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ORIGINAL ARTICLE

Propofol Injection Pain: Comparison of Large Antecubital Vein Versus Small Vein on Dorsum of Hand

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ABSTRACT

Objective: To compare the effectiveness of large antecubital vein versus small vein on dorsum of hand in prevention of propofol injection pain in patients undergoing surgery in general anaesthesia..

Design of the Study: The study design was randomized control trial.

Study Settings: Study was conducted at Department of Anesthesia, Dow University of Health sciences, Civil Hospital, Karachi from 23-05-18 till 23-11-18.

Material and Methods: After obtaining a patient's permission, data was gathered in the future. A total of 76 patients were studied (38 in group A and 38 in group B). Mean and standard deviation were used to represent demographic data, whereas frequency or percentages were used to represent the qualitative factors. As part of the post-segregation chi square test, which was applied to the data, the significance level was set at 0.01.

Results of the Study:. A total of 76 patients were enrolled in the study (38 in each of the two groups). The average age in groups A and B was 39.25 ±3.91 and 38.71 ±4.01, respectively. The efficiency of the large antecubital vein vs the small vein on the dorsum of the hand in preventing propofol injection was 81.6 percent vs. 36.87 percent out of 38 patients in groups A and B.

Conclusion: Using a large antecubital vein for propofol injection was found to be more effective than a small vein on the dorsum of the hand for preventing pain.

Keywords: General anesthesia, elective surgery, propofol injection pain, VAS score

INTRODUCTION

Because of its rapid onset, short duration of action, and ease of titration, propofol is frequently used to induce general anaesthesia and drowsiness. When administered in small, carefully timed dosages, propofol has minimal hemodynamic effects.[1] The prevalence of discomfort on injection of propofol ranges from 26 to 70 percent, and hypersensitivity reactions are quite rare. [2,3] Propofol's injection pain cannot be ignored because of its widespread use in clinical settings. None of the interventions were found to be effective in erasing all the pain. Propofol-induced pain is still poorly understood. [2] A painless usage of propofol is required in many hospital settings where it is used on a regular basis. Pain may be caused by the release of local mediators and/or the direct irritation of nerve terminals by propofol. [4-5]

Different researchers proposed different solutions to this challenge based on their beliefs about the propofol-induced pain pathway.[6] The large antecubital vein injection of propofol was judged better to any other non-pharmacological strategies The temperature of propofol, the size of the intravenous catheter, and the injection speed can all be adjusted. [7]

Pretreatment with lidocaine and venous occlusion has been used for pharmacological treatments. To name a few, there have been numerous studies on propofol-lidocaine mixtures [8, 9, 10, 11], pretreatment with Ketamine [12], non-steroidal anti-inflammatory medications [13], magnesium sulphate [14], ondansetron [15], and ramosetron [16]. Propofol-lidocaine admixture injected intravenously into the antecubital vein and the small vein on the dorsum of the hand resulted in moderate to severe pain in 20% of patients, compared to 71% of patients who received the injections utilising the hand's dorsal vein and the big antecubital vein. [17]

There is a lack of data on this topic in the local area, and anaesthetics are adopting a variety of methods to decrease discomfort when administering propofol. It is therefore the purpose of this study to determine which injection location is more effective, and which will be employed in future cases.

MATERIAL AND METHODS

The study Approval from IRB of the institute was obtained prior to the conduct of the study. Study was conducted at Anesthesia department, Civil Hospital, Karachi from 23-05-18 till 23-11-18. Admitted patients presenting to Patients who met the research's eligibility requirements for elective general anaesthetic surgery were enrolled in the trial with their informed permission. Male and female patients aged 20 to 50 who were ASA status I or II and scheduled for elective surgery under general anaesthesia were included in the study.. Obese patients (BMI > 27 kg/m2), those with a known history of lidocaine allergy, those who expected a difficult intubation (thyromental distance 6 cm), and pregnant women were also excluded from the trial. The WHO calculator was used to compute the study sample of 76 patients (38 in each group) using a threshold of significance of 95 percent and a power of test of 99 percent, with the efficacy of the antecubital vein at 79 percent and the effectiveness of the tiny vein at 29 percent [17.]

The patients were divided into two groups at random using a sealed opaque envelop. Intravenous catheters will be put pre-surgery between 15 and 30 minutes in all patients, either in an antecubital vein (Group A) or an antecubital vein on the dorsum of the hand (Group B) (Group B). It was decided to start the Lactate Ringer infusion at 120 ml/h. A green covering was draped over the limb. Lidocaine and propofol were administered either through a big antecubital vein (Group-1, n = 38) or through a vein on the dorsum of the hand (Group-2, n = 38). Intravenous catheters were used to provide 30 percent of the predicted dose of propofol (2mg/kg) to both groups. All patients were instructed on how to use a visual analogue scale to rate their level of pain, which ranged from 0 to 10. The procedure for inducing anaesthesia was then carried out as usual. Effectiveness was defined as a VAS score of 3 or less. For higher scores, management was left up to the consultant's whim. For this study, demographic information such as age, gender, location, ASA status, and pain intensity will be recorded and entered into the questionnaire.

By using SPSS version 22, we were able to enter and evaluate data. For numerical variables, the mean standard deviation was calculated. For categorical variables, percentages and frequencies were determined. It was determined that P-values less than or equal to 0.01 were significant for the Chi X2 test when comparing the effectiveness of each group's pain prevention strategy.

STUDY RESULTS

Mean pain score, BMI, height and weight of group A in our study was 3.78±1.65, 31.28±2.56 kg/m2, 145.41±11.47 cm and

121.84±23.02 kg respectively and mean pain score, BMI, height and weight of group B in our study was 6.24±2.22, 31.72±2.31 kg/m2, 138.04±14.51 cm and 110.84±28.57 kg and respectively as shown in Table 1. Frequency distribution of age, gender, residence status, ASA status, diabetes mellitus, hypertension, smoking status presented in Table 2. Frequency distribution of efficacy showed that out of 38 patients in group A, 31 (81.6%) and 07 (18.4%) patients achieved and did not achieve efficacy respectively. Frequency distribution of efficacy showed that out of 38 patients in group B, 14 (36.87%) and 24 (63.2%) patients achieved and did not achieve efficacy respectively. P-value was 0.08 as presented in Table 3. Stratification for age, gender, residence status, ASA status, diabetes mellitus, hypertension, and smoking status with respect to efficacy in group A and B is presented in Table 4.

Table-1: Descriptive statistics of Group A and B patients

Variable	Mean	Min-max
Age group a (years)	39.25±3.91	20-50
Age group b (years)	38.71±4.01	20-50
Pain score group a	3.78±1.65	1-10
Pain score group b	6.24±2.22	1-10
Bmi (kg/m^2) group a	31.28±2.56	27-34
Bmi (kg/m^2) group b	32.72±2.31	27-34
Height (cm) group a	145.41±11.47	120-180
Height (cm) group b	138.04±14.51	120-180
Weight (kg) group a	121.84±23.02	52-154
Weight (kg) group b	110.84±28.57	52-154

Table-2: Details of different variables distribution In Group A and B

Variables	Years	Group a	Group b
Age	20-35	17 (44.7%)	23 (60.5%)
	36-50	21 (55.3%)	15 (39.5%)
Gender	Male	24 (63.2%)	24 (63.2%)
	Female	14 (36.8%)	14 (36.8%)
Residence Status	Urban	21 (55.3%)	25 (65.8%)
	Rural	17 (44.7%)	13 (34.2%)
ASA Status	I	22 (57.9%)	18 (47.4%)
	II	16 (42.1%)	20 (52.6%)
Diabetes Mellitus	Yes	10 (26.3%)	07 (18.4%)
	No	28 (73.7%)	31 (81.6%)
Hypertension	Yes	12 (31.6%)	18 (47.4%)
	No	26 (68.4%)	20 (52.6%)
Smoking Status	Yes	06 (15.8%)	12 (31.6%)
	No	32 (84.2%)	26 (68.4%)

Table 3: Propofol Injection Pain Reduction with the Large Antecubital Vein vs. the Small Dorsum of Hand Vein

Efficacy	Group a	Group b	P-value
Yes	31 (81.6%)	14 (36.8%)	0.08
No	07 (18.4%)	24 (63.2%)	

Table-4: Propofol injection pain can be reduced by using large antecubital veins or small veins on the dorsum of the hand. with age, gender, residence status, ASA status, diabetes mellitus, hypertension, smoking status

Parameters	Details	Efficacy group a	Efficacy group b	P value
Age	20-35	14(82.4%)	09(39.1%)	0.01
	36-50	17(81%)	05(33.3%)	0.01
Gender	Male	21(87.5%)	10(41.7%)	0.01
	Female	10(71.4%)	04(28.6%)	0.05
Residencestatus	Urban	16(76.2%)	10(40%)	0.01
	Rural	15(88.2%)	04(30.8%)	0.01
ASA status	I	18(81.8%)	05(27.8%)	0.01
	I	13(81.2%)	09(45%)	0.06
Diabetes mellitus	Yes	08 (80%)	03(42.9%)	0.11
	No	23(82.1%)	11(35.5%)	0.01
Hypertension	Yes	10(83.3%)	05(27.8%)	0.01
	No	21(80.8%)	09(45%)	0.01
Smoking status	Yes	04(66.7%)	04(33.3%)	0.17
	No	27(84.4%)	10(38.5%)	0.01

DISCUSSION

A popular anaesthetic and sedative medicine, Propofol is commonly used in intensive care, the ER, and for endoscopic operations. Out of a total of 76 (38 in group A and B) patients who were included. Mean age in groups A and B was 39.25±3.91 and 38.71±4.01. 81.6 percent of the time, the large antecubital vein worked, and 36.87 percent of the time, the small hand dorsal vein worked, respectively, in preventing propofol injection in 38 patients in groups A and B..

A prospective randomized clinical trial conducted at Riyadh (KSA) included 160 patients. It was found that both groups were given an antecubital vein (Group 1) or a dorsum of hand vein (Group-2) combination of propofol (1 percent) and lidocaine (2 percent) to induce anaesthesia (Group-2). No pain, mild, moderate or severe were rated. A propofol-lidocaine admixture intravenously injected into the antecubital vein and a tiny vein on the dorsum of the hand caused moderate to severe pain in 20% of patients, compared to 71% in the placebo group. Antecubital vein injection of propofol – lidocaine combination resulted in a significant decrease in pain compared to injection into a tiny vein on the dorsum. [18]

Prospective double-blind study of 180 patients, ASA I or II, undergoing elective surgery was done. Each of the three groups of 60 people was chosen at random. Pre-treatment with 40 mg lidocaine in saline, 100 mg paracetamol, and 10 ml saline was recommended was given to groups I, II, and III, respectively. A superficial radial vein was used to introduce an 18-gauge catheter into each subject. For 20 seconds after the patient's veins were blocked for two minutes, a quarter of the total amount of The veins were injected with propofol. Unknown researchers used a four-point verbal rating scale (VRS) to gauge the patient's level of discomfort during the pretreatment solution and propofol injections. Propofol-induced pain was equivalent in intensity and severity between the paracetamol and lidocaine groups. Propofol injection-induced discomfort was reduced by pretreatment with i.v. paracetamol.[19]

In a second trial, 100 youngsters who were scheduled for general anaesthesia were split into two groups. Propofol LCT or propofol MCT/LCT was given to patients at random. Prior to losing consciousness, mCHEOPS and Wong-Baker Faces Scale were used to measure pain and evaluate the effects of injections on patients. Propofol LCT had a pain incidence of 5%, while propofol MCT/LCT had a pain incidence of 15% (P 0.05) according to the mCHEOPS scale. Propofol LCT had a pain incidence of 17%, while propofol MCT/LCT had a pain incidence of 21% (P 0.05). The dorsum of the hands should be avoided in favour of the antecubital veins. [20]

CONCLUSION

Using a large antecubital vein for injection of propofol resulted in better results than using a small vein located on the dorsum of the hand for injection. Despite the advent of improved formulations of

propofol, discomfort during general anaesthesia induction remains a typical problem. Propofol's IV injection causes increased discomfort in younger patients, those with a peripheral IV site, and those who are male, according to our findings.

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