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SCIENTIFIC ARTICLE

A comparative study between propofol and etomidate in patients under general anesthesia

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KEYWORDS
Propofol;
Induction of anesthesia;
Myoclonus;
Hemodynamic stability;
Mean arterial pressure

Abstract
Background and objectives: Induction of anesthesia is a critical part of anesthesia practice. Sudden hypotension, arrhythmias, and cardiovascular collapse are threatening complications following injection of induction agent in hemodynamically unstable patients. It is desirable to use a safe agent with fewer adverse effects for this purpose. Present prospective randomized study is designed to compare propofol and etomidate for their effect on hemodynamics and various adverse effects on patients in general anesthesia.
Methods: Hundred ASA I and II patients of age group 18–60 years scheduled for elective surgical procedure under general anesthesia were randomly divided into two groups of 50 each receiving propofol (2 mg/kg) and etomidate (0.3 mg/kg) as an induction agent. Vital parameters at induction, laryngoscopy and thereafter recorded for comparison. Adverse effect viz. pain on injection, apnea and myoclonus were carefully watched.
Results: Demographic variables were comparable in both the groups. Patients in etomidate group showed little change in mean arterial pressure (MAP) and heart rate (HR) compared to propofol ($p > 0.05$) from baseline value. Pain on injection was more in propofol group while myoclonus activity was higher in etomidate group.
Conclusions: This study concludes that etomidate is a better agent for induction than propofol in view of hemodynamic stability and less pain on injection.

PALAVRAS-CHAVE
Propofol;
Indução da anestesia;
Mioclonia;

Estudo comparativo entre propofol e etomidato em pacientes sob anestesia geral

Resumo
Justificativa e objetivos: A indução da anestesia é uma parte crítica da prática de anestesia. Hipotensão súbita, arritmias e colapso cardiovascular são complicações ameaçadoras após a

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Estabilidade hemodinâmica;
Pressão arterial média

injeção de agente de indução em pacientes hemodinamicamente instáveis. É aconselhável o uso de um agente seguro com menos efeitos adversos para esse propósito. O presente estudo prospectivo, randômico teve como objetivo comparar propofol e etomidato quanto a seus efeitos sobre a hemodinâmica e aos vários efeitos adversos em pacientes sob anestesia geral.
Métodos: Cem pacientes ASA I e II, idades entre 18-60 anos, programados para procedimento cirúrgico eletivo sob anestesia geral foram divididos aleatoriamente em dois grupos de 50 cada para receber propofol (2 mg/kg) e etomidato (0,3 mg/kg) como um agente de indução. Os parâmetros vitais na indução, laringoscopia e posteriormente foram registrados para comparação. Efeitos adversos como dor à injeção, apneia e mioclonia foram cuidadosamente monitorados.
Resultados: As variáveis demográficas foram comparáveis em ambos os grupos. Os pacientes do grupo etomidato apresentaram pouca alteração da pressão arterial média (PAM) e da frequência cardíaca (FC) em comparação com o grupo propofol ($p < 0,05$) a partir do valor basal. Houve mais dor à injeção no grupo propofol, enquanto houve mais atividade mioclônica no grupo etomidato.
Conclusões: Este estudo conclui que etomidato é um agente melhor para a indução que propofol em relação à estabilidade hemodinâmica e menos dor à injeção.

Introduction

Induction agents are drugs that, when given intravenously in an appropriate dose, cause a rapid loss of consciousness. Induction agents are used to induce anesthesia prior to other drugs being given to maintain anesthesia, as the sole drug for short procedures, to maintain anesthesia for longer procedures by intravenous infusion, to provide conscious sedation during procedures undergoing in local anesthesia and intensive care unit.

Propofol, 2,6-diisopropylphenol is most popular induction agent with its favourble characteristics of rapid and smooth induction and recovery, decrease incidence of nausea and vomiting, etc.[1,2] While on other side decrease blood pressure, dose dependent depression of ventilation, pain on injection are the major drawbacks.[3–5]

Etomidate, carboxylated imidazole is characterized by hemodynamic stability, minimal respiratory depression and cerebral protective effects. Its lack of effect on sympathetic nervous system, baroreceptor reflex regulatory system and its effect of increased coronary perfusion even on patients with moderate cardiac dysfunction makes it an induction agent of choice in cardiac disease patients.[6–9] However, the adverse effects such as pain on injection, thrombophlebitis and myoclonus are some undesirable adverse effects.[10,11]

This study is an attempt to evaluate the effects of propofol and etomidate by comparing certain parameters such as change in blood pressure and heart rate during induction and intubation as a primary outcome and pain an injection, myoclonic movements, Post-operative nausea and vomiting as a secondary outcome; so that we can choose a safer induction agent.

Methods

This prospective randomized double blind study is conducted on 100 patients of American Society of Anaesthesiologist (ASA) grade I and II between 18 and 60 years of age of either sex, scheduled for elective surgical procedure under general anesthesia with endotracheal intubation.

After approval from institutional ethical committee, written informed consent was obtained from all the patients. The total 100 patients were randomly assigned into 2 groups of 50 patients each according to a computer generated table of random numbers.

- Group I ($n = 50$): received Inj. Propofol 1% (2 mg/kg of body weight)
- Group II ($n = 50$): received Inj. Etomidate (0.3 mg/kg of body weight)

Patients with history of allergy to study drugs, history of seizure disorder, presence of primary and secondary steroid deficiency/on steroid medication and hypotensive patients were excluded from study.

All patients were pre-medicated with tablets alprazolam 0.25 mg and ranitidine 150 mg, the night before the surgery and instructed for fasting for 8 h. On arrival at operation theatre, patients were attached with standard anesthesia monitoring including Electrocardiogram (ECG), Non-invasive blood pressure (NIBP), Pulse oximeter and baseline vital parameters were recorded. An 18G intravenous (I.V.) cannula was secured in left hand and ringer lactate 10 mL/kg/h was started.

Glycopyrrolate 0.2 mg, midazolam 0.02 mg/kg and fentanyl 3 mg/kg I.V. were injected followed by an induction dose of either propofol (Propofol spiva 1%, Claris Lifesciences Limited) or etomidate (Etomidate Lipuro, B. Braun, India). Pain on injection and myoclonic movements were recorded, if any at induction. Trachea was intubated with appropriate size of endotracheal tube after 3 min of intubating dose of vecuronium (0.1 mg/kg) I.V. Endotracheal tube was secured after confirming correct position and positive pressure ventilation was initiated. Anesthesia