

## Propofol Sedation in Diagnostic Upper Gastrointestinal Endoscopy

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### ABSTRACT

**Background:** Sedation are commonly used these days in patients that having gastrointestinal endoscopy. Propofol is sedative agent that commonly used in endoscopy procedure.

**Method:** All patients who were performed diagnostic EGD in Abdi Waluyo Hospital's Gastrointestinal Endoscopy Unit from January 1st 2017 – 31st December 2017, included in this study. The amount of Propofol, duration during hypnosis/sedation and adverse effects were all recorded.

**Results:** 170 patients were performed diagnostic EGD with Propofol sedation, most of them were male (87 patients, 51,5%). The median age was 48,78 + 14. The median Body Mass Index (BMI) was 24,45. The median of duration of hynosis (sedation) during EGD was 5 minutes. The median of propofol total dose during EGD was 180 mg. Adverse effects that found during Propofol sedation are muscle twitching(10,6% patients) and pain in area of injection(80% patients).

**Conclusion:** The duration of propofol hypnosis/sedation during Esophagogastroduodenoscopy examination was 5 minutes. Propofol total dose needed for diagnostic EGD was 180 mg. The common adverse effects of propofol are muscle twitching and pain in area of injection.

**Keywords:** Propofol, endoscopic sedation, adverse effect

### ABSTRAK

**Latar belakang:** Sedasi sering digunakan akhir-akhir ini pada pasien yang dilakukan pemeriksaan endoskopi gastrointestinal. Propofol adalah obat penenang yang biasa digunakan dalam prosedur endoskopi.

**Metode:** Semua pasien yang dilakukan diagnostik EGD di Unit Endoskopi Gastrointestinal Rumah Sakit Abdi Waluyo dari 1 Januari 2017 - 31 Desember 2017, dimasukkan dalam penelitian ini. Jumlah Propofol, durasi selama hipnosis/sedasi dan efek samping semua dicatat.

**Hasil:** 170 pasien dilakukan EGD diagnostik dengan sedasi Propofol, kebanyakan dari mereka adalah laki-laki (51,5%). Usia rata-rata adalah 48,78 ± 14. Rata-rata Indeks Massa Tubuh (BMI) adalah 24,45. Median durasi hynosis (sedasi) selama EGD adalah 5 menit. Median dosis total propofol selama EGD adalah 180 mg. Efek samping yang ditemukan selama sedasi Propofol adalah otot berkedut (10,6% pasien) dan rasa sakit di daerah injeksi (80% pasien).

**Simpulan:** Durasi propofol hipnosis/sedasi selama pemeriksaan Esophagogastroduodenoscopy adalah 5 menit. Dosis total propofol yang diperlukan untuk diagnostik EGD adalah 180 mg. Efek samping umum dari propofol adalah otot berkedut dan nyeri pada area injeksi.

**Kata kunci:** Propofol, endoscopic sedation, adverse effect

## INTRODUCTION

Sedation for upper gastrointestinal endoscopy or esophagogastroduodenoscopy (EGD) is increasingly used to improve patient tolerance by relieving anxiety, discomfort, and pain during procedures. Propofol or 2,6-diisopropylphenol is a sedative agent that has high effectiveness and low side effects. Propofol is a lipophilic, ultra short-acting sedative agent, and has rapid recovery. Propofol is mixed in a liquid containing soybean oil, egg lecithin and glycerol, therefore Propofol is contraindicated in patient with hypersensitivity to egg and soybean.<sup>1,2,3</sup>

Significant anxiety and discomfort has been noted in some patients undergoing diagnostic or therapeutic EGD without sedation. Propofol can relieve anxiety and discomfort during EGD, so diagnostic and therapeutic procedure can be done properly. The aim of this study is to get effectiveness, dosage, adverse effects, and other related factors of propofol as sedative agents in diagnostic EGD.

## METHOD

All patients who were performed diagnostic EGD in Abdi Waluyo Hospital's Gastrointestinal Endoscopy Unit from January 1<sup>st</sup> 2017 – 31<sup>st</sup> December 2017, included in this study. We got the permission of this study from Abdi Waluyo Hospital Medical Committee. The patient were excluded from this study if the information was not complete or patient got combination of sedative agents. The induction dose of Propofol in this study was 0,5 – 1 mg/kg body weight initially then 10 – 20 mg every 30 seconds for maintenance dose. We used Recofol, A Propofol brand that manufactured by Primex Pharmaceuticals AG in Zug, Switzerland and imported by Dexa Medica Indonesia. Hypnosis was achieved when patient's awareness decrease from fully alerted into sopor or sopor-coma after intravenous Propofol was given. The amount of Propofol, duration during hypnosis/sedation and adverse effects were all recorded.

## RESULTS

In 2017, 170 patients were performed diagnostic EGD with Propofol sedation, most of them are male (87 patients, 51,5%). The median age was 48,78 + 14. The median Body Mass Index (BMI) was 24.45. The most common comorbidity in patients was hypertension (8,8%). (Table. 1)

**Table 1. Characteristics of study subjects**

Characteristics	n = 170
Age (years), mean (SD)	48.78 (±14)
Sex, (%)	
Male (SD)	87(±51,5)
Female (SD)	82(±48.5)
Body weight (kg), median (min-max)	70 (41-120)
Body height (cm), median (min-max)	165 (148-187)
Body mass index/BMI, Median (min-max)	24,45 (16.53-44.08)
Comorbidities, n (%) (SD)	
Hypertension	15(±8.8)
Diabetes Mellitus	5 (±2.9)
Dyslipidemia	4 (±2.4)
Coronary arterial disease	9 (±5.3)
Hyperthyroidism	1 (±0.6)
Smoking	14(±8.2)
Alcohol	2 (±1.2)
No comorbidities	120 (±70.6)

The median of duration of hynosis(sedation) during EGD was 5 minutes, minimal 3 minutes and maximal 55 minutes. The median of propofol total dose during EGD was 180 mg, Minimal 50 mg and Maximal 400 mg. (Table. 2)

**Table 2. Dose of proposal during EGD**

Propofol (min-max)	Total
Duration of hypnosis during EGD, Median(min-max) (minutes)	5(3-55)
Propofol total dose during EGD, Median(min-max) (mg)	180(50-400)

Adverse effects that found during Propofol sedation are muscle twitching and pain in area of injection. Muscle twitching during hypnosis /sedation was found in 18/170(10.6%)patients. Pain in area of injection was found in 80% patients. (Table. 3)

**Table 3. Adverse effects of propofol**

Adverse effects	Total (n = 170) n (%)
Muscle Twitching during sedation/hypnosis, n(%) (SD)	
Positive	18(10.6)
Negative	152(89.4)
Pain in area of injection (%)	136(80)

Age and BMI were not related to duration of hypnosis ( $p = 0,061$  and  $p = 0,945$ ). Propofol total dose is related to age ( $p = 0,002$ ), but not related to BMI ( $p = 0,062$ ) (Table 4)

**Table 4. Relation between age, body mass index (BMI), and duration of hypnosis/sedation, total propofol dose**

Variable	Duration of hypnosis/sedation	Total propofol dose
	r p	r p
Age	-0.145 0.061	-0.243 0.002
BMI	-0.005 0.945	0.148 0.062

Note: analysis with Spearman's correlation test

Female patients were related to longer duration during hypnosis than male subjects ( $p < 0,001$ ). Propofol total dose are not related to sex ( $p = 0,083$ ).

The emergence of muscle twitching during propofol hypnosis/sedation were not related to duration of hypnosis, nor propofol total dose (Table. 5)

**Table 5. Relation between Sex, Muscle Twitching and duration of hypnosis, propofol total dose**

Variable	Duration of hypnosis/sedation	Propofol total dose
Sex (minimum-maximum)		
Male	5 (3-25)	200 (83-400)
Female	5 (3-55)	170 (70-300)
P value (Mann-Whitney test)	< 0.001	0.083
Total muscle twitching (minimum-maximum)		
Positive	5 (4-14)	180 (100-280)
Negative	5 (5-35)	180 (70-400)
p value (Mann-Whitney test)	0.687	0.509

Subjects in this study were patients who were going to have diagnostic EGD with propofol sedation in private hospital. The characteristics of subjects were around 48,78 years old, most of them were male. The subjects body weight were around 70 kg with BMI 24,45 (minimum 16,53, maximum 44,08). The age of patients who were done EGD in this study was inline with the indications of EGD in adults, which is above 45 years old. The age of patients who were done EGD are vary between hospitals in Indonesia and abroad. In Singkawang Hospital, the majority patients were reported at ages 51-60 years (20%), followed by 41-50 years (18%).<sup>4</sup>

Most of the subjects in this study were male (51,5%). It's inline with the study in Singkawang Hospital where the most common patient in the endoscopy unit was male (52%).<sup>4</sup> In this study, we can only have the median of data that we recorded, because the distribution is not normal so we can not have the mean of data. The median of subject's BMI was 24,45, still normal. According to WHO, BMI is divided into: Underweight =  $BMI < 18.5 \text{ kg/m}^2$ ; Normal =  $BMI 18.5-24.9 \text{ kg/m}^2$ ; Overweight =  $BMI 25-29.9 \text{ kg/m}^2$ ; Obese =  $BMI \geq 30 \text{ kg/m}^2$ .<sup>5</sup> In other study, most

of subject's BMI that had done EGD were categorized as overweight (46%).<sup>6</sup> Comorbidities and other factors like smoking and consumption of alcohol suffered were found in 29.4% of subjects. The most common were hypertension (8.8%) and smoking (8.2%).

The median duration of propofol hypnosis during EGD in this study was 5 minutes (minimum 3 minutes and maximum 55 minutes). This is consistent with a metaanalysis study which found that propofol showed the duration effect of propofol lasted 4 – 8 minutes.<sup>9</sup> In that metaanalysis study, propofol was compared to midazolam. It was found that propofol achieved hypnosis state faster (2 vs. 6-8,5 minutes) and had emergence time faster (15 vs. 50-55 minutes).<sup>2,3,9,10,11</sup> Other study has generally found that the duration of propofol to get hypnosis is related to age, where the older the patient, the longer hypnosis achieved. Duration and total dose of propofol for hypnosis/sedation also related to cardiac output, female, and comorbidities.<sup>7,8,9</sup>

The median of propofol total dose in this study was 180 mg. This dose vary among other studies, depend on subject's body weight, age, and comorbidities.<sup>11,12</sup> Adverse effects of propofol are vary in some studies, in this study we found muscle twitching and pain in injection area. This is inline with the research of Chen et al.<sup>13</sup> The relationships between age, BMI and duration of hypnosis, propofol total dose are vary in other studies. In this study, we found that propofol total dose was related with increasing age, but not with BMI.<sup>9,10,11,12</sup>

Muscle twitching as propofol adverse effect was not related to duration of hypnosis achieved, nor to propofol total dose. This is in line with other studies.<sup>3,13</sup> Muscle twitching as propofol adverse effect is also found in other studies but rare.<sup>14,15</sup> The common adverse effects of propofol that are found in other studies are respiratory depression, oxygen desaturation, hypotension, bradycardia, phlebitis, and pain during injection. In this study we found pain in propofol injection area as adverse effects, without phlebitis.

We suggest that protocols and preventions are needed to reduce the incidence of propofol adverse effects during diagnostic EGD procedure, so that patients and GI endoscopists will feel more comfortable and safe.

## CONCLUSION

The duration of hypnosis/sedation using propofol during Esophagogastroduodenoscopy examination was

5 minutes. Propofol total dose needed for diagnostic EGD was 180 mg. The common adverse effects of propofol are muscle twitching and pain in area of injection. There was a relation between propofol total dose and age. There was a relation between propofol total dose and female. Propofol total dose was not related to muscle twitching.

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