Sedation Of Elderly Patients During Endoscopic Retrograde Cholangiopancreatography

Magdy Abdel Aziz Mansour (MD)
Department of Anesthesiology
Medical Research Institute, Alexandria University

ABSTRACT

Patients who undergo flexible endoscopy suffer from periods of hemodynamic changes which may present risk for the development of complications. The aim of this work was to demonstrate the ability of ketamine to reduce propofol sedative requirements, improve quality of recovery and decrease discharge time when used in the setting of ERCP in elderly patients. The study included 40 patients who were randomly divided into 2 equal groups to receive either propofol alone or propofol-ketamine (0.25 mg.kg^{-1}). Patients were monitored for non-invasive blood pressure, three leads ECG and peripheral pulse oximetry. The total propofol dose used was compared in the two groups and time till discharge from recovery room were recorded. The results showed that low dose of ketamine reduce propofol requirements used to sedate elderly patients during ERCP with significantly more stable hemodynamics, better oxygenation and earlier discharge.

***Key words**: Anesthetics, propofol, ketamine, sedation, monitoring, ERCP.*

INTRODUCTION

Gastrointestinal endoscopy, although accepted as a safe procedure, carries a certain risk for cardiopulmonary complication which account for over 50% of serious adverse events associated with flexible endoscopy.(1) Endoscopic retrograde cholangiopancreatography (ERCP) is one of the endoscopic procedures which attracts many elderly and frail patients. This procedure can be performed under light general anesthesia without intubation. Propofol is an iv anesthetic used for such purposes. However, propofol has a known dose dependent negative inotropic effect.(2) Ketamine, a non-competitive N-methyl D-aspartate receptor (NMDA) antagonist, has been shown to enhance opioid induced antinociception.(3) Small dose ketamine supplementing desflurane-remifentanil anesthesia reduced perioperative opioid requirements(4) and was effective in reducing subjective pain ratings in humans.(5) The aim of this study was to test for the efficacy of small dose of ketamine in reducing propofol sedative requirements, quality of recovery and discharge time during ERCP in elderly patients.

PATIENTS AND METHODS

After ethics committee approval and informed patient consent, 40 patients ASA II or III aged $\geq$ 60 years presented with obstructive jaundice and scheduled for ERCP at the endoscopy unit of Medical Research Institute of Alexandria University, were enrolled in the study. After optimization of patients medical conditions, they were randomly allocated into one of the two equal groups, group 1 (P) and group 2 (KP).

An iv cannula was inserted into a suitable vien in the right upper limb. The examination was carried out in the Rodiology Department under fluoroscopic control with the patient in the exaggerated left lateral position.

In KP group, a ketamine bolus of 0.25 mg/kg was administered iv before propofol. In both groups, a carefully titrated subhypnotic dose of propofol (Diprivon, Astra-Zeneca)(6) (0.5 mg.kg^{-1}) was given then incremental doses were given as required.

Prior to introduction of the endoscope, the pharynx was sprayed with 10% xylocaine spray (xylocaine 10%, Astra, USA).

A patient was considered unconscious if he fails to open his eyes in response to verbal command followed by a gentle rubbing of the shoulders. If the patient respond to the passage of the endoscope by gross purposful movement or severe bucking, sedation was considered inadequate and an incremental dose of propofol was given before another trial is attempted.

Patients were monitored with three leads ECG, peripheral pulse oximeter and automated blood pressure measurements (DATEX AS-3, Finland). Heart rate (HR), mean arterial blood pressure (MBP) and oxygen saturation (SPO_2)

were measured pre-induction and every 15 min till the end of ERCP.

The duration of the procedure and time to discharge from the recovery room (with stable hemodynamics, $SpO_2 \geq 92\%$ on room air, minimal nausea and no vomiting) were also noted. The total dose of propofol was calculated for each patient.

Statistical analysis was performed using SPSS (version 9) computer software. Data are expressed as mean and (SD) and were analysed using student's t-test and Chi-square test. $P < 0.05$ was considered to be statistically significant.

RESULTS

Fourty patients were included in the study, there was no difference between the groups with respect to patients characteristics (table 1).

There was no significant difference between the two groups as regards duration of operation ($P = 0.953$) (Table 2). The ketamine treated group (KP) consumed significantly less propofol both for induction and maintenance of the procedure. The reduction was 45% ($P < 0.001$). The time till discharge from the recovery room was significantly shorter in KP group (table 2).

More cardio-vascular stability was achieved in ketamine treated group. There was no significant difference in the pre-induction HR or MBP in the studied groups. After induction, the HR and MBP decreased significantly in ketamine treated group ($P < 0.05$) (Fig. 1 and 2).

DISCUSSION

The pharmacokinetic and pharmacodynamic profile of propofol favours its use for light general anesthesia with a predictable and rapid effect. However, propofol is known for its peripheral vasodilatation and reduction of cardiac output.[7] Although these effects are usually well tolerated in healthy adults, they may be deleterious to patients with heart disease. Also, it was shown to impair muscles of respiration by its effect on the central part of the motor system in a dose dependent manner.[8] Despite the fact that this may contribute to the back of response to noxious stimuli,[9] in the presence of upper airway manipulation, as it happens during ERCP.

In this study we showed that small doses of ketamine during sedation with propofol, resulted in reduction of both induction and total doses of propofol by 45%.

Table (1): Demographic data expressed as mean ±SD or number. No significant difference.

	P n = 20	KP n = 20
Age (yr)	62.15 ± 9.73	65.30 ± 8.65
Weight (Kg)	89.25 ± 8.90	91.60 ± 8.35
Sex M/F	16/4	18/2
Bile duct findings:		
- Malignant stricture	10	11
- Bile duct stone	7	7
- Operative injury	0	1
- Fascioliasis	1	0
- Failed visualization	2	1

Table (2): Anesthetic data.

	P n = 20	KP n = 20	P value
Duration of the procedure (min)	33 ± 7	35 ± 6	0.953
Propofol:			
Total dose (mg)	165 ± 9	90 ± 5*	0.094
Time to discharge (min)	130 ± 5	88 ± 3*	0.075

* significantly different from propofol group. ($P < 0.05$)

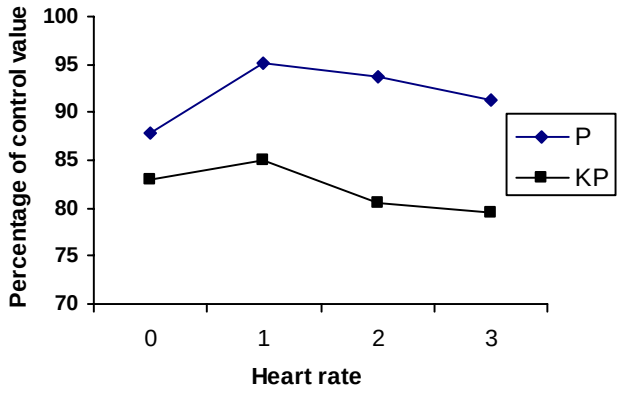

Fig. (1): Heart rate

Percentage of the control value (i.e. the beginning of the ERCP) is plotted against time. Data are expressed as means ± SD.

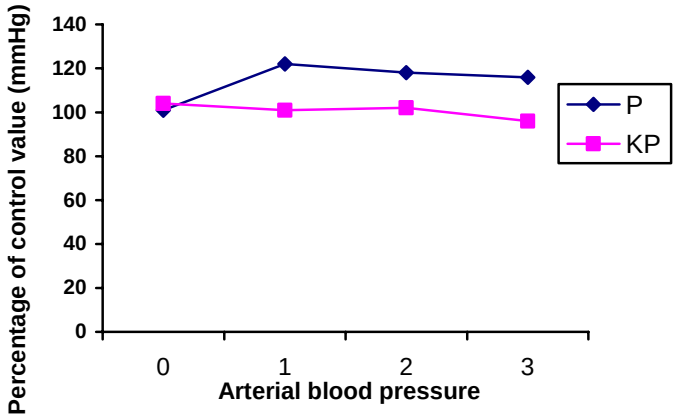

Fig. (2): Arterial blood pressure

Percentage of the control value (i.e. the beginning of the ERCP) is plotted against time. Data are expressed as means ± SD.

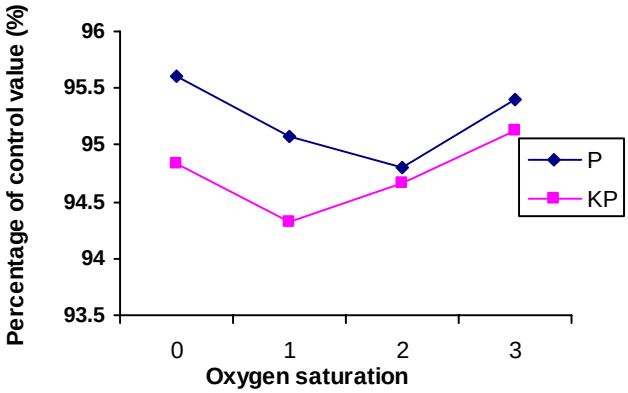

Fig. (3): Oxygen saturation

Percentage of the control value (i.e. the beginning of the ERCP) is plotted against time. Data are expressed as means ± SD. No significant difference

of iv ketamine in conjunction with opioids or anesthetics.[4,15]

In conclusion, small dose of ketamine supplementing intravenous anesthesia with propofol during ERCP in elderly patients, resulted in a significant reduction of doses of propofol used. There were better oxygenation, greater wakefulness and negligible incidence of nausea and vomiting, which resulted in earlier discharge from the recovery room.

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Royblat et al[10] have found that the addition of low dose ketamine to general anesthesia decreased the narcotic consumption during the first 24 postoperative hours. Adam et al[11] found that preoperative administration of low dose ketamine in patients undergoing total mastectomy did not elicit a pre-emptive analgesic effect and ketamine given at closure reduced patient controlled morphine analgesia requirements in the first 2 postoperative hours. This could be explained by induction of anesthesia with sufentanil in Adam et al study which might masked the preemptive analgesia of ketamine.

In our study the heart rate response to the passage of the endoscope was not different among the studied groups. To achieve this stability in group 1, higher doses of propofol were required. Such a dose was associated with significantly higher incidence of hypo-tensive episodes.

These observations were reported by Billard et al[12] who reported similar hemo-dynamic responses to induction of anesthesia and tracheal intubation with propofol alone or supplemented with fentanyl. More cardio-vascular stability was achieved in group 2 which was attributed to the release of catechol-amines from the adrenergic nerves endings by ketamine.[13]

Another beneficial effect of small doses of ketamine added to propofol anesthesia was the improved SpO_2 in group 2. SpO_2 is a clinically reliable indicator of respiration. Ketamine was shown to increase respiratory muscle tone[14] that could have contributed to the upper airway patency and better SpO_2.

The addition of small dose ketamine resulted in a significant reduction of propofol required to complete ERCP. This allowed earlier discharge from the recovery room.

These findings are consistent with those reported by Weinbroun.[15] Short timed hallucinations are the most common side effects of ketamine.[16] Sub-anesthetic doses of ketamine resulted in short term impairment of congnitive functions in healthy human volun-teers.[17] There were no changes in cognition, perception, mood swings or the incidence of vivid dreams in any of our ketamine-treated patients. Similar findings were reported by Guignard et al, who used sub-anesthetic doses

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