Debate of using propofol safely if given by non-anesthesia providers.

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Abstract

Clarification of the problem: Evidence is amassing that non-anesthesiologist-directed propofol (NAAP) sedation has a security and feasibility profile comparative or superior to anything that outfitted by benzodiazepines with or without opioids. The guidelines starting at now open underline the essentialness of appropriate patient decision, staff getting ready, checking, and low-estimation sedation traditions for use security.

Methodology and theoretical orientation: Propofol given with initial bolus: 1.5 to 2.5 mg/kg, patient will be apneic inside 30 to 90 seconds the imbuement at rate of 80-120 µg/kg/min.

Conclusion and significance: It is unrealistic that the use of propofol by non-anesthesia specialists will stop. From different points of view, propofol might be as secured as cures that are more standard. Watching must be standardized and adequate. Given their availability, experience, and general condition, anesthesiologists ought to be at the forefront to pick customs, start preparing, perform or organize competency audits, and set up quality declaration programs.

Keywords: Propofol (Diprivan), Non-anesthesiologist administered propofol (NAAP), Non barbiturate, Intravenous anesthetic, Sedation, Total intravenous anesthesia, Fentanyl, Emergency department, Emergency service, Conscious sedation, Infusions.

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Introduction

Propofol (Diprivan) was first prepared in early 1970s in the UK by Imperial Chemical Industries as ICI 35868 [1-3]. Clinical trials followed in 1977, first by Kay and Rolly, using a form solubilized in cremophor EL confirmed the potential of propofol as an anesthetic to induce anesthesia. The emulsified pro-creation was re- projected by ICI in 1986 (now AstraZeneca) as Diprivan (abbreviated version of di-isopropyl IV anesthetic) [4]. Then used as sedative–hypnotic in USA in 1989.

Perhaps couple of people can argue that propofol is superior to anything conventional opiate regimens (blend of a benzodiazepine with a narcotic) for sedation in endoscopy. The argument is not whether to use propofol, rather it is about who can administrate it. Propofol (2,6 di-isopropofol) is a neuroleptic that combines the most unique properties of rapid inception of operation (30-45 seconds) and brief length of impact (4-8 minutes), making it a perfect ace for fairly short outpatient method, for example, upper endoscopy and colonoscopy [3,4].

Organic Chemistry

Structure

2,6 di-isopropylphenol, the color of solution is Milky white and is accessible in 1% and 2% concentration.

The formulation contains soybean oil, egg, lecithin and glycerol which make the injection intake painful (Figure 1).

The propofol injectable emulsion is isotonic and has a pH of 4.5-6.4. It should be used within 6 h after opening the vial because there have been death reports following the use of contaminated solution of propofol (as egg lecithin is a good media for bacterial growth). No other therapeutic agents should be mixed with Propofol with prior to administration.

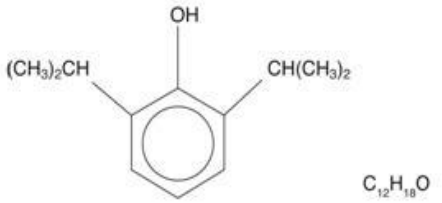

Figure 1. *Structure of It is Non barbiturate short acting intravenous anesthetic agent, alkyl phenol.*

If lidocaine minimize the pain on injection of Propofol, it is then recommended to be administered prior to Propofol administration or should added to Propofol immediately not exceeding 20 mg lidocaine/200 mg propofol [4,5].

All formulations are stable at room temperature and are not light sensitive. Store below 250˚C, do not freeze. The pharmacokinetics of propofol is a three-compartment linear model, which include the plasma, rapidly, and slowly equilibrating tissues. Initially, equilibration of propofol is rapid that levels between plasma and highly perfused tissue of the brain, representing the rapid effect of anesthesia. Successive redistribution from the brain to other equilibrating tissues slowly ends the anesthetic effects of propofol. Propofol is pre-dominantly removed by hepatic conjugation to inactive glucuronide metabolites, the waste products which are excreted by the kidney [6,7].

Pharmacodynamics

Exact mode of action of propofol is still in confusion, but is believed to have many pharmacological effects (Figure 2). Propofol instantaneously activates γ-aminobutyric acid (GABA) receptors, which interact with the β subunits specifically, resulting in endocytosis at the GABA receptor by reducing the association with adaptin complexes AP2 [8,9].

It is Ultra short-acting anesthetic; depress the central nervous system (CNS) to produce hypnosis and anesthesia without analgesia.

Propofol increases dopamine concentration in the nucleus acumens (phenomenon associated with drug abuse and pleasure seeking behavior) resulting in a sense of wellbeing in a patient.

Onset of hypnosis starts within 90 to 100 seconds for 5 to 10 minutes [10].

Indications

Induction of anesthesia: a) It is the most commonly used IV induction agent, b) Dose: 1-2.5 mg/kg IV dose reduced with increasing age

Maintenance of anesthesia: a) A bolus of 10- 40 mg repeated every few minutes, b) Continuous infusion with rate of 50- 150 µg/kg/min IV combined with N_2O or opiate and c) Preferred anesthetic drug for TIVA (Total Intravenous Anesthesia) technique in conjugation with short acting opioids [6,15].

Sedation: a) For short surgical methodology or ICU sedation/ responsive sedation, b) Dose of 25-75 µg/kg/min IV and c) Mostly favored drug in Day care surgery sedation.

Anticonvulsant activity: a) It has anti-epileptic activity due to GABA interceded pre- and post-synaptic inhibition of chloride ion channels, b) Dose more than 1 mg/kg body weight decreases seizure duration.

Adverse Effects

- Apnea is more complexed and longer.
- Hypotension is highly acute.
- Injection is painful.
- Solution is less firm or steady (6 hours)
- A chance of poisoning with infected solution is high.
- Myoclonic activity.
- Expensive than thiopentone.
- Allergic reactions are seen in those who are allergic to egg lecithin.
- Propofol infusion syndrome: It is a lethal complication and is very rare, normally seen if infusion is more than 48 hours and is mostly common in children.
- A profound fall in tidal volume leading to apnea in many patients is the first respiratory disturbance after a bolus dose of propofol [7,8].

Figure 2. *Propofol (drug).*

Discussion and Results

Evaluation of the data on propofol use by non-anesthesia providers is complex because of several factors, the foremost of which is the lack of adequately powered studies that statistically support the conclusions made. In addition, a direct comparison among the different specialties cannot be made (Figure 3). Procedural needs, patient presentation, and defined endpoints are quite different for each specialty. Gastroenterology has evolved from simple procedures such as colonoscopy and diagnostic EGD that require only moderate sedation, to more invasive and stimulating ones such as ERCP and EUS [8,9].

The traditional approaches have been to combine a benzodiazepine with or without an opioid and these are the combination against which propofol-based sedation protocols with or without adjuvants are compared. Similarly, physicians in the specialty of emergency medicine are often faced with the need for deep sedation and analgesia to perform short, painful procedures such as the reduction of a dislocated joint or closed fracture. The specialty of radiology has supported the development of pediatric sedation units (PSUs) primarily for radiologic procedures. The sedation teams are supervised at times at a distance by pediatric intensivists or emergency department physicians [10,11].

Because these cases can require hours of sedation, propofol is one of several options used. Finally, dentistry has long been associated with painful procedures. Although local infiltration or nerve blocks remain the techniques of choice, patients may receive supplemental sedation to accompany the procedure,

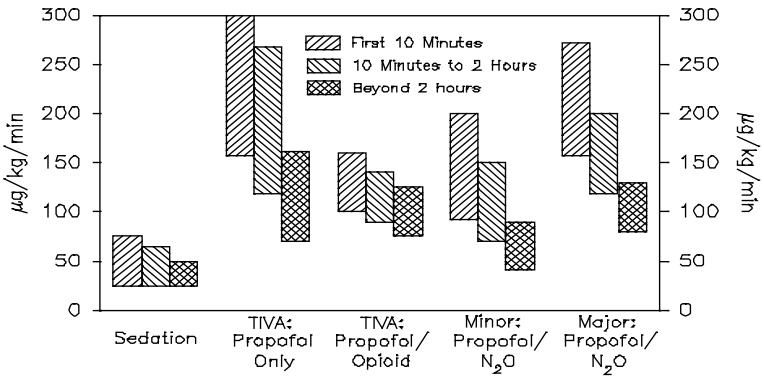

Figure 3. *Evaluation of the data on propofol use by non-anesthesia providers.*

especially at the time of the nerve block or local infiltration. Current studies report sedation being maintained throughout the entire procedure at a more responsive level [12].

Although propofol is undoubtedly an attractive sedative for endoscopic procedures, there continues to be debate regarding its safe use by non- anesthesiologists. It is clear that when propofol is administered by an experienced professional, the rate of sedation-related adverse events is low. Newer technologies such as computer-assisted customized sedation are likely to standardize the rapid use of propofol by non-anesthesiologists in endoscopy [13-15]. Propofol use by non-anesthesiologists is found to be more common because of the increasing demand in patients and physicians and also due to the increasing number of techniques being performed outside the operating theater [15,16].

Use of propofol is high for sedation purposes during endoscopic retrograde cholangiopancreatography (ERCP). This study aims to evaluate the truth about the safety of non-anesthesiologist administration of propofol (NAAP) during therapeutic ERCP [16,17].

Conclusion

The use of propofol by non-anesthesia professionals may not stop. Generally, propofol may be as safe as or safer than other traditional medications. However, education of non-anesthesia professionals who are responsible for the patient is needed to improve patient safety. Considering risks for non-fasted patients and providing the training to avoid and rescue from deep levels of sedation are essential. Monitoring must be standard and adequate. All specialties using sedation should agree on a consistent set of definitions of sedation depth. The sedation related adverse events in patients administered propofol by non-anesthesiologists are extremely low. We cannot compare such outcomes with anesthesia providers, as similar studies are not available. Anesthesia professionals need to be prepared to address the use of such potent drugs by non-anesthesia professionals in a more proactive manner. The American society of anesthesiologists (ASA) has started to establish the necessary documentation to address future events.

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