“Comparison of Ramsay Sedation Score and BIS monitoring in sedoanalgesia for ERCP ”

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INTRADUCTION

Bispectral index (BIS) monitoring is widely used to monitor the electrical activity of sedative anesthetics and cerebral cortex. It provides noninvasive objective measurement of consciousness level in sedatized patient. Patient monitoring and close follow-up is necessary in order to avoid cardiovascular and respiratory problems during the ERCP procedure.

The results of studies evaluating the benefits of BIS monitoring for gastrointestinal endoscopy have not been found consistent.

In this study, we aimed to evaluate the effect of sedation on propofol usage, hemodynamic parameters, respiratory functions, endoscopist and patient satisfaction by monitoring the BIS value of sedation based on hypothesis that we can reduce cardiovascular and respiratory risk by using propofol in minimal doses in order to achieve sedation at the desired level with BIS monitoring.

METHOD

Sixty patients in the ASA 1-2 category who were scheduled for ERCP with sedation were randomly divided into two groups after the approval of the Local Ethics Committee. Procedure was performed with administration of sedation so that Ramsay Sedation Score (RSS) would be 4-5 in the Group 1, while the Group 2 was sedated with BIS monitoring so that BIS value would be 65-75.

All patients were monitored noninvasively (heart rate, arterial pressure, pulse oximeter). Both groups received 0.03 mg/kg IV midazolam and 1 mg/kg lidocaine followed by sedation with 1 mg/kg propofol and 1 mcg/kg fentanyl. Sedation administration was achieved with a 4 mg/kg/h propofol infusion.

Sedation was achieved in Group 1 so that RSS would be 4-5; while in group 2, BIS electrode was adhered to the frontotemporal region to provide a sedation so that BIS value would be 65-75. In the case of sedation failure, an additional dose of 0.1 mg/kg propofol (i.v.) was administered. The propofol infusion was stopped when the BIS value fell below 65 and the RSS exceeded 5.

Situations in which cardiopulmonary disease could develop and all interventions performed were recorded. Bradycardia (<50/min), hypotension (systolic arterial pressure <80 mmHg), hypoxia (SpO₂ <90%).

The total duration of the procedure and the total amount of propofol consumed were recorded. Postoperative recovery time, nausea-vomiting, pain, patient and endoscopist satisfaction were evaluated.

The normal distribution of numerical measurements was investigated by the Kolmogorov-Smirnov test. Parameters with normal distribution were analyzed with independent samples t-test, those with no normal distribution were analyzed with either Mann-Whitney U test or Fisher-Freeman-Halton test, whichever appropriate. The statistical significance was considered to be statistically significant when p value was <0.05.

RESULTS

SpO₂ values at the beginning of sedation, and at 1st, 5th and 10th minutes were significantly higher in the BIS group (p<0.0001) (Table 1).

When the number of times that SpO₂ value was lowered under 90% was evaluated, it was found higher in the RSS group (p <0.05) (Table 2).

There was no difference in the amount of propofol used, duration of PACU stay, hemodynamic values, and patient and endoscopist satisfaction between the two groups (Table 3).

CONCLUSION

Although there was no difference in the amount of total propofol consumed in both groups in our study, SpO₂ values were higher in the BIS group during induction, suggesting that safer sedation can be achieved with BIS monitoring in terms of respiratory depression.

Table 1. SpO₂ values

	Grup 1			Grup 2			p
	N	Mean	SD	N	Mean	SD	
SpO ₂ begining of sedation	30	96,400	1,773	30	97,767	1,569	<0.001
SpO ₂ 1st minute	30	90,167	6,576	30	95,233	3,559	<0.001
SpO ₂ 5th minute	30	92,167	4,504	30	95,900	2,759	<0.001
SpO ₂ 10th minute	30	93,071	3,887	30	96,103	2,932	<0.001

Table 2. The number of times that SpO₂ value was decreased

		Group 1		Group 2		p
		Number	%	Number	%	
Decreasing of SpO ₂	none	10	33.3 ^a	19	63.3 ^b	0.010
	1 time	9	30 ^a	6	20 ^a	
	2 times	4	13.3 ^a	5	16.7 ^a	
	3 times	7	23.3 ^a	0	0 ^b	

Table 3. Comparing of parameters

	Group 1			Group 2			p
	N	Mean	SD	N	Mean	SD	
Anesthesia Time	30	27,23	14,488	30	24,33	11,80	0,399
PACU_Time	30	10,83	6,308	30	9,16	5,583	0,283
Amount of Propofol	30	216	124,67	30	207	60,41	0,724
Endoscopist Satisfaction	30	3,50	0,682	30	3,76	0,430	0,092
Patient Satisfaction	30	3,93	0,253	30	3,90	0,305	0,643