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USAGE OF VARIOUS CONCENTRATIONS OF KETAFOL FOR DILATATION AND CURETTAGE

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Abstract

Background: Ketafol is a combination of Ketamine and Propofol in different proportions. Various gynecological techniques are short periods and need only pain relief with moderate sedation.

Aim: To compare the benefit of Ketafol with different concentration in dilatation and curettage regarding onset of sedation, level of sedation, recovery time, post operative pain and surgeon satisfaction score.

Methods: Our respective investigation includes 104 adult female patients, aged 20-38 years, classed I by the American Society Of Anesthesiologists and planned for elective Dilatation and Curettage procedure with a period of surgical intervention not more than 15 min, during the period Jan 2015 - Mar 2016, at Prince Hashim hospital, Zarqa, Jordan, after obtaining approval from our Ethics and research board review Committee of the Royal Medical Services and written informed consent from all participants.

Patients were divided into two groups: group (I, n=51) given Ketafol containing Ketamine: Propofol (1:1) while group (II, n=53) given Ketafol containing Ketamine: Propofol (1:2) .Then we compare two groups regarding onset of sedation, level of sedation using Ramsey sedation scale, recovery time using modified Aldrete score, post operative pain using verbal rating scale and surgeon satisfaction score.

Results: Ketofol in groups I and II was similar in onset of sedation (GI: 1.46 ± 0.45 min, GII: 1.47 ± 0.59 min), intraoperative Ramsey sedation scores at 10 min (GI: 5.47 ± 0.37, GII: 5.72 ± 0.24) and recovery times (GI: 3.87 ± 0.88 min, GII: 3.42 ± 0.54 min). Regarding the onset of sedation, intraoperative sedation score and recovery time, there were no remarkable differences between the groups.

Conclusion:Ketofol in a proportion of 1:2 induces better sedation level in comparison to the other group, both ketofol concentrations (1:1 and 1:2) are comparable regarding sedation profile in dilatation and curettage procedures.

Introduction

Sedative and analgesic drugs are commonly administered for procedural sedation. Titration of anesthetic doses must be performed with care and the patients must be permanently monitored. A combination of ketamine and propofol has many positive anesthetic characteristics. There is remarkable interest in ketofol as a drug for procedural sedation.

The advisable anesthetic protocol for female short gynecological procedures is moderate sedation with pain relief and local anesthesia (1). Moderate sedation and pain relief with local anesthesia induces enhanced recovery, optimum comfort and less cost (2). Ketofol is a combination of ketamine and propofol with good pain relief and sedative characteristics with a fast onset of action, making it adequate for short surgical techniques (3).

Ketofol is a combination of ketamine and propofol in any required proportions (1). Ketamine and propofol are physically compatible for 60 minutes at 23°C and may be combined in various concentrations for various surgical

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techniques (4). Ketofol is the combination of ketamine and propofol in various concentrations. It commonly used for several procedures. Ketamine, a neuroleptic anesthetic drug,acts on thalamocortical and limbic N-methyl-D-aspartate (NMDA) receptors.Ketamine causes psychomimetic activity and emergence reactions in up to 30% of patients. Propofol, a sedative, hypnotic and anesthetic drug, is also an antagonist at N-methyl-D-aspartate receptors. Propofol has a narrow therapeutic range. Propofol based sedation is safe and highly effective. The combination of these two agents has several
benefits.

The aim of this investigation was to compare various solutions of ketamine and propofol in the proportion of 1:1 and 1:2 regarding the period and level of sedation and character of pain relief for female dilatation and curettage.

Methods

Our prospective, double-blind and randomized investigation included 104 female adult patients, aged 20-38 years, classed I by the American society of anesthesiologists and scheduled for elective dilatation and curettage with a period of surgical intervention not more than 15 min, during the period Jan 2015-Mar 2016,at Prince Hashim hospital,Zarqa,Jordan, after obtaining approval from our Ethics and research board review Committee of the Royal medical services and written informed consent from all participants. Patients were ruled out if they were hypersensitive to ketamine or propofol and procedures lasting more than 15 min were ruled out from the investigation

In the operation room, room temperature was maintained at 23°C. The patients were divided in a random manner into two groups: I (n=51) and II (n=53). Patients in groups I and II were administered ketofol intravenously in a proportion of (ketamine: propofol) 1:1and 2:1, respectively, in 3 mls as primary dose until an optimum sedation of Ramsey sedation score of 5-6 (needed to start the surgical procedure).Table I. The ketofol in group I was prepared by adding 2 ml of 50 mg/ml ketamine to 10 ml of 10 mg/ml propofol in the same syringe. The ketofol in group II was prepared by adding1 ml of 50 mg/ml ketamine to 10 ml of 10 mg/ml propofol. The time to attain the desired sedation was recorded. The period of surgery, total sedation duration and recovery time were recorded. The recovery time was defined as the time from the injection of the last dose of ketofol until the patient reached a modified Aldrete Score of 9-10.Table II. The total sedation time was defined as the time from the first injection of ketofol until the opening of eyes to verbal orders postoperatively. The postoperative verbal rating of pain was performed using verbal rating scale (VRS) 10 min postoperatively. Failed sedation was defined as failure to attain the required level of sedation

Statistics

The data were compared using ANOVA test. The Chi-square test was used to compare the surgeon satisfaction and verbal rating for pain between the different groups. A *P* value of < 0.05 was considered significant.

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RESULTS

There were no remarkable differences regarding patient's characteristics, total surgical intervention duration (Table III) and onset of sedation between the two groups (Table IV). There was no statistically significant difference between patients in groups I and II in terms of recovery time.Table IV.

Regarding the Ramsey sedation score, there were no significant differences at all times between patients in both groups (Table V).

Mean total sedation time was 19.57 and 19.20 min in groups I and II, respectively (P>0.05).

There was a remarkable difference in verbal rating scale for pain after surgery between the patients in the two groups (I, II) (*P* <0.05) (Table VI). The two groups were similar regarding the surgeon satisfaction score. Groups I and II demonstrated a difference in administration of propofol such that propofol administration was the least in group I (1.47+/- mg/kg). (In group II, propofol administration was 1.33+/-0.12 mg/kg). There were three cases of failed sedation in our investigation from group II (ketofol 1:2).

Table I.Ramsey sedation scale.

Awake		
	1	Anxious,agitated,restless
	2	Cooperative,oriented,tranquil
	3	Responsive to commands only
Asleep		
	4	Brisk response to light glabellar tap or loud auditory stimulus
	5	Sluggish response to light glabellar tap or loud auditory stimulus
	6	No response to light glabellar tap or loud auditory stimulus

Table II.Aldrete scale.

		score
activity		
	Able to move 4 extremities voluntarily or on command	2
	Able to move 2 extremities voluntarily or on command	1
	Able to move 0 extremities voluntarily or on command	0
Respiration y0o		
	Able to breathe deeply and cought freely	2
	Dyspnea or limited breathing	1
	apneic	0
consciousness		
	Fully awake	2
	Arousable on calling	1
	Not responding	0
circulation		
	B/P +/-20% of preanesthetic level	2
	B/P +/-20-50% of preanesthetic level	1

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	B/P +/-50% of preanesthetic level	0
color		
	Normal	2
	Pale,dusky,blotchy,jaundiced,other cyanotic	1
	cyanotic	0

Table III. Patients characteristics.

	GI	**GII**
Ketofol conc.	1:1	1:2
No.	51	53
Age (years)mean+/-SD	29.17±1.24	31.44±1.32
ASA I	51	53
Duration of surgery(min)mean +/-SD	13.32±2.41	13.21±1.17

Table IV.Comparison of anesthetic times.

	GI	**GII**	**P**
Onset of sedation	1.46±0.45	1.47±0.59	>0.05
Recovery time	3.87±0.88	3.42±0.54	>0.05
Total sedation time	19.57±1.54	19.20±1.39	>0.05

Table V.Comparison of Ramsey scores.

	GI	**GII**
5 min after induction	5.11+/-0.23	5.56+/-0.36
At 10 min	5.46+/-0.29	5.71+/-0.28
At end of surgery	3.70+/-0.46	3.26+/-0.38
At 15 min	1.64+/-0.05	1.76+/-0.18

Table VI.Comparison of verbal rating scores.

	0	**1**	**2**	**3**	**4-10**
GI	39	25	8	1	0
GII	44	21	6	0	0

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Discussion

The objective of anesthesia is to decrease anxiety and perception of pain (5). The combination of ketamine and propofol (ketofol) for sedation is safe and efficient. The combination enhances a fast recovery time.In our investigation, ketofol 1:1and 1:2 were investigated as previous investigations have demonstrated that these proportions are efficient for sedation and pain relief (6). The Propofol-ketamine combination was used for procedural sedation. Propofol ketamine combinations in the ratios of 2:1, 3:1 and 4:1 were administered. The ratios of 2:1, 3:1 and 4:1 were very effective for the procedures. The efficacy of sedation, recovery and discharge time in the ratios of 3:1 and 4:1 combinations of ketofol were similar.

In our investigation, ketofol in groups I and II attained a required sedation level of 5-6 on Ramsey sedation scale, comparatively (I: 1.46 ± 0.45 min, II: 1.47 ± 0.59 min). The Ramsey sedation scale score is simple and easy to use (7). Sedation scores were more and better sustained in patients in group II (ketofol 1:2) who were administered higher amount of propofol in comparison to patients in group II (I: 5.46 ± 0.29, II: 5.71 ± 0.28). ketofol in the proportion of 1:2 causes efficient sedation with a fast recovery (4). Other authors recommended a concentration of ketofol 1:1 because the mean propofol use and the number of over-sedated patients (sedation score >4) were more in patients receiving a 1:2 proportion (8). In our investigation, patients in both groups showed a higher comparative Ramsey sedation score as demonstrated by previous authors (9). In our investigation, the mean total sedation time was similar in both groups.

Many researchers have demonstrated better cardiovascular stability when using various mixtures of ketamine and propofol compared to either drug used alone (10).
The addition of low dose ketamine to propofol enhances ventilation and decreases the risk of respiratory depression and the requirement for recurrent drug use .This may be caused by ketamine-induced sympathoadrenal stimulation (7). In our investigation, patients receiving ketofol (1:1) experienced better postoperative pain relief than the other group. These results are caused by the analgesic action of ketamine in the higher ketamine proportion group (1:1).In a previous study (11), patients receiving a 1:1 ketofol infusion had remarkably more VRS pain scores.

The need of propofol was remarkably less in (1:1) group (mean dose 1.47 ± 0.25 mg/kg) in our investigation because the addition of ketamine reduces the consumption of propofol, indicating synergism between the two drugs. The administration of propofol was more in our investigation in comparison to other investigations (12).Other surgical more invasive procedures need more degree of sedation.The sedative and antiemetic actions of propofol can decrease the emetic and psychomimetic actions of ketamine.(12). The addition of ketamine to propofol causes an analgesic component. Ketamine reduces the total dose of propofol required for the same level of sedation. Propofol reduces emergence features after surgery correlated with ketamine administration. (13).Our two groups hadn't any statistically remarkable difference regarding surgeon satisfaction scores. Sedation scores using bispectral index and electroencephalography were not available.

Conclusion

Ketofol in a proportion of 1:2 induces better sedation level in comparison to the other group, both ketofol concentrations (1:1 and 1:2) are comparable regarding sedation profile in dilatation and curettage procedures.

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