# Effect Of Intravenous Infusion Of Propofol On Platelet Function During ENT Procedures For Endoscopic Carbon Dioxide Laser , Septoplasty And Endoscopic Nasal Surgery

K SAID

**Citation**

K SAID. *Effect Of Intravenous Infusion Of Propofol On Platelet Function During ENT Procedures For Endoscopic Carbon Dioxide Laser , Septoplasty And Endoscopic Nasal Surgery*. The Internet Journal of Otorhinolaryngology. 2000 Volume 1 Number 1.

**Abstract**

Propofol has inhibitory effect on platelet aggregation by using high dose more than9mg/kg.bw./hour.Also reduce the platelets count during surgery after 30 minutes from start. But has insignificant effect on bleeding time.It was happend in 3%of our cases,using propofol and 10% of cases using more than 9mg/kg.bw./hour.we recommended further study ,using different laboratory techniquies

## BACKGROUND

Most E.N.T.surgical procedures require a dry operative field and suitable hypotensive anesthetic techniques. Propofol "2,6 diisopropyl phenol", is a intravenous anesthetic agent that is used for induction, total intravenous anesthesia (TIVA) and conscious sedation with reasonable pharmacokinetic profile ([5]). As it reduces the blood pressure with little effect on the pulse rate, it has been used for hypotensive anesthesia ([6]). A number of studies claimed that propofol could impair platelet activity. Platelets participate in a sequence of events that lead to the formation of platelet plug and finally stable fibrin clot formation at the site of vessel interruption ([7]). This study is conducted to evaluate the effect of changing propofol infusion rate on platelet count and aggregation .

## METHODS

This is a prospective study which was approved by the local ethics committee for ENT and anesthesia department . The technique was explained to each patient and a written consent was obtained. Ninety patients, of ASA I and II classification, scheduled for endoscopic nasal, septoplastic and endoscopic carbon dioxide laser sugery, were chosen .

We excluded patients with a history of blood disease, a family history of blood disorder, renal or hepatic disease. Patients were also informed to stop aspirin or any non-steroidal anti-inflammatory drugs 3 weeks before the operation ([8]). Patients were divided into 3 groups, 30 patients each. A special chart was used to record history, data, laboratory results and concentration of propofol infusion .

One day before the operation, patients were admitted and investigated for ECG, chest X-ray, complete blood count CBC, bleeding time and the first sample of blood (2ml) was sent for platelet aggregation ([9]). All patients were premedicated in the morning of the operation at 6 am with 10 mg valium and 10 mg metochlopramide oral tablets ([10]).

In the theatre, patients were monitored for ECG, non-invasive blood pressure, pulse oxymetry, end-tidal carbon dioxide and rectal temperature. A gauge 18 venous canula was inserted in the right anticubital vein and kept for anesthetic drugs and iv fluid administration .

On the left arm a sphygmomanometer cuff was applied to measure the blood pressure and also to measure bleeding test by fixing the pressure at 40 mm/Hg . Another 18 gauge venous canula was inserted into one vein at the dorsum of right or left foot to take blood samples for CBC and patelet aggregation, with a Dinamap (electrical blood pressure to measure and record systolic, diastolic, main arterial blood pressure). Blood samples were taken before starting propofol infusion then every 30 minutes during the infusion. Following the end of the infusion, additional blood samples were taken after 60 minutes, 2 hours and 24 hours .

All the patients reveived Ringer's lactate solution at a rate of

8-10 ml/min ([11]). Anesthesia was induced in all patients using fentanyl 1mcg/kg iv bolus , followed by sodium thiopental 5mg/kg by slow iv injection and then succinylcholine 1mg/kg iv. An oral endotracheal tube was inserted after mask ventilation with 4-2 oxygen-air mixture. Anesthesia was maintained with isoflurane 1.5 % concentration and propofol iv drip, spontanous +/- assistance ventilation.

Patients were divided into three groups , the first group, 30 patients, with propofol infusion rate at 2-5mg/kg/hr., the second group, 30 patients, at 6-8mg/kg/hr. and the third group at 9-12mg/kg/hr. Propofol infusion rate was titrated according to blood pressure, heart rate, length of the operation, and end-tidal carbon dioxide ([12]). At the end of the operation, propofol as well as other anesthetic agents were stopped , 100% oxygen was administered and the patient was extubated. Postoperative analgesia was achieved using pethidine 1mg/kg bw on demand for the first 24 hours after the operation .

The duration of the surgery was between 45 min to 90 min, position of the head was 30 degrees. All patients were done in the same room by the same nurse, surgeon and assistants. We also used standard back socket of xylocain 2% in adrenaline 1:200*10^3([13]). All patients were selected to avioid any obesity (54-96 kg) age between 18-57 years, sex 18 female vrs. 72 male, different nationalities between Asia and Africa most with middle class people and middle class education.

The study was performed between January 2000 and end of January 2001 for the duration of 13 months, Location was the Rumailla Hospital Doha Qatar.

## RESULTS

Clinical results showed that most of the pateints in group 2 and 3 were hypotensive while group 1 showed a minor change of BP of about –10%.

Clinicaly the surgeon was unhappy with only 3 patients (2male-1 female) because of oozing of blood during the surgery(from 3rd high dose group).

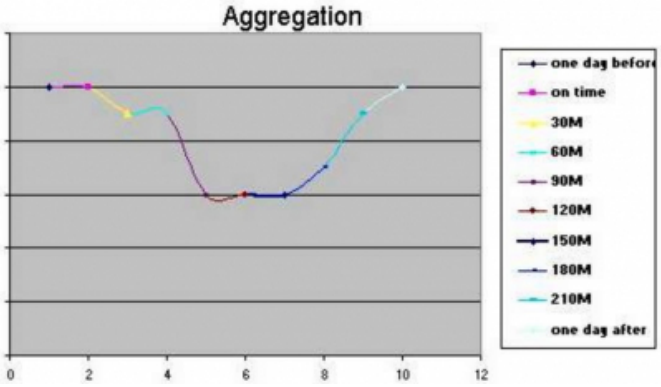
Increasing the dose in 30% to an upper limit >9 mg/kg/h had an effect on bleeding time (increase of about 30 sec) and platet count (decrease of about 20000) for the duration of 60 min.

Also when we reached the level with the propofol infusion of 12 mg /kg /h the inhibition of platlet aggregation curve appeared like the asprin curve ([14]) in other studies. This explains why oozing was increased from the wound. This was accompanied by a reduction of the number of platelts in circulation and a reduction of the heamoglobin count.

3 patients of the third group (10%) showed acute changes and inhibiton of the aggregation curve and platelet count (87500 below the first reading).

### Figure 1

Figure 1: Aggregation curve




Platelet count and hemoglobin was back to normal after 24 hours.

**Figure 2**

Figure 2: Platelet counts

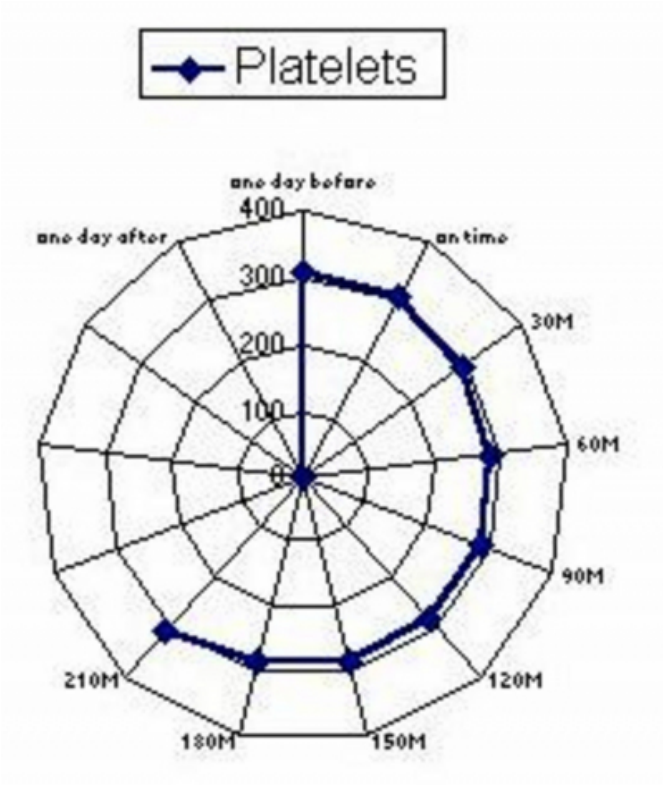
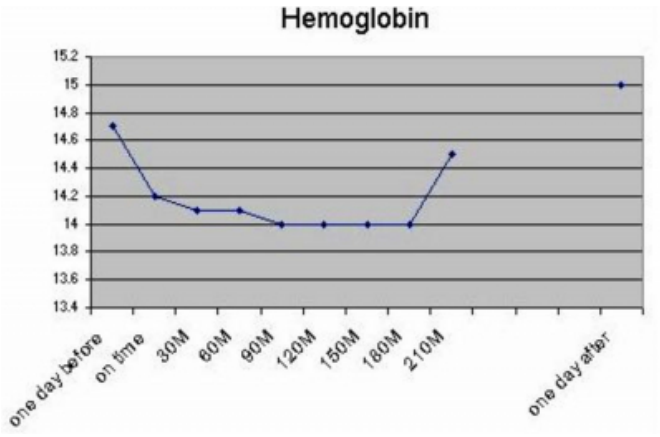



**Figure 3**

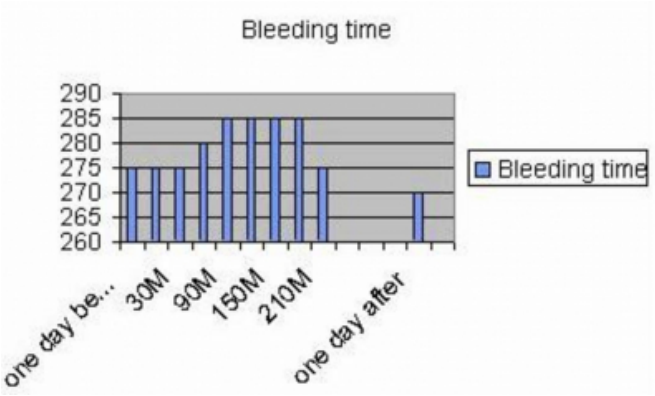
Figure 3: Hemoglobin count




Bleeding time did not significantly change during surgery or after 24 hours.

**Figure 4**

Figure 4: Bleeding times




Propofol measured in the circulation was between 4-9 microgram /ml and completely dissapeared from the circulation after 2 hours from ending the infusion. We used a chromatography analysis ([15]) .

**Figure 5**

Figure 5: Laboratory measurements

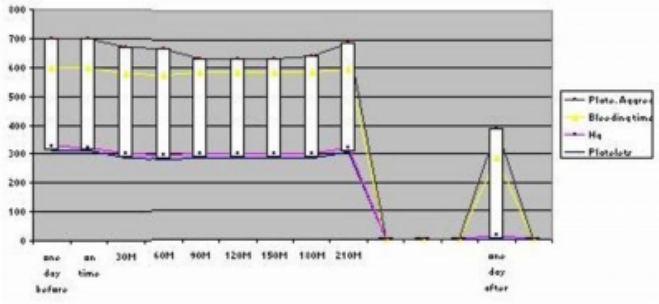


**Figure 6**

Table 1: Laboratory measurements

| | Platelets | Hg | Bleeding time | Plate. Aggreg |
|---|---|---|---|---|
| one day before | 310 | 14.7 | 275 | 100 |
| on time | 310 | 14.2 | 275 | 100 |
| 30M | 289 | 14.1 | 275 | 90 |
| 60M | 282 | 14.1 | 280 | 90 |
| 90M | 285 | 14 | 285 | 50 |
| 120M | 285 | 14 | 285 | 50 |
| 150M | 285 | 14 | 285 | 50 |
| 180M | 285 | 14 | 285 | 60 |
| 210M | 308 | 14.5 | 275 | 90 |
| | | | | |
| | | | | |
| | | | | |
| one day after | 310 | 15 | 270 | 100 |

## DISCUSSION

Platelets participate in the sequence of events that lead to the formation of platelets plug and finally stable fibrin clot formation on the site of vessel interuption ([16]).

We chose to measure the adhesion with bleeding times by Levy's (Simplate) method in wich the normal bleeding time is between 3- 9 minutes using a special double plate knife and special filter paper and measuring a skin area about 2 square inch below the left hypocubital fossa after fixation of the sphygmometer to 40 mm Hg during tests. This was done under anethesia to avoid any pain($_{17}$).

To measure the aggregation clinically we used

CBC

Platelet count in vivo by using photocell electronic method.

In vitro we measured platelet aggregation by transmission of light through stirred platelets, rich in plasma with adding A.D.P (Adenosine Diphosphate) and recording a curve. This curve was compared with the basic one (one day before) and the basic line for each sample using a spectrometer curve.

Our study included 90 patients

We predict that if we increase the time and number of patients and sugery we will find more changes in platelet count and more inhibition of platelet aggregation. We base these hypothesis on the following:

a study by Aoki et al in Japan: Propofol inhibited platelet aggregation if it exceeded 5 mg/kg/ hour ($_{18}$).

a study by Del Cruz etal Malasia – Spain: He found Propofol to reduce the platelet activity in whole blood in vitro($_{19}$).

a study by Kyto University Japan about the composition of propofol eg. soya bean oil, purified egg phosphate glycerin: They found no effect by these compounds on platlet activity and the only effect arised from the phenyle group in propofol($_{20}$).

Some study showed that using propofol in low doses increased platelet aggregation ($_{21}$). Another study concluded no change in platelet aggregation or bleeding time or platlet count ($_{22}$).

## CONCLUSION

Propofol has an inhibitory effect on platelet aggregation when using high doses of more than 9mg/kg/hour. It also reduced the platelet count during surgery after 30 minutes. The effects on bleeding times were insignificant even in high doses.

Changes occured in 3% of our study and in 10% of the group using high doses of propofol. We recommend further studies on a large number of patients and using different laboratory techniques.

## ACKNOWLEDGEMENT:

We thank H.G.H for supporting us to finish this study and Dr. Abdulhafiz Chairman of the Anethesia Dept for his encouragement Dr. M Osman Biochemist Lab, staff of OT Rumella Hospital S.Waffa, tech Naser, Seleem, Aicha, Typest Anilla.

### References

1. Anesthesiology 1999 (5) 1361-9
2. Pharmacotherapy 1997, 17 (6) 1331-7
3. www.Anesthesiology.grouche.med.yale.edu
4. www.gasnet.org
5. www.baxter.com/propofol baxter health care Co-operation study between 1995-2000
6. Prof.U.Graundmann , M. UTH Acta Anesthesiol. Scand 1998
7. www.ncbi.nlm.nih.gov-----medline------
8. Muller Anesthesia vol 1 premedication edd 1996, Anesthesist 48 (11) : 807-12 1999 nov
9. Emmanuel .C Besa Hematology textbook.
10. Ferrari L.R , Donlon JV Anesth Analg 1992 75:351-4
11. Shaffer S. Anesthesiology 1991 74:53-63
12. Morgan Textbook of Anesthesia edd 1999
13. Endoscopy 32(3):233-8 2000 , Pharmacol 128 (7) : 1538-44 1999
14. Patricia M. Catalano Hematology text book
15. Fujita -a hig uchi -j- nagai-T Anesth Analg 2000 June 90
16. Clinical Chemical pathology and applied hematology Prof Ali Khalifa 2000 Cairo Centre. Pharmacology P. shaaban part 1 year 2000, Cairo
17. Simplate
18. Anesthesiology 1998 Feb 62-70 , Japan By Tabushi Y. Shibata -Dept of Anaesthesia Nagahama , Anaesthesiology 1998 Feb 6270
19. Anaesth-Analg 1997 apr. 84.919 - 21
20. Anesthesiolgy 1999 Nov 91 by Kyto Uni. Japan
21. Acta Anethesia Scan 1999, 43
22. Anesthesiolgy 1988 43 supple: 97-100 , Clinical Trial. Gast. 2000, 95, 1476-9

## Author Information

**KASSIM M SAID, Dr. M.D., Mb.B.CH, FACHARZT Germany**
Consultant., Anaesthesia dep., Hamad General Hospital, Hmad cororation.Doha.Qatar