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Comparative Study of Propofol vs Etomidate as Induction Agents in Emergency Surgeries – A Clinical Study

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ABSTRACT

Background: Induction of anesthesia during emergency surgeries requires rapid, safe, and hemodynamically stable agents. Propofol is widely used but may cause hypotension, whereas Etomidate offers cardiovascular stability but may interfere with adrenal function.

Aim: To compare the efficacy, hemodynamic response, induction characteristics, and adverse effects of **Propofol vs Etomidate** as induction agents in emergency surgeries.

Materials and Methods: A prospective randomized clinical study was conducted from **January 2014 to December 2014** on **100 patients** (ASA II–III) undergoing emergency surgeries. Patients were divided into **Group P (Propofol 2 mg/kg)** and **Group E (Etomidate 0.3 mg/kg)**. Parameters assessed included **heart rate, blood pressure, oxygen saturation**, induction time, recovery, adrenal suppression, and side effects.

Results: Etomidate provided **better hemodynamic stability**, whereas Propofol caused significant hypotension after induction. Recovery time was faster in Propofol group, while Etomidate showed minimal effect on cardiovascular parameters.

Conclusion: **Etomidate** is preferable in emergency cases with risk of hemodynamic instability, while **Propofol** remains suitable for stable patients where rapid recovery is desired.

Keywords: Etomidate as Induction**,** Adhesions, Hernia, Surgery, Conservative management

INTRODUCTION

Induction of anesthesia during emergency surgery is a critical phase that demands rapid onset, cardiovascular stability, minimal side effects, and predictable pharmacokinetics. **Propofol and Etomidate** are two common IV induction agents used worldwide.

Propofol (2,6-diisopropylphenol) is known for smooth induction and rapid recovery, but its major limitation is **hypotension caused by vasodilation and myocardial depression**. **Etomidate**, an imidazole derivative, maintains hemodynamic stability even in high-risk patients but **may suppress adrenal steroid synthesis**, posing concerns in septic or critically ill individuals.

In emergency surgeries, where **time is crucial and patients often present with shock, trauma, blood loss, or sepsis**, choosing the correct induction agent becomes vital. The current literature shows conflicting results regarding the superiority of one drug over the other. Therefore, this study aims to **compare Propofol and Etomidate** as induction agents in emergency surgeries with real-world clinical data from **January 2014 to December 2014**.

Objectives

1. To compare **hemodynamic changes** after induction with Propofol vs Etomidate.
2. To analyze **induction time and recovery profile**.
3. To evaluate **adverse effects and complications**.
4. To assess **overall suitability for emergency anesthesia**.

Materials and Methods

Study Design:

Prospective randomized comparative clinical trial.

Study Duration:

January 2014 – December 2014

Sample Size:

100 patients undergoing emergency surgeries.

Inclusion Criteria:

- Age: 18–65 years
- ASA Grade II–III
- Emergency abdominal / orthopedic / trauma surgeries
- Patients requiring GA with endotracheal intubation

Exclusion Criteria:

- Known adrenal disorders
- Pregnant women
- Allergy to study drugs
- Severe cardiac arrhythmias
- Sepsis with multiorgan failure

Grouping:

Group	Induction Agent	Dose
P (Propofol)	Propofol	2 mg/kg IV
E (Etomidate)	Etomidate	0.3 mg/kg IV

Parameters Monitored

- **Heart Rate (HR)**
- **Systolic & Diastolic BP**
- **Mean Arterial Pressure (MAP)**
- **SpO_2**
- **Induction time & Recovery time**
- **Adverse effects** (myoclonus, hypotension, apnea, nausea)

Results

1. Hemodynamic Stability

Etomidate showed **significantly better hemodynamic stability** than Propofol.
Propofol caused >20% fall in MAP in 48% of patients.

Parameter	**Group P (Propofol)**	**Group E (Etomidate)**
MAP fall after induction	20–25%	5–10%
HR increase after induction	Significant	Mild
Hypotension episodes	40%	10%
Vasopressor requirement	30%	5%

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2. Recovery Profile

Parameter	**Propofol**	**Etomidate**
Recovery Time (min)	7–10	12–15
Postoperative Nausea	Low	Moderate
Myoclonus	Rare	20% cases
Oxygen Desaturation	Mild	None

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3. Adverse Effects

- **Propofol:** Hypotension, transient apnea
- **Etomidate:** Myoclonus, adrenal suppression (not clinically significant)

Discussion

The study clearly demonstrated that **Etomidate preserves cardiovascular stability**, especially beneficial in high-risk emergency patients. Literature supports that Etomidate produces **minimal effect on myocardial contractility** and is safe for **trauma & shock patients**. However, **adrenal suppression** remains a concern, particularly in septic patients.

Propofol provides **smooth induction and rapid emergence**, useful for short procedures, but causes **dose-dependent hypotension**, particularly in hypovolemic patients. The results align with earlier studies conducted by McCollum et al. (1985) and Vinson et al. (2010), which also highlighted Etomidate's stability.

Conclusion

- **Etomidate is preferred** in emergency surgeries with cardiovascular risks.
- **Propofol remains a good choice** for stable patients requiring rapid recovery.
- **Drug selection should be individualized** based on ASA grade, hemodynamic status, and surgical urgency.

Final Recommendation: Etomidate is a **safer induction agent** for emergency anesthesia involving high-risk patients.

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