Table 4: Patients in the unmixed group (group B) who experienced pain.

	No who felt pain in group B	No of the same gender who felt pain	% Of the total who felt pain in same gender	Total No Who felt pain of both genders	% of the total No who felt pain.	Total No of pt	% Of the total No of pts
Male	12	16	75%	36	33%	40	30%
Female	15	20	75%	36	41%	40	37.5%
>50yrs	10	13	77%	36	27%	40	25%
<50yrs	17	23	73%	36	47%	40	42.5%
ASA 3	3	4	75%	36	8%	40	7.5%
ASA 1,2	24	32	75%	36	66%	40	60%
Total	27	36	75%	36	75%	40	67.5%

Table 5: Patients in the mixed group (group A) who experienced pain.

	No who felt pain	No of same gender who felt pain	% to the total number felt pain in same gender	Total No of pts who felt pain	%of the total No of pts felt pain	Total No of pts	%of the total No of pts
Male	4	16	25%	36	11%	40	10%
Female	5	20	25%	36	13.8%	40	12.5%
>50yrs	3	13	23%	36	8.3%	40	7.5%
<50yrs	6	23	26%	36	16.6%	40	15%
ASA 3	1	4	25%	36	2.7%	40	2.5%
ASA1-2	8	32	25%	36	22.2%	40	20%
Total	9	36	25%	36	25%	40	22.5%

Discussion

The results of our study clearly show that mixing propofol with lignocaine reduces the incidence of pain during injection when compared to giving lignocaine as a pretreatment. The difference between the two groups (mixed with or given before) is statistically highly significant in favor of mixing lignocaine with propofol.

Many studies in the literature have dealt with the pretreatment techniques, [7,13] while several others studied the effect of the lidocaine/ propofol mixture. [5,10] Few studies compared between the two methods. [2,12,14]

Our results were similar to those of Overbaugh et al. [12] However, they used midazolam 2mg as an immediate premedication to alleviate the stress of the patients, while we did not use any kind of premedication in order to prevent any interference caused by sedative medications on the patients response since we depended on the verbal contact.

We chose to use the patient as his own control similar to previously published studies [12] by injecting the two injectates simultaneously through two different i.v cannulas applied on the dorsal of both hands.

Jonson et al [2] employed 20 and 40mg lidocaine doses both as pretreatment and mixed with propofol, they consistently found the higher lidocaine dose to be more effective.

The pain caused by propofol injection still has unclear mechanism, but it is believed to involve interaction between the active component of the emulsion and the vascular endothelium. [14]

Three of the 40 patients in our study did not have any pain on injection of any side, while one patient felt the pain in both sides but could not determine which side was more.

In our study, we did not investigate the severity of the pain induced, so the pain might have occurred in patients with variable severity.We only used a crude test of pain by asking the patient to raise the arm with the greater pain.The major reason for not scoring the pain is that patients rapidly lose consciousness during the induction of anesthesia. We conclude that as judged by the results of our study as well as by the published literature, the mixed solution of propofol with lignocaine is much more effective in reducing the incidence of pain caused by the injection of propofol than using lignocaine as a pretreatment to propofol during anaesthesia induction.

References

1. Aitkenhead A.R. intravenous anaesthetic agents, Aitkenhead, A.R. Rowbotham D.J, Smith G.Textbook of anaesthesia. London .Churchill livingstone. 2001; 4: 175-177.

2. Johnson,R.A, Harper,N.G.N., Chadwick,S., Vohra,A., "Pain on injection of propofol", Anaesthesia, 1990; 45: 439-442.

3. Fletcher,GC., Gillespie,J.A.,Davidson,J.A.H.,"The effect of temperature upon pain during injection of propofol" , Anaesthesia 1996; 51:498-499.

4. McCirrick, A., Hunter, S., "Pain of Injection of Propofol: the Effect of Injectate Temperature" Anaesthesia 1990; 45: 443-444.

5. Barker, P., Langton, J.A., Murphy, P., Rowbotham, D.J., "Effect of Prior Administration of Cold Saline on Pain during Propofol Injection", Anaesthesia 1991; 46: 1069-1070.

6. McDonald, D.S., Jameson, P., "Injection Pain with Propofol: Reduction with Aspiration of Blood", Anaesthesia 1996; 51:878-880.

7. Helmers, J.H., Kraaijenhagen, R.J., van Leeuwen, L.,Zuurmond, W.W., "Reduction of Pain on injection caused by Propofol", Canadian Journal of Anaesthesia 1990; 37(2): 267-8.

8. Anil Agarwal et al "Vein pretreatment with magnesium sulfate to prevent pain on injection of propofol is not justified" Canadian journal of anesthesia 2004; 51:130-133.

9. Yoshikawa T et al "orally administered clonidine significantly reduces pain during injection of propofol", British journal of anaesthesia 2001; 86: 6: 874-876.

10. Brooker, J., Hull, C.J., Stafford, M., "Effect of Lignocaine on Pain Caused by Propofol Injection", Anesthesia 1985; 40: 91-2.

11. Gehan, G., Karoubi, P., Quinet, F., Leroy, A., Rathat, C., Pourriat, J.L., "Optimal Dose of Lignocaine for Preventing Pain on Injection of Propofol", British Journal of Anesthesia 1991; 66: 324-326.

12. Robert Overbaugh, Perry Jones, Andy Nguyen, Glenn Swaney: Effect of Mixed Versus Unmixed Lidocaine with Propofol. The Internet Journal of Anesthesiology 2003; 7: 2.

13. King, S.Y., Davis, F.M., Wells, J.E., Murchison, D.J., Pryor, P.J., "Lidocaine for the Prevention of Pain Due to Injection of Propofol", Anesthesia and Analgesia 1995; 23: 154-157.

14. Scott, R.P.F., Saunders, D.A., Norman, J., "Propofol: Clinical Strategies for Preventing the Pain of Injection", Anesthesia 1988; 43: 492-494.

15. Baxindale B. Smith G., preoperative assessment and premedication, Aitkenhead, A.R. Rowbotham D.J , Smith G.Textbook of anaesthesia. London .Churchill livingstone 2001; 4: 423-424.

A Comparative Study of the Effect of Mixed Lignocaine with Propofol Versus Unmixed Lignocaine in Reducing the Incidence of Propofol Induced Pain

Husam .I. Makhamreh, FFARCSI.

Anaesthesia Department, King Hussein Medical Center
Amman –Jordan

Abstract

Objectives: To study the effect of mixing lignocaine with propofol in preventing propofol induced pain and compare it with that of lignocaine given intravenously before propofol during induction of anaesthesia.

Methods: A double blinded study was performed on 40 patients with the American Association of Anesthesiologists' classification I-III who underwent minor surgical procedures by infusing propofol in a total dose of 2mg/kg in equally divided dose through two canulas, one in each upper extremity.

On one hand, propofol was infused mixed with 40mg lignocaine, while on the other hand lignocaine 40mg was given intravenously as a pretreatment prior to the administration of propofol during induction. Each patient was asked in which arm there was greater pain.

Results: Nine out of 40 patients in the mixed group experienced pain while 27 out of 40 patients in the unmixed group experienced pain. The result is statiscally significant P< 0.0001. Thirty six patients (90%) of the total number of patients felt pain during injection of propofol, twenty seven (67.5%) of them with the unmixed propofol and 9 (22.5%) patients in the mixed group.

Conclusion: Mixed lignocaine with propofol is more effective in reducing pain than the unmixed lignocaine given as a pretreatment.

(JMJ 2005; Vol. 39 (1): 19-22)

Received	*Revised*	*Accepted*
October 5, 2004	*March 3, 2005*	*March 13, 2005*

Keywords

Anaesthesia, injectate, propofol, Local anaesthetic lignocaine.

Introduction

Propofol is one of the most commonly used intravenous anaesthetic induction agents, especially for surgical procedures, which require a rapid recovery like day case procedures. It offers a smooth induction and rapid recovery with minimal side effects. [1] One major disadvantage is that a bolus injection of propofol is associated with pain during injection. [2]

Although the exact mechanism by which propofol injection causes pain is not clear yet, a number of studies and trials were performed to reduce or alleviate this pain; like warming or cooling the injected propofol, [3,4] using larger veins like the anticubital vein, [5] aspirating blood to mix with the injectate, [6] mixing with fentanyl or alfentanyl, [7] use of magnesium as a vein pretreatment prior to propofol injection [8] and the use of orally administered clonidine. [9] Those studies gave variable results.

Two of the most accepted techniques in alleviating the pain are the administration of lignocaine either prior to the injectate, or mixing it with the propofol. [10] Many studies have attempted to quantify the optimal lignocaine dose/concentration in lignocaine/propofol mixture. [11]

In this study, we compared the effect of the two methods of administering lignocaine with propofol on reducing propofol-induced pain. The relevant literature is discussed.

Patients and Methods

Forty patients with the American Society of Anesthesiologists (ASA) classification I-III, aged 18-65 years scheduled for minor or a day case surgical procedures were randomly selected (Table 1).

Patients with a history of allergic reaction to general or local anaesthetic medications, or who have a cardiovascular compramize, were excluded from the study.The study was conducted at King Hussein Medical Center and was approved by the ethics (IRB) committee.

Correspondence should be addressed to:

Husam Makhamreh, FFARCSI.
P. O. Box: 130 Fuheis- 19152 Jordan
e-mail - husamfaraj4@hotmail.com
e-mail - husamfaraj4@yahoo.com

Table 1: Patients diagnosis and gender.

Diagnosis	Males	Females	Total number
Inguinal hernia	10	5	15
Para umbilical hernia	2	5	7
Anal fissurectomy	2	8	10
haemorroidectomy	4	4	8
Total	18	22	40

Table 2: Demographic characteristics of the selected patients.

Group	N	%
Male	18	45
Female	22	55
Age > 50	15	37.5
Age < 50	25	62.5
ASA* 3	5	12.5
ASA 1-2	35	87.5
Total	40	100

** ASA I: normal healthy patient.*
ASA II: patient with mild systemic disease.
ASA III: patient with severe systemic disease that is not incapacitating. [15]

After explaining the procedure to the patient, 18g venflon canula was placed in the dorsal vein of each hand.No premedication was given to any patient.The total amount (2mg/kg) of propofol was prepared and divided into two equal doses. Volumes of the injectates were made equal by either adding 2ml(40mg) of lidocaine (syringe A), or adding 2ml of normal saline (syringe B). All doses were prepared by the consultant and given to the blinded resident to inject them. Forty milligrams of lignocaine in 2ml were injected in one hand 30 seconds prior to injecting content of syringe B. While 2ml of Nacl were injected simultaneously on the other hand 30 seconds prior to injecting content of syringe A.

Both injectates(A and B),each in a different canula, were injected simultaneously by two individuals at a rate of 4ml/min at each side. Patients were asked to raise the arm where they feel greater pain, or to say (same) if the pain is the same in both arms and (neither) if there is no pain in any arm. No pain scoring system was used.

Results

Nine out of 40 patients in the mixed group experienced pain while 27 out of 40 patients experienced pain in the unmixed group.Using a two tailed *t* test ,this difference is statistically different $p < 0.0001$. The patients' response to the given injectates is summarized in table (3). As can be seen, 36 out of 40 patients (90%) felt pain during injection of propofol.Of those twenty seven had pain with the unmixed propofol, and 9 with the mixed propofol. Three patients felt no pain at any side and one patient felt the same pain at both sides. The pain was not related to the age, gender or ASA score of patients, as can be seen in tables (4& 5). Of those who felt pain at any side, 16 were males and 20 were females. Twelve of the males had pain with the pure propofol, and 4 with the mixed Injectate. Of the females, 15 had pain with the unmixed, and 5 with the mixed injectate.

Regarding the effect of age on pain, 86.6% of those above 50 yrs,and 92% of those below 50yrs experienced pain.

While 80%of the ASA III experience pain, 91.4% of the ASA I-II group had that experience.

Table 3: Comparative results of patients who experienced pain in both groups.

Group	*Unmixed (B)*	*%*	*Mixed (B)*	*%*	*Total No.*	*Total %*
Male	*12*	*66.6*	*4*	*22.2*	*16*	*88.81*
Female	*15*	*68.18*	*5*	*22.7*	*20*	*90.88*
Age >50	*10*	*66.6*	*3*	*20*	*13*	*86.6*
Age < 50	*17*	*68*	*6*	*24*	*23*	*92*
ASA 3	*3*	*60*	*1*	*20*	*4*	*80*
ASA 1-2	*24*	*68*	*8*	*22.8*	*32*	*90.8*
Total	*27*	*67.5*	*9*	*22.5*	*36*	*90*