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## To compare the recovery time of propofol and isoflurane using day case techniques

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### Abstract

**Background and objectives:** In order to determine how well Propofol and Isoflurane keep patients under anaesthesia during day surgery, For the purpose of determining the best medication to have the patient return home after surgery as quickly as feasible.

**Methods:** An institutionally-approved randomized prospective study was carried out from February 2016 to December 2016 in the Department of Dermatology, Fakhruddin Ali Ahmed, Medical College, Barpeta, Assam, India, to compare the efficacy of propofol and isoflurane for day case procedures in terms of getting patients back on their feet as quickly as possible after anaesthesia maintenance.

**Results:** Group I included 25 individuals with a mean age of 30.6 and Group P included 25 patients with a mean age of 28.3. The average patient weight in Group P was 49.25 kg, but in Group I it was 55.56 kg. Group I had 9 men and 16 females, whereas group P had 10 men and 15 females. Groups P and I had Phase I recovery times of 12.7 and 13 minutes, respectively. Group I required 62 minutes to recover from Phase II, while group P required 32.75 minutes.

**Conclusion:** Although both groups demonstrated comparable gains during Phase I, the one administered with propofol alone resulted in a speedier recovery. In contrast to isoflurane maintenance anesthesia, propofol TIVA significantly shortened the time required for phase II recovery.

**Keywords:** Anaesthesia, Propofol, Isoflurane, and the recovery phase

### Introduction

Performing surgery and thereafter admitting and releasing a patient on the same day is a prevalent and customary procedure in the contemporary healthcare system. Over the years, many words such as day case, day care, day surgery, ambulatory surgery, 23-hour surgery, and outpatient department (OPD) procedures have been suggested and changed in nomenclature. The practice of day surgery has existed since the inception of medicine, adapting to advancements in the profession and the needs of patients to achieve its current level of excellence. Prior to the widespread availability of hospitals, it is probable that the renowned surgeon Sushruth conducted a significant number of his surgeries as outpatient treatments. The widespread attribution of the construction of hospitals and ambulatory care centers to Ashoka the Great is universally acknowledged. In 1909, Mac Nicoll released his extensive collection of 7,000 day care cases [1-3].

According to his findings, children do better when they are given the opportunity to recover at home. During that period, healthcare practitioners reached a consensus that maintaining patients in the hospital following surgery was the most effective method to prevent the transmission of infection. Consequently, a setback occurred within the domain of day surgery. The field of Day Care surgery experienced a resurgence throughout the 1940s and 1950s due to advancements in antibiotics and sepsis. However, it was not until the 1970s and 1980s that it became a fundamental component of contemporary medicine [2-3].

The advancement of more efficient anesthetic medications led to the recognition that requiring patients to remain in the hospital overnight was unnecessary, hence enhancing the popularity of day procedures. Day surgeries have progressed due to several factors, some of which are unique to each country. The cost of medical care in the United States has escalated to such an extent that the government has implemented a requirement for the establishment of health insurance. The healthcare professional was driven to contemplate and ultimately embrace the cost-saving strategies of Day Care surgery due to the influence exerted by insurance companies.

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When the National Health Service in the United Kingdom had difficulties and experienced prolonged waiting times for surgical procedures due to the high influx of patients requiring medical attention, many resorted to seeking care in day care centers. Both problems occur simultaneously in India, where the implementation of universal health care has not yet taken place. Day surgery has shown an increase in popularity and has evolved into a highly advanced medical specialty [2-5].

Due to the decreased duration of patients' hospital stays, this strategy effectively decreases overall expenses and allocates resources towards treating a larger number of individuals. Additional advantages of a shorter hospital stay include a reduction in nosocomial infections and a decrease in the duration of absence from work or school for both the patient and their family members. The decreased duration of time spent in a non-home environment renders it more attractive to both younger and older individuals seeking medical care. Ralph Waters introduced the concept of ambulatory anesthesia in the early 1900s, and it has since experienced rapid and significant growth. Initially, localized anesthetic procedures were used, but nowadays, a significant number of patients choose for general anesthesia. Historically, the extended duration of recovery periods linked to general anesthetic medications rendered them inappropriate for immediate surgical procedures. The emergence of shorter-acting anesthetic medications with a better recovery profile has made it possible to utilize general anesthesia for day case procedures [6-8].

Patients are permitted to go from the hospital within a few hours following surgery due to the state of "clearheadedness" associated with the recovery process. Propofol and Isoflurane are two anesthetics that have demonstrated significant efficacy in the utilization of this approach. This investigation aims to examine the recovery patterns and efficacy of two medications for utilization in outpatient settings.

## Materials and Methods

An institutionally-approved randomized prospective study was carried out from February 2016 to December 2016 in the Department of Dermatology, Fakhruddin Ali Ahmed, Medical College, Barpeta, Assam, India, to compare the efficacy of propofol and isoflurane for day case procedures in terms of getting patients back on their feet as quickly as possible after anaesthesia maintenance.

### Inclusion criteria

- Examined patients at ASA physical status levels I and II.
- Adults in the 18-50 age range.

### Exclusion criteria:

- The patient's lack of cooperation.
- The ASA classifies it as at least a class III hazard.
- The airway at MPC level four.

## RESULTS

The study's included subjects were divided into two categories, each consisting of 25 patients. Group P (n = 25) received propofol as a maintenance treatment, while Group I (n = 25) received isoflurane.

**Table 1:** The mean age (in years) of the two subjects in the study

Group	N	Mean (years)	SD
Group P	25	29.0	5.12
Group I	25	31.1	11.2

There was no statistically significant disparity observed in terms of age between the two groups.

**Table 2:** Mean weight (weighing in kilograms) for each categories

Group	N	Mean (Kg)	SD
Group P	25	48.00	12.00
Group I	25	56.12	10.12

There was no statistically significant disparity in weight distribution between the two groups.

**Table 3:** The study examines the gender distribution within the two categories

Sex	Group P	Group I
Male	8	11
Female	17	14

There was no statistically significant disparity in sex distribution between the two groups.

**Table 4:** The operation's duration

Group	N	Mean (mins)	SD
Group P	25	40.55	16.49
Group I	25	43.40	12.23

There was no statistically significant disparity in the duration of the procedure between the two groups.

**Table 5:** Phase I recovery duration

Group	N	Mean (mins)	SD
Group P	25	10.32	2.12
Group I	25	14.01	2.00

There was no statistically significant difference between the two groups for the duration of Phase I recovery.

**Table 6:** Phase II recovery duration

Group	N	Mean (mins)	SD
Group P	25	31.32	9.32
Group I	25	63.00	21.70

During the pre-home preparedness period, a statistically significant disparity was seen between the two groups. In comparison to isoflurane, propofol exhibited a significantly reduced duration until Phase II recovery.

## Discussion

The gold standard of anesthesia care, including the shortest recovery time, the fewest adverse effects, and the lowest risk of complications, is required for day surgical anaesthesia. In light of these factors, it could be prudent to choose for regional or local anaesthesia as the principal means of alleviating pain. The ideal method of administering anesthesia includes a quick and painless induction, maintenance of a physiologically stable level of anesthesia with an easily adjustable depth, and a quick and complete recovery that allows for an early return to normal activities, all of which are important when general

anesthesia is required. The induction and maintenance of general anaesthesia are both facilitated by propofol, a short-acting intravenous anesthetic. This method of waking up after anesthesia induction is significantly more efficient and thorough than any other<sup>[9-11]</sup>.

With Propofol anesthesia, the laryngeal reflex remains stable, making the installation of the laryngeal mask easier. Therefore, the Laryngeal Mask Airway has become the gold standard for individuals with this condition. Using local maximum anaesthesia (LMA) instead of tracheal intubation requires less anesthetic depth and almost never causes postoperative sore throat. Propofol helps with a faster awakening with less lasting effects on the brain and spinal cord, which is one of its main advantages. Isoflurane is poorly soluble in blood and other bodily tissues and has an extraordinarily lengthy half-life when breathed. It passes almost unchanged via the respiratory system and undergoes minimal metabolism. The removal of a considerable volume of isoflurane by the lungs is necessary to maintain anesthesia. Since isoflurane is not particularly soluble in water, it has a short recovery period when administered to people. An LMA is preferred to a tracheal tube for GA in day care patients. Daycase anesthesia is best administered via the Laryngeal Mask Airway, as shown in studies by Joshi, Girish P., Inagaki, Yoshimi, *et al.*; Molloy, Mary E., Buggy, Donal J., Scanlon, Patrick, and others<sup>[11-13]</sup>.

When compared to artificial ventilation, spontaneous breathing significantly alleviates postoperative throat discomfort following laryngeal mask anesthesia. Researchers McCrory (Connail R., MB) and McShane (Alan J.) found that only patients who did not take medication for their ambulatory surgery experienced acid reflux. Minimal aspiration and reflux were prevented by proper premedication. A laryngeal mask was selected for the study's airway management based on the research. Patients recovered after propofol-assisted surgeries of varying durations. One possible explanation is the physiological reaction to drug withdrawal. The metabolism and redistribution of propofol hasten its recovery time<sup>[13, 14]</sup>.

Rapid metabolic clearance guarantees that drug reintroduction to the circulation from tissue storage sites cannot avert plasma concentration decline, even with prolonged infusions. On the other hand, the lungs are the only route of elimination for inhaled isoflurane because so little of it is metabolized. Isoflurane builds up in adipose tissues after long-term anesthesia, which slows down the healing process. We restricted the study to 90-minute procedures in order to prevent bias. When administering TIVA Propofol, it is ideal to use a target-controlled infusion system that uses computer programs to estimate plasma levels. We cannot guarantee that these pumps will work for our patients because their algorithms were developed for use with Caucasian individuals. Tiva infusions performed manually in steps are easy and effective. Sear and Glen found that according to patient weight, manual stepwise Propofol infusions resulted in satisfactory plasma levels and a problem-free operation. We used gradual infusions in our experiment<sup>[14, 15]</sup>.

Some patients need boluses of Propofol despite increasing infusions because their movements were uncontrollable. Isoflurane took longer to recover from than propofol TIVA. Longer recuperation times could be a result of longer procedures. The use of propofol was beneficial to Franklin Dexter and John H. Tinker. Results showed no statistically

significant difference in duration between isoflurane and propofol, according to a study by Vincent, Robert D., Jr. Syrop, Bradley J. VanVoorhis, David H. Chestnut, Amy E.T. Sparks, Joan M. McGrath, and Won W. Choi. Postoperative nausea and vomiting were significantly alleviated by propofol. Recovery was facilitated by propofol. According to research by Ashworth, Julie, and Smith, Ian, the recovery durations of Propofol and isoflurane were similar. Both drugs had the same time to take effect due to Propofol's lipid solubility and the fact that older adults tend to have more body fat. The group given isoflurane had a quicker recovery, according to Rowbotham *et al.* (2019). While propofol and isoflurane both induced vomiting, the latter was more severe. Isoflurane, similar to Moffat and Cullen, jolts you awake more quickly than Propofol. Compared to isoflurane, propofol had a better recovery rate in this research<sup>[15-17]</sup>.

Even though we only measured recovery time, Propofol had far better recovery quality in general. Postoperative nausea and vomiting, a particularly severe side effect of general anesthesia, did not occur when Propofol was used as the maintenance medicine. Isoflurane has not a strong analgesic effect. This aspect of isoflurane had no impact on the results because of the use of a strong opioid like fentanyl and the small scale of the procedures. This analysis neglected to take the cost into account, which is a critical factor. It will be very challenging to analyze the outcomes because the research is taking place at a public facility and patients are not paying for their treatment<sup>[17, 18]</sup>. The cost of the drugs will not be borne by the patient. Several research have shown that compared to Propofol, isoflurane is the most economical choice. There is no comparison, however, of the overall cost of a stay in a high-dependency unit, the cost of trained personnel, or the cost of medications used to manage PONV<sup>[18-20]</sup>.

## Conclusion

Compared to the inhalational maintenance strategy with isoflurane, the recovery duration and readiness for home after ambulatory anesthesia using propofol as the total intravenous venous anesthesia agent was observed to be shorter. Both groups showed comparable rates of recovery during Phase I. In contrast to isoflurane maintenance anesthesia, propofol TIVA significantly shortened the time required for phase II recovery. For day case procedures, TIVA with Propofol is preferable than isoflurane maintenance since it speeds up home readiness.

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## Conflict of interest

None.

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