive anesthetic features with regard to the ideal agent [2]. Unfortunately, fatal hyper-sensitivity reactions due to Cremophor EL, which was the original solubilizing substance, caused withdrawal of propofol from clinical use [3]. Recently, an alternative formulation (oil-in-water emulsion) has been introduced into clinical practice [4].

In the present study we compared propofol to thiopental as induction agents for short urological outpatient surgery. This included procedures such as diagnostic cystoscopy, biopsy and fulguration of superficial tumors, and removal of urethral condylomata acuminata.

Forty patients (13 men and 27 women) between the ages of 18 and 65 years and scheduled for short urological procedures participated in the study. All were in good general health (ASA class I–II) and each gave written informed consent. Exclusion criteria of subjects included obesity of more than 45 kg over normal body weight, major organ dysfunction, history of adverse reaction

to anesthesia and use of medications. The subjects were randomly divided into two groups: (1) thiopental (n = 20) and (2) propofol (Diprivan; n = 20). All patients were unpremedicated. Two minutes before induction of anesthesia, fentanyl, 0.1 mg, was administered intravenously, and 1 min before induction systolic and diastolic blood pressure and heart rate were taken as baseline data.

Propofol, 2.5 mg/kg, or thiopental, 4 mg/kg, was administered as a bolus over 20 s into the median cubital vein, and anesthesia was maintained with 66% nitrous oxide in oxygen supplemented with increments of the induction agent.

At the end of surgery, 100% oxygen was administered until patients opened their eyes and obeyed simple commands. Time between end of surgery and opening of eyes was considered recovery time. When fully alert, patients were asked to assess the quality of anesthesia and whether they would choose the same mode of anesthetic in the future. Other parameters, such as induction time, apneic time, blood pressure and heart rate, maintenance and side effects, were assessed by the anesthesiologist. Surgical conditions were assessed by the urologist.

42

Katz/Rozenberg/Moskovitz/Greenberg/Birkhan

The results were analyzed statistically using Student's t test. Data are reported as means $\pm$ SD, and a calculated p value of less than 0.05 was considered significant.

Results

Both groups were comparable with respect to age, weight, baseline hemodynamic variables and duration of procedure.

Induction time and apneic period were significantly longer with propofol than with thiopental (table I). Systolic blood pressure decreased slightly with both agents, but more profoundly in the propofol group. On the other hand, there were no significant differences between the two groups with regard to diastolic blood pressure (although it was decreased compared to baseline values). Heart rate increased in the thiopental group after injection, with no parallel change in the propofol group. Recovery time was markedly prolonged in the thiopental group compared to the propofol group (table I).

Other parameters, such as acceptability of anesthesia by patients, quality of anesthesia and a positive response to the question about choosing the same drug in the future, were similar in both groups. In the propofol group 1 patient complained of nausea, and in the thiopental group 1 patient vomited following recovery.

Discussion

Many urological procedures, such as diagnostic cystoscopy and fulguration, can be performed in an outpatient surgery unit. Since such interventions are performed repeatedly, shortening the hospitalization period is a crucial factor in saving money for the hospital budget. On the other hand, it requires the full cooperation of the patient, and this depends on the quality of anesthesia that the patient experiences.

Our study confirms that propofol is a suitable agent for outpatient urological surgery. It fulfills some of the requirements of the ideal anesthetic for short procedures, namely, rapid recovery and orientation without a hangover effect which delays the patient's discharge. This effect is due to the rapid metabolism of propofol in the liver, which enables short elimination half-life, and is less cumulative than thiopentone [5, 6]. It also gives a good quality of anesthetic maintenance conditions, both to the surgeon and to the anesthetist, and acceptability rates of anesthesia are high.

Table I. Induction, apnea and recovery time in urological outpatients anesthetized with propofol or thiopental

Propofol (n = 20)	Thiopental (n = 20)	
Induction time, s	25.5 ± 2.5	19.7 ± 2.3
Duration of apnea period, s	34.3 ± 4.2	25.1 ± 4.2
Recovery time, min Eyes open	4.7 ± 0.5	7.4 ± 0.9
Oriented	5.6 ± 0.5	9.5 ± 1.1

Results are expressed as means $\pm$ SD.

A previous formulation of propofol, which caused side effects such as pain on injection and hypersensitivity reactions, has been replaced by a new formulation which does not result in these side effects [7]. Although induction was slower for the propofol group, recovery and full alertness are much more necessary for successful outpatient unit functioning. In conclusion, this study shows that propofol in the new formulation is a suitable agent for induction of anesthesia in ambulatory urological surgery, with rapid recovery, pleasant anesthesia and minimal side effects.

Acknowledgement

We thank Miss Ruth Singer for typing the manuscript.

References

- Loder, R.E.: The anaesthetist and the intensive-care unit. *Anaesthesia* 37: 691–693 (1982).
- Kay, B.; Roily, G.: ICI 35868, a new intravenous induction agent. *Acta anaesth. belg.* 28: 303–307 (1977).
- Briggs, L.P.; Clarke, R.S.J.; Watkins, J.: An adverse reaction to administration of disopropofol (Diprivan). *Anaesthesia* 37: 1099–1102(1982).
- Healy, T.E.J.: Conclusions about Diprivan. *Post-grad. med. J.* < 57:suppl. 3, pp. 169–172(1985).
- Briggs, L.P.; Clarke, R.S.J.; Dundee, J.W.; Moore, J.; Bahar, M.; Wright, P.J.: Use of diisopropyl phenol as main agent for short procedures. *Br. J. Anaesth.* 53: 1197–1202 (1982).
- Adam, H.K.; Briggs, L.P.; Bahar, M.: Pharmacokinetic evaluation of ICI 35868 in man: single induction doses with different rates of injection. *Br. J. Anaesth.* 55: 97–103 (1983).
- Mackenzie, N.; Grant, I.S.: Comparison of the new emulsion formulation of propofol with methohexitone and thiopentone for induction of anaesthesia in day cases. *Br. J. Anaesth.* 57: 725–731 (1985).