

Evaluation of the Effect of Dexmedetomidine on Hemodynamic Changes and Recovery Time in Patients Undergoing Dilatation and Curettage

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Abstract

Background: Because of the traditional use of propofol drugs for relaxation in dilatation and curettage is used. Recently, doctors have taken into consideration the importance of dexmedetomidine treatment. Since quantitative reports on the use of long-acting diuretics in the practice of dilatation and curettage, this study aimed to compare the effect of dexmedetomidine and placebo (normal saline) on the rate of patient recovery instead, the amount of pain in recovery and hemodynamic parameters, and the need for drugs and hypnosis drugs.

Methods: This double blind clinical trial was conducted between two groups of 50 patients with dexmedetomidine (D) and placebo (P). At first, group D received 1µg/kg dose of dexmedetomidine for 10 minutes and P group received 1µg/kg normal saline for 10 min. Then, 2 mg/kg fentanyl and both groups received 1.5 mg anesthetic Injecting propofol per kilogram to Ramsey relaxation score of 3-4, and during the hemodynamic operation, it was recorded and compared with the amount of opioid and propofol needed.

Results: In group D, the maximum blood pressure and minimum blood pressure in the 5th minute after the start of the operation were significantly different with the P group ($P < 0.05$). Also, in group D, heart rate was significantly different in the 5th and 10th minutes after surgery with P group ($P < 0.05$). There was a significant difference between groups in D group with recovery group ($P < 0.05$).

Conclusion: Since the use of Dexmedetomidine in comparison with placebo has hemodynamic stability, the patient's greater satisfaction and less pain in recovery, it is deduced that Dexmedetomidine is a suitable alternative for short-term surgery.

Keywords: Dilatation and curettage; Dexmedetomidine; Placebo; Propofol; Fentanyl

Introduction

One of the most common surgical procedures in Iran is the use of various medicines for anesthesia, diagnosis of the disease and therapeutic curettage [1]. The cervix dilatation and curettage is a common procedure for determination the cause of abnormal uterus bleeding [2,3]. Common methods for the anesthetization of dilatation and curettage are including general anesthesia, local anesthesia or paracervical block, according to patient's medical history and surgical indication [2-4]. In these patients, the time to exit from anesthetics, the length recovery time, post-operation side effects such as pain, nausea and vomiting, dizziness, and overall satisfaction of the patient is very important and effective on hospital discharge and patient rehabilitation. One of the anesthesia drugs with a high efficiency is Dexmedetomidine (DEX), selective agonist of the adreno receptor [5-7]. DEX is a powerful anesthetic drug that helps to maintain homodynamic status of the patients with its central sympathomimetic effect which reduces the need for opioids and improve recovery quality [8-12]. The anesthetic ability of DEX is unique and causes mild cognitive impairment, which facilitates easy communication between the medical staff and patient in the ICU ward.

Recent studies have compared DEX with other drugs such as Diprivan, Triamcinolone and Midazolam. Results of these studies showed that DEX has more sufficient anesthetic and anti-pain effects in comparison with other drugs [13-16].

DEX tends to increase, but due to its anesthetic effects, few studies have evaluated the quality of patient recovery and possible delay in his awareness after infusion of the drug [16]. Therefore, the aim of the present study was to evaluate effects of dexmedetomidine on the quality and time rate of recovery in patients undergoing dilatation and curettage and to survey hemodynamic parameters and the need for narcotic and hypnotic drugs.

Material and Methods

A total of 100 patients aged 18 to 50 years old, curettage dilatation candidates, with anesthetic risk of class I (based on American College of Anesthesiologists) enrolled in this clinical trial study and randomly divided to two groups consist of 50 patients. In the case group, after a complete cardiovascular monitoring, a dose of 1µg/kg of body weight of DEX, was injected intravenously for 10 minutes, 15 minutes before the operation. Patients of the control group, received Placebo using the same anesthesia procedure. Vital signs, including heartbeats and arterial blood pressure were measured and recorded every 5 minutes. Before operation, the anesthetizing routine procedure was conducted using 2 µg/kg body weight of Fentanyl and 1.5 mg/kg body weight of propofol for 4 minutes to obtain a 3-4 s Ramsey sedation score. Pain rate was measured on the basis of the Numeric Score Rating Scale, and the recovery time was recorded based on the Alert criteria and patient satisfaction has obtained by asking questions. Data were analyzed using SPSS software version 20 and descriptive statistics were analyzed using Chi-square, independent t-test and regression analysis.

Results

The aim of this study was to evaluate the effects of Dexmedetomidine on patients undergone curettage dilatation, 50 patients with a mean age of 36 years old and an average weight of 68.5 kgs, compared with 50 control subjects with an average age of 36.5 years old and an average weight 68 kgs. One of the patients in the control group and 4 patients in the case group were excluded from the study due to exclusion criteria or lack of cooperation. Weight and age

differences between study groups, were not statistically significant, P value=0.79 and 0.84 respectively. The mean of the maximum blood pressure in both groups of study before surgery, 5, 10, 15 and 20 minutes after surgery has showed in Table 1. Results showed that there was no significant difference in pre-operative maximum blood pressure between study groups based on Mann-Whitney test (P value=0.22). The differences were only significant for maximum blood pressure 5 minutes after surgery (p value=0.007)

Group		Pre-operative	5 min	10 min	15 min	20 min
Control	Mean (mmHg)	126.83	112.55	115.54	124.66	116.00
	Number	49	49	33	6	1
	Std. variation	24.57	18.41	14.98	26.76	-
Case	Mean (mmHg)	132.63	125.02	117.18	114.09	121.00
	Number	46	46	44	21	6
	Std. variation	16.48	24.86	22.18	16.12	21.78

Table 1: Results of maximum blood pressure in study groups.

The mean of the minimum blood pressure in both groups of study before surgery, 5, 10, 15 and 20 minutes after surgery has showed in Table 2. Results showed that there was no significant difference in pre-operative minimum blood pressure between study groups based on

Mann-Whitney test (P value= 0.6). The differences were only significant for minimum blood pressure 5 minutes after surgery (p value=0.002).

Group		Pre-operative	5 min	10 min	15 min	20 min
Control	Mean (mmHg)	82.469	69.645	71.9394	74.666	65.000
	Number	49	48	33	6	1
	Std. variation	11.91	11.04	12.559	19.14	-
Case	Mean (mmHg)	84.521	78.0652	70.295	67.428	67.000
	Number	46	46	44	21	6
	Std. variation	12.14	13.89	15.04	10.19	11.48

Table 2: Results of minimum blood pressure in study groups.

The mean of the heartbeat in both groups of study before surgery, 5, 10, 15 and 20 minutes after surgery has showed in table 3. Results showed that there was no significant difference in pre-operative

heartbeat between study groups based on Mann-Whitney test (P value=0.1). The differences were significant for heartbeat 5 and 10 minutes after surgery (p value=0.00).

Group		Pre-operative	5 min	10 min	15 min	20 min
Control	Mean (Beats/min)	96.224	82.857	81.147	83.666	105.000
	Number	49	49	34	6	1
	Std. variation	15.71	13.38	15.19	15.69	-
Case	Mean (Beats/min)	90.739	68.326	69.54	73.050	79.666
	Number	46	46	44	20	6

	Std. variation	17.04	10.24	8.73	11.25	28.59
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Table 3: Results of heartbeat in study groups.

Pain rate was measured on the basis of the Numeric Score Rating Scale. Mean of pain scores in study groups was showed in Table 4. The mean pain score in the control group was 2.79 and in the case group was 0.68, which shows a significant difference in pain score, based on Mann-Whitney test, (P value=0.008).

Groups	Pain Score	Prevalence	%
Control	0.0	6	12.2
	1.0	9	18.4
	2.0	5	10.2
	3.0	14	28.6
	4.0	7	14.3
	5.0	4	8.2
	6.0	1	2.0
	7.0	2	4.1
	8.0	1	2.0
Total	49	100.0	
Case	0.00	35	79.5
	1.00	2	4.5
	2.00	2	4.5
	3.00	1	2.3
	4.00	1	2.3
	5.00	2	4.5
	7.00	1	2.3
	Total	44	100.0

Table 4: Pain score in study groups.

Discussion

Different types of surgeries are being performed today, which has created an increasing number of challenges for anesthetists [17]. The time to wake up and exit from anesthesia, the length of stay in the recovery, the various side effects such as pain, nausea, vomiting and dizziness, and the overall satisfaction of patients is very important [18]. Various drugs have been studied to improve the condition of anesthesia and recovery afterwards. One of the most commonly used drugs is Dexmedetomidine (DEX) that is an anxiety reducing and anti-pain drug. DEX is notable for its ability to provide sedation without risk of respiratory depression and can provide cooperative or semi-arousable sedation [19].

The aim of this study was to investigate the effects of DEX on hemodynamic parameters (heart rate and blood pressure), respiratory status, the time of recovery, and the need for drugs and anesthetic

drugs. The targeted parameters in this study were hemodynamic stability (the maximum and minimum blood pressure in the 5 different times after surgery) and reduction of postoperative pain in recovery.

The results of this study showed that the mean of maximum blood pressure 5 minutes after operation was 125.0 mmHg in the case group and 112.4 mmHg in the control group indicating a significant difference. The average blood pressure was 5 minutes after surgery in the case group was 87.1 mm Hg and 69.4 mmHg in the control group that showed significant difference between study groups. The patient's motion was 11 and 21 times in the case and control groups respectively; According to Chi-square test, this difference was not significant. Results of pain score indicated that the drug group has significantly more pain than the case group. Based on independent t-test, activity levels, respiratory status and arterial oxygen levels were similar in both study groups.

Sethi et al. compared Diprivan and DEX in convenience of patients and the usefulness of these drug for cervix dilatation and curettage surger. Results showed that the satisfaction score of the patient and surgeon in is higher for DEX and patients who undergone anesthesia with DEX, has better hemodynamic properties [14].

Bani Hashem et al. compared the sedation effects of DEX with Midazolam in esophageal echocardiography patients. Results showed that long-acting doses of DEX, as compared with midazolam, are an appropriate drug for relaxation and patient satisfaction [16].

The results of this study are consistent with the results of Sethi et al. [14] on curettage operation. Both studies showed that the effects of DEX on hemodynamic stability is considerable in short-term surgery and can reduce patient's pain in recovery. Also in terms of hemodynamic stability, our results is approximately similar to results of Alimian et al. study [20] conducted on patients candidate for posterior fusion surgery of the spine; hemodynamic stability and recovery pain are the same in both studies. The results of our study is also in direction with the results of merisheti et al study [21] and tanscanan et al study [22].

Conclusion

Since the use of Dexmedetomidine in comparison with placebo has hemodynamic stability, the patient's greater satisfaction and less pain in recovery, it is deduced that Dexmedetomidine is a suitable alternative for short-term surgery.

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