

# The use of di-hydroxypropylphenol (Propophol) in endoscopic procedures

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**Abstract.** – The authors illustrate different endoscopic procedures that may require anaesthesiological assistance through analgo-sedation procedures. Analgo-sedation is useful to the patient and to the endoscopist that can carry out the exam more rapidly and in optimal conditions. The technique employed consists in the administration of propophol, starting with an initial bolus of the drug followed by a continuous perfusion to maintain the hypnotic state. Monitoring of cardiovascular and respiratory parameters shows a great reliability of the drug and effectiveness of the method.

Key-Words:

Endoscopic procedures, Analgo-sedation, Propophol.

## Introduction

Minimal invasive and practically painless technique have contributed to the wide acceptance and practice of diagnostic and operative endoscopy. However, sometimes patients can be intolerant to these procedures and request the assistance of the anaesthesiologist. Analgo-sedation is an experimented anaesthesiological technique well tolerated by patients and welcomed by the endoscopist. The reasons for this success rely on the possibility of carrying out a more rapid endoscopic procedure due to a good cooperation of the patient and his optimal awakening at the end of the exam<sup>1-4</sup>.

The first drugs employed for analgo-sedation techniques were benzodiazepines for intravenous (diazepam, midazolam) or oral (flunitrazepam) route. However, the primary effect of benzodiazepines is not analgesic but hypnogenetic and awakening may be lengthy, with residual sleepiness representing a prob-

lem in the outpatient. Recently, propophol has been used as a single drug and the different administrations routes have been studied<sup>4-10</sup>.

When propophol is used at the routine hypnogenetic dosage<sup>11-12</sup> it does not show an analgesic effect<sup>4</sup>; however when administered in repeated boluses or in continuous infusion with a syringe-pump, it acquires this characteristic and demonstrates an ideal analgesic effect for endoscopic procedures. Propophol is a widely employed drug and has gone through numerous experimental and clinical evaluations. It is a very simple chemical molecule (2-6-di-hydroxypropylphenol) that is easily metabolized by liver enzymes. Propophol's metabolism may be slowed down in geriatric or in hepatopathic patients, however overdosage has not been described in these cases and awakening is always rapid after suspension of infusion.

The studies on propophol conducted up to date had the aim of defining:

- a. the drug's pharmacological effects on the cardiovascular system<sup>13-19</sup>;
- b. the drug's pharmacological effects on the central nervous system and peripheral receptors;
- c. the best administration route to reach effective concentrations<sup>7,8,20-23</sup>;
- d. drug interactions in case of polipharmacological associations<sup>2,5,9,10,24</sup>;
- e. the best way to avoid bacterial contamination of propophol emulsion<sup>25</sup>.

## Materials and Methods

One hundred sixty-one patients, 79 men and 92 women, belonging to ASA class I, II and III have been divided in three groups ac-

according to the endoscopic procedure required (Table I). Age ranged from 16 to 87 years, with a great prevalence of patients in their fifth to eighth decade.

The three groups were thus divided:

1. Esophagogastroduodenoscopy 6 cases;
2. Colonoscopy (operative and diagnostic) 80 cases;
3. ERCP (Endoscopic Retrograde Cholangio-Pancreatography) 85 cases.

The limited number of gastroscopies is in relation to the minor request of this procedure in our series because of the briefness of the procedure itself and the relatively minor trauma that generally does not require analgesic medication.

Analgo-sedation was carried out with a slow injection, according to the age and conditions of the patients, of propofol, administered in an initial bolus of 1.5-2.0 mg/kg and followed by maintenance doses of 20 to 60 mg of the drug. During ERCP maintenance was carried out with a continuous dosage of propofol administered through a syringe-pump at the rate of 6-9 mg/kg/h.

Endoscopic procedures were performed in outpatients and inpatients. All patients were preoperatively studied by routine chemical and hematological exams with chest radiography, electrocardiogram, and cardiological visit. Informed consent was requested both for the endoscopic procedure and for the anaesthesiology.

Continual monitoring of ECG, arterial pressure and O<sub>2</sub> saturation pressure (SpO<sub>2</sub>) was performed during the endoscopic procedure. When induction of hypnosis caused respiratory depression, respiratory assistance was performed with erogation of 100% O<sub>2</sub> through a facial mask or a naso-pharyngeal

tube; respiratory assistance continued until autonomous ventilatory function was resumed and patients ventilated spontaneously in room air. In ERCP, were the patient must assume a prone position, we utilized a naso-pharyngeal tube erogating O<sub>2</sub> at a FiO<sub>2</sub> of 0.5 until the end of the procedure.

However, in all cases SpO<sub>2</sub> was the guiding factor of all anaesthesiological measures adopted. SpO<sub>2</sub> was in all cases acceptable, if not optimal, and even the lowest levels registered were never put the patient at risk.

## Results

We can summarize the various aspects of our experience with the following statements, that illustrate the effectiveness of the drug employed and its side effects on organs and functions.

**a.** It has been confirmed that propofol does not show any anaesthesiological properties<sup>4</sup>. Hypnosis level, however, was always deep enough to protect the patient from modest painful stimuli and leave a certain degree of amnesia.

**b.** The positive results obtained with the procedure are due to the high "amnesic" effect of the drug.

**c.** The dosage we utilized, administered either by repeated boluses or by continuous infusion, was adequate for obtaining the target effect. Only in some cases of patients with a compromised hepatic function or very old, we observed a lengthening of the awakening interval. This effect is an already well known characteristic of propofol.

**d.** Propofol induces a reduction of the arterial pressure and of the heart rate. This ef-

Table I.

Endoscopic procedure	Cases	Minimal age	Maximal age
Diagnostic or surgical colonoscopies	80	18	84
Esophagogastroduodenoscopies	6	16	72
Endoscopic retrograde cholangiopancreatographies with exploration of the choledocus	85	30	87

fect was present also in our patients. We noticed, however, that reduction of blood pressure and heart rate do not seem to be dose-dependent and are easily corrected by the administration of atropine sulfate.

**e.** We are able to confirm that propophol causes respiratory depression and apnea, that are particularly evident after starter bolus of the drug. This phenomenon is partially dose-dependent and may be induced by an excessively rapid infusion.

**f.** Awakening, in healthy subjects, occurs at 3 to 5 minutes from the last administration of the drug. Patients awake well oriented, sometimes slightly euphoric and are completely well after a two hour interval.

**g.** We want to underline our personal experience of a good local venous tolerance to the drug and the absence of hypersensitivity or allergic episodes.

### Conclusions

Our present experience stems from a limited number of cases, however, we believe it is of value because of the great variety of procedures performed and the severity of some of the treated cases. Another observation makes us suppose that the choice of propophol as an analgo-sedative agent may be a happy one. In fact, a steadily growing number of patients are requesting this kind of assistance in place of the benzodiazepines previously employed by endoscopists with modest and doubtful results. Another reason of the superiority of propophol is the rapid and pleasant awakening that is completely different from recovery after administration of benzodiazepines. It is worth to mention the rare incidence of nausea and vomiting after awakening.

During the performance of colonoscopy, we have supplemented the administration of propophol with nitrogen protoxide and observed a great increase of the analgesic effect together with a reduction of propophol required.

This does not mean that elevated doses of the drug can be dangerous. During long and difficult procedures, particularly ERCP, we have administered doses of propophol of 600 to 700 mg, without ever registering cumulative phenomena or alterations of patient omeosta-

sis. However, reduction of propophol dose through supplementation with nitrogen protoxide may represent a further refinement of this analgesic procedure and possibly a cost reduction.

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