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Comparison of recovery profile of sevoflurane and propofol as induction agent in day care surgery

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ABSTRACT

Daycare surgical procedure are those procedures which are performed in a hospital or an outpatient setting/surgeon's office where the patient is discharged within 24 hours. 1% Propofol and 8% sevoflurane are commonly used induction agents for such procedures. It is of great importance to select a better induction agent with rapid onset and recovery with minimal side effects. Our study comprises of 60 cases undergoing various daycare surgical procedures that were admitted in National Institute of Medical Sciences and Research Hospital, Jaipur from January 2017-June 2018. This study was carried out to compare which out of propofol and sevoflurane is a better induction agent for day care procedures. In our study, we found that induction was faster and with fewer complications with propofol as compared to sevoflurane which was associated with a higher incidence of postoperative nausea and vomiting. We concluded that propofol is a better induction agent than sevoflurane for daycare surgical procedures.

Keywords— *Propofol, Sevoflurane, Recovery, Daycare surgery*

1. INTRODUCTION

Daycare surgical procedure are those procedures which are performed in a hospital or an outpatient setting/surgeon's office where the patient is discharged within 24 hours[1]. Anesthesiologists provide anaesthesia care. Various advantages like cost-cutting, a lower rate of nosocomial infection, less anxiety and a higher degree of satisfaction have been a hallmark of this sub-speciality for over fifty years. It was proved that pediatric patients recovered better at home without separating from their mothers. Less expenditure including post-operative medications and early discharge.

It is feasible for patients to choose the time of their surgery. The introduction of newer anaesthetic drugs has helped in faster recovery, the inclusion of more complex surgical procedures and access to a safer operation theatre environment without using flammable anaesthetics [2]. Use of multi-parameter monitors has provided an upper hand in monitoring during anaesthesia, allowing sicker patients for day care procedures. Anaesthesia techniques for daycare vary from local anaesthesia to general anaesthesia, depending on factors like a surgical procedure, patient's preference and medical history of the patient.

The four variants for daycare anaesthesia are:
(a) General anaesthesia
(b) Regional anaesthesia
(c) Monitored anaesthesia care
(d) Local anaesthesia

The ideal equation for post-operative pain management in general anaesthesia with regional anaesthesia. The advantage of this combination is comfort and lack of awareness with general anaesthesia and excellent pain relief with the regional anaesthesia. Daycare anaesthesia is the one administered for elective surgeries done on selected patients, keeping in mind its three elements (admission, surgery and discharge) within 24 hours. It is also known as a day case, ambulatory or outpatient anaesthesia and more recently office –based Anesthesia[3]. Daycare or ambulatory anaesthesia is a rapidly growing subspecialty of anaesthesia. In the US, day case anaesthesia comprises 70% of all outpatient facilities provided. In India, 70% of elective surgeries that fit in the criteria are performed as outpatient procedures[(4)].

Out of various anaesthetic agents available in India, both propofol and sevoflurane have set a benchmark by enhancing the ability of anesthesiologists to carry out a smother and successful daycare experience. The present research compares the induction and recovery characteristics of both these anaesthetic drugs and their role in ambulatory anaesthesia.

Nowadays certain drugs like thiopentone sodium, ketamine, etomidate and propofol are used for anaesthesia in outpatient surgical procedures. These drugs are used alone or in combination. It is important to provide the patient with an induction which is rapid, smooth and awakening is quick. Propofol has come out to be the best in class for such procedures.

Advantages of propofol are:
- Rapid onset and recovery
- Less incidence of PONV
- Minimal residual CNS effects

Propofol is an isopropyl phenol (2, 6 - diisopropyl phenol) that is administered intravenously as 1 % solution in an aqueous solution of 10 % soybean oil, 2.25% glycerol and 1.2% purified egg lecithin[5].Propofol administration in the dose of 1.5 to 2.5 mg/kg as a rapid IV injection (<15 secs), produces unconsciousness within 30 seconds[6]. Awakening is more fast and complete as compared to other anaesthetics like thiopentone sodium and ketamine. The quicker awakening with minimal side effects is one of the most important advantages of propofol over other agents used for this purpose. Side effects are allergic reaction pain on injection lactic acidosis (propofol infusion syndrome).

Sevoflurane is fluorinated methyl isopropyl ether used for inhalational anaesthesia. Sevoflurane is used in adults and children for both induction and maintenance of anaesthesia in outpatient surgeries. Sevoflurane 8% is used as an induction agent for daycare surgical procedures. Inhaled anaesthetics are thought to act by disrupting the normal synaptic transmission and interfering with the release of neurotransmitters from pre-synaptic nerve terminal or they may activate GABA channels and hyperpolarize cell membranes[7]. However, the exact mechanism of action of volatile anaesthetics may be a combination of two or more such theories described as multisite action hypothesis. Sevoflurane is used as 8% for induction of anaesthesia.

This study was to evaluate the outcome of these two agents by comparing changes in various parameters like BP and PR at the time of intubation as a primary outcome; and PONV and recovery characteristics as a secondary outcome.

2. AIMS AND OBJECTIVES

2.1 Aim

To compare the induction profile and recovery characteristics of 1%propofol and 8% sevoflurane as an induction agent in day care surgery.

2.2 Objectives

- Compare the time to loss of consciousness.
- To compare the hemodynamic changes.
- To compare the significant side effects of the drugs.
- To compare the recovery from both the drugs.

3. MATERIAL AND METHOD

3.1 Study design

Hospital-based randomized comparative study.

3.2 Study location

Department of Anaesthesiology, National Institute of Medical Sciences and Research, Jaipur, Rajasthan, India.

3.3 Study period

Jan 2017 to June 2018.

3.4 Sample size

A total of 60 patients divided into 2 groups.

3.5 Inclusion criteria

- Patients with ASA physical status I & II
- Patients with normal biochemical and haematological parameters
- Age group between 20 to 60 years
- No known hypersensitivity to egg or drug allergy
- Airway – MPG I & II
- Patients undergoing various daycare surgical procedures

3.6 Exclusion criteria

- Patient not willing
- Patients with ASA physical status III and above
- Patients with a history of drug or egg allergy
- Anticipated difficult airway

3.7 Methodology

This study will be carried out in the Department of Anaesthesiology at National Institute of Medical Sciences and Research Jaipur, Rajasthan, India on 60 cases after getting approval from the ethical committee.

4. OBSERVATION

Table 1: Distribution of Cases by Group and Age

Age	Group				Total	
	Propofol		Sevoflurane			
	No.	%	No.	%	No.	%
≤30	14	46.67	14	46.67	28	46.67
31-40	7	23.33	6	20.00	13	21.67
41-50	4	13.33	10	33.33	14	23.33
>50	5	16.67	0	0.00	5	8.33
Total	30	100.00	30	100.00	60	100.00

P value = 0.070

Table 1 shows the distribution of age in both groups. Out of 30 patients in each group, 46.67% of patients were in the age group <30 years. However, this was not significant statistically.

Table 2: Distribution of cases by groups and sex

Sex	Group				Total	
	Propofol		Sevoflurane			
	No.	%	No.	%	No.	%
Male	19	63.33	18	60.00	37	61.67
Female	11	36.67	12	40.00	23	38.33
Total	30	100.00	30	100.00	60	100.00

P value = 1.000

Table 2 shows the sex distribution in each group. There is a male preponderance with more than 60% of patients being male in each group. The difference in the distribution between the two groups is not statistically significant.

Table 3: Distribution of cases by groups and ASA status

ASA Grade	Group				Total	
	Propofol		Sevoflurane			
	No.	%	No.	%	No.	%
1	25	83.33	25	83.33	50	83.33
2	5	16.67	5	16.67	10	16.67
Total	30	100.00	30	100.00	60	100.00

P value = 1.000

Table 3 shows the distribution of cases in each group on the basis of the ASA classification. All case were equally divided in both the groups as ASA class I and II and there is a difference in both the groups. This was insignificant statistically.

Table 4: Distribution of cases by groups and BMI

BMI	Group				Total	
	Propofol		Sevoflurane			
	No.	%	No.	%	No.	%
<18.5	4	13.33	0	0.00	4	6.67
18.5-24.99	25	83.33	25	83.33	50	83.33
≥25	1	3.33	5	16.67	6	10.00
Total	30	100.00	30	100.00	60	100.00

P value = 0.036

Table 4 shows the distribution of cases in both groups according to BMI. There is a significant difference in the BMI between the two groups with sevoflurane (S) group having 16.67% of patients having a BMI of more than 25(P=0.036). However, there is no statistical significance to this.

Table 5: Distribution of cases by age, height, weight and BMI

	Group	N	Mean	SD	Median	Min.	Max.	'p' value*
Age	**Propofol**	30	34.80	10.96	33	18	54	0.512
	Sevoflurane	30	33.10	8.91	32.5	21	50	
Height (Meter)	**Propofol**	30	1.66	0.06	1.69	1.53	1.75	<0.001
	Sevoflurane	30	1.57	0.04	1.58	1.48	1.62	
Weight (Kg.)	**Propofol**	30	56.73	5.51	58	45	65	0.390

	Sevoflurane	30	55.63	4.24	55.5	48	63	
BMI	**Propofol**	30	20.65	2.00	20.295	16.81	25.2	<0.001
	Sevoflurane	30	22.68	2.09	22.545	18.99	26.91	

Table 5 shows the mean age, height, weight and BMI in both the groups. There is a difference in the mean height in both groups; propofol group having a mean height of 1.66 meters and sevoflurane group having a mean height of 1.57 meter (p<0.001). There is a difference in BMI in both groups (p<0.001). However, this was not significant statistically.

Table 6: Distribution of cases by groups and MPG class

MPG	**Group**				**Total**	
	Propofol		**Sevoflurane**			
	No.	**%**	**No.**	**%**	**No.**	**%**
1	23	76.67	26	86.67	49	81.67
2	7	23.33	4	13.33	11	18.33
Total	30	100.00	30	100.00	60	100.00

P value = 0.506

There was no significant difference in the distribution of cases according to MPG grading in both the groups with more number of grade I patients in the sevoflurane group. This was insignificant statistically.

Table 7: Distribution of Cases by Groups and Diagnosis

Diagnosis	**Group**				**Total**	
	Propofol		**Sevoflurane**			
	No.	**%**	**No.**	**%**	**No.**	**%**
Amenorrhea	0	0.00	1	3.33	1	1.67
Appendicitis	10	33.33	7	23.33	17	28.33
AUB	1	3.33	5	16.67	6	10.00
Cervical Polyp	1	3.33	1	3.33	2	3.33
Cholelithiasis	6	20.00	1	3.33	7	11.67
Chronic Tonsillitis	5	16.67	5	16.67	10	16.67
Epigastric Hernia	0	0.00	1	3.33	1	1.67
Implant In Situ Lt. Elbow	1	3.33	0	0.00	1	1.67
Implant In Situ Rt. Arm	0	0.00	1	3.33	1	1.67
Inguinal Hernia	2	6.67	3	10.00	5	8.33
Missed Abortion	2	6.67	2	6.67	4	6.67
Primary Infertility	2	6.67	2	6.67	4	6.67
Swelling Right Elbow	0	0.00	1	3.33	1	1.67
Total	30	100.00	30	100.00	60	100.00

P value = 0.448

Table 7 shows the distribution of cases according to diagnosis in both the groups. All the cases were divided randomly into both the groups with Appendicitis (17 i.e 28.33%) and tonsillitis (10i.e 16.67%) being more in number. However, this had no statistical difference in the study.

Table 8: Distribution of cases by groups and surgical procedures

Procedure	**Group**				**Total**	
	Propofol		**Sevoflurane**			
	No.	**%**	**No.**	**%**	**No.**	**%**
Diagnostic Hysterolaparoscopy	2	6.67	2	6.67	4	6.67
Diagnostic Laparoscopy	0	0.00	1	3.33	1	1.67
Dilatation And Curettage	1	3.33	2	6.67	3	5.00
Dilatation And Evacuation	2	6.67	2	6.67	4	6.67
Endometrial Biopsy	1	3.33	3	10.00	4	6.67
Laproscopic Herniorrhaphy	0	0.00	1	3.33	1	1.67
Implant Removal	1	3.33	1	3.33	2	3.33
Joint Aspiration	0	0.00	1	3.33	1	1.67
Laproscopic Appendicectomy	10	33.33	7	23.33	17	28.34
Laproscopic Cholecystectomy	5	16.67	1	3.33	6	10.00
Laproscopic Hernioplasty	2	6.67	3	10.00	5	8.33
Polypectomy	1	3.33	1	3.33	2	3.33
Tonsillectomy	5	16.67	5	16.67	10	16.67
Total	30	100.00	30	100.00	60	100.00

P = 0.806

Table 8 shows the distribution of cases according to surgical procedures performed. Laparoscopic appendicectomy (28.34%) and tonsillectomy (16.67%) were predominant among all the procedures. However, this was not significant statistically.

Table 9: Distribution of Cases by Groups and Adverse Effects

Adverse drug reactions	Group				'p' Value*
	Propofol		Sevoflurane		
	No.	%	No.	%	
Hypotension	0	0.00	4	13.33	0.112
Bradycardia	0	0,00	0	0.00	NA
Bronchospasm	1	3.33	3	10.00	0.612
Nausea &Vomiting	7	23.33	18	60.00	0.008

Table 9 shows the incidence of adverse drug effects in each group. Post-operative nausea and vomiting were significantly high that is 60% in the sevoflurane group (p=0.008) as compared to the propofol group (23.33%). However statistically insignificant. Hypotension was minimal and no bradycardia was reported in both the groups. The incidence of bronchospasm was 10% in sevoflurane and 3.33% in the propofol group. This had no significance statistically.

Table 10: Distribution of Cases by Groups and SBP

SBP	Group	N	Mean	SD	Median	Min.	Max.	'p' value*
Before PAM	Propofol	30	122.17	5.80	123.5	111	132	0.676
	Sevoflurane	30	121.53	5.99	120.5	112	132	
5 min. after PAM	Propofol	30	122.47	6.00	122	112	131	0.246
	Sevoflurane	30	120.67	5.89	120	112	132	
At time of intubation or LMA	Propofol	30	122.57	6.15	122	111	132	0.647
	Sevoflurane	30	121.83	6.31	121.5	111	131	
1min. after intubation	Propofol	30	145.87	7.31	145	132	160	0.443
	Sevoflurane	30	144.13	9.93	138	132	161	
5min. after intubation	Propofol	30	122.23	5.93	122.5	111	132	0.329
	Sevoflurane	30	120.73	5.87	120	111	131	
7min. after intubation	Propofol	30	122.27	5.70	122.5	112	131	0.753
	Sevoflurane	30	121.80	5.79	121.5	111	130	
10min. after intubation	Propofol	30	122.97	5.19	124	113	132	0.123
	Sevoflurane	30	120.70	6.01	121	111	131	
20min. after intubation	Propofol	30	119.60	5.73	119	112	131	0.358
	Sevoflurane	30	121.07	6.53	121.5	111	131	
30min. after intubation	Propofol	30	121.33	6.67	121	111	131	0.800
	Sevoflurane	30	121.77	6.72	123.5	111	132	
60min. after intubation	Propofol	30	121.57	6.72	122	111	132	0.652
	Sevoflurane	30	120.87	5.15	122	112	130	

Table 10 shows mean SBP in both the groups recorded at different time intervals starting before premedication, at the time of intubation and till 60 minutes postoperatively. There was an elevation of mean SBP 1 min after intubation in both the groups (p=0.443). This was not significant statistically.

Table 11: Distribution of Cases Groups and DBP

DBP	Group	N	Mean	SD	Median	Min.	Max.	'p' value*
Before PAM	Propofol	30	81.10	5.82	82	72	90	0.500
	Sevoflurane	30	80.13	5.23	81	71	89	
5 min. after PAM	Propofol	30	81.50	5.15	82	72	90	0.896
	Sevoflurane	30	81.33	4.88	82.5	73	90	
At time of intubation or LMA	Propofol	30	76.30	7.67	75.5	65	89	0.341
	Sevoflurane	30	78.27	8.23	79.5	65	89	
1min. after intubation	Propofol	30	97.17	6.51	98	87	109	0.388
	Sevoflurane	30	95.80	5.65	96	87	108	
5min. after intubation	Propofol	30	85.13	2.49	85	81	90	0.882
	Sevoflurane	30	85.03	2.72	85	81	90	
7min. after intubation	Propofol	30	79.50	5.01	80.5	71	86	0.205
	Sevoflurane	30	77.90	4.66	78	71	87	
10min. after intubation	Propofol	30	78.23	4.11	80	72	84	0.346
	Sevoflurane	30	77.30	3.45	77	72	85	
20min. after intubation	Propofol	30	78.87	5.26	77.5	71	89	0.725
	Sevoflurane	30	79.37	5.67	79	71	90	
30min. after intubation	Propofol	30	82.97	4.20	83	76	90	0.302
	Sevoflurane	30	84.03	3.67	84	77	91	
60min. after intubation	Propofol	30	81.57	6.70	80.5	72	92	0.728
	Sevoflurane	30	82.17	6.62	81	71	92	

Table 11 shows mean DBP in both the groups recorded at different time intervals starting before premedication, at the time of intubation and till 60 mins postoperatively. There was a slight fall in mean DBP at the time of intubation in both the groups (p=0.341). This was not significant statistically.

Table 12: Distribution of Cases by Groups and MAP

MAP	Group	N	Mean	SD	Median	Min.	Max.	'p' value*
Before PAM	Propofol	30	93.50	5.65	93	84	103	0.064
	Sevoflurane	30	96.33	5.96	98	85	104	
5 min. after PAM	Propofol	30	97.67	3.62	97	92	104	0.276
	Sevoflurane	30	98.63	3.13	98.5	93	104	
At the time of intubation or LMA	Propofol	30	91.97	3.83	92	85	98	1.000
	Sevoflurane	30	91.97	4.31	92.5	85	98	
1min. after intubation	Propofol	30	110.80	5.89	109	103	122	0.011
	Sevoflurane	30	114.77	5.80	115.5	103	123	
5min. after intubation	Propofol	30	101.10	3.85	101	95	107	0.585
	Sevoflurane	30	101.63	3.63	102	95	107	
7min. after intubation	Propofol	30	99.20	3.06	99	94	104	0.589
	Sevoflurane	30	98.77	3.07	98.5	94	104	
10min. after intubation	Propofol	30	94.87	3.37	95	88	100	0.802
	Sevoflurane	30	95.13	4.53	96	88	101	
20min. after intubation	Propofol	30	93.97	2.53	94	88	98	0.931
	Sevoflurane	30	93.90	3.63	94	88	100	
30min. after intubation	Propofol	30	94.80	3.04	94.5	89	100	0.698
	Sevoflurane	30	95.13	3.49	96	90	100	
60min. after intubation	Propofol	30	96.93	4.53	98	90	105	0.272
	Sevoflurane	30	98.23	4.55	99	90	105	

Table 12 shows mean arterial pressure (MAP) in both the groups recorded at different time intervals starting before premedication, at the time of intubation and till 60 minutes postoperatively.

A rise in the MAP was observed 1 min after intubation in both the groups (p=0.011). This was not significant statistically.

Table 13: Distribution of Cases by Groups and PR

PR	Group	N	Mean	SD	Median	Min.	Max.	'p' value*
Before PAM	Propofol	30	89.87	8.63	88.5	75	105	0.721
	Sevoflurane	30	90.67	8.63	89.5	78	106	
5 min. after PAM	Propofol	30	98.57	5.91	98	88	107	0.981
	Sevoflurane	30	98.53	7.03	98	86	110	
At time of intubation or LMA	Propofol	30	84.07	8.20	81.5	74	98	0.072
	Sevoflurane	30	87.87	7.83	87.5	75	100	
1min. after intubation	Propofol	30	110.47	9.91	109	97	127	0.828
	Sevoflurane	30	109.90	10.30	107.5	95	126	
5min. after intubation	Propofol	30	97.40	7.21	98	86	108	0.867
	Sevoflurane	30	97.10	6.58	96.5	86	108	
7min. after intubation	Propofol	30	96.23	6.45	96	87	109	0.441
	Sevoflurane	30	97.57	6.93	98	86	108	
10min. after intubation	Propofol	30	90.60	5.61	91	80	99	1.000
	Sevoflurane	30	90.60	5.90	92	81	100	
20min. after intubation	Propofol	30	85.53	9.33	85.5	71	101	0.818
	Sevoflurane	30	86.10	9.78	86	70	102	
30min. after intubation	Propofol	30	100.43	10.18	97.5	85	117	0.868
	Sevoflurane	30	99.97	11.12	102	83	116	
60min. after intubation	Propofol	30	88.20	5.80	88	79	98	0.893
	Sevoflurane	30	88.43	7.25	86.5	78	99	

Table 13 shows pulse rate (PR) in both the groups recorded at different time intervals starting before premedication, at the time of intubation and till 60 mins postoperatively. There was a rise in the PR noted 1 min after intubation (p=0.828) and 30 mins after intubation (p=0.868) in both the groups. This was not significant statistically.

Table 14: Distribution of Cases by Group and SPO2

SPO2	Group	N	Mean	SD	Median	Min.	Max.	'p' value*
Before PAM	Propofol	30	97.73	0.91	98	97	100	0.865
	Sevoflurane	30	97.77	0.90	98	97	100	
5 min. after PAM	Propofol	30	98.27	1.11	98	97	100	0.625
	Sevoflurane	30	98.40	0.93	98	97	100	
At the time of intubation or LMA	Propofol	30	98.93	0.74	99	98	100	0.283
	Sevoflurane	30	98.73	0.69	99	98	100	
1 min. after intubation	Propofol	30	99.63	0.49	100	99	100	0.641
	Sevoflurane	30	99.57	0.50	100	99	100	
5 min. after intubation	Propofol	30	99.90	0.31	100	99	100	0.681
	Sevoflurane	30	99.93	0.25	100	99	100	
7 min. after intubation	Propofol	30	99.83	0.53	100	98	100	0.176
	Sevoflurane	30	99.97	0.18	100	99	100	
10 min. after intubation	Propofol	30	100.00	0.00	100	100	100	NA
	Sevoflurane	30	100.00	0.00	100	100	100	
20 min. after intubation	Propofol	30	100.00	0.00	100	100	100	NA
	Sevoflurane	30	100.00	0.00	100	100	100	
30 min. after intubation	Propofol	30	99.93	0.25	100	99	100	0.681
	Sevoflurane	30	99.90	0.31	100	99	100	
60 min. after intubation	Propofol	30	100.00	0.00	100	100	100	NA
	Sevoflurane	30	100.00	0.00	100	100	100	

Table 14 shows oxygen saturation (SPO2) in both the groups recorded at different time intervals starting before premedication, at the time of intubation and till 60 mins postoperatively. There was not much difference in oxygen saturation in both the groups at any time interval. This was not significant statistically.

Table 15: Distribution of cases by groups and time to onset of LOC

	Group	N	Mean	SD	Median	Min.	Max.	'p' value*
Onset of LOC (sec.)	Propofol	30	40.50	15.72	35	20	90	<0.001
	Sevoflurane	30	69.33	23.55	67.5	35	130	

P value <0.001

Table 15 shows the mean time to loss of consciousness in both groups. There was a significant difference in the onset of LOC in both the groups with the propofol group having a mean of 40.50 sec. and sevoflurane group having a mean of 69.33 sec. (p<0.001).

Table 16: Distribution of Cases by Groups and Phase I and II Recovery

	Group	N	Mean	SD	Median	Min.	Max.	'p' value*
Total Aldrete Score	Propofol	30	9.43	0.57	9	8	10	0.836
	Sevoflurane	30	9.47	0.57	9.5	8	10	
Total PADSS	Propofol	30	9.47	0.57	9.5	8	10	<0.001
	Sevoflurane	30	8.43	0.86	8	7	10	

Table 16 shows the postoperative mean score of discharge of the patient from the OT to recovery (Aldrete) and from recovery to PACU (PADSS). The mean Aldrete score in propofol group was 9.43/10 comparable with that of sevoflurane which was 9.47/10 (p=0.863). The mean PADSS score in the propofol group was 9.47/10 which was higher than the sevoflurane group which was 8.43/10 (p=<0.001).

5. DISCUSSION

The purpose of the study was to compare the induction and recovery characteristics along with side effects of Propofol and Sevoflurane for day care surgical procedures. The study included 60 patients of both the sexes randomly divided into 2 groups who met the inclusion and exclusion criteria. The study was carried out in different daycare surgeries like:

(a) Surgical procedures: laproscopic appendicectomy, laproscopic cholecystectomy, laproscopic hernioplasty, laproscopic herniorrhaphy.
(b) Gynecological procedures: diagnostic hysterolaproscopy, diagnostic laproscopy, dilatation and curettage, dilatation and evacuation and endometrial biopsy.
(c) Orthopedic procedures: implant removal and joint aspiration.
(d) ENT procedures: tonsillectomy.

All patients were premedicated with injection midazolam and fentanyl. The mean age was almost the same in both groups with 34.8 in propofol and 33.10 in sevoflurane. The mean weight in the propofol group was 56.73 and in sevoflurane was 55.63. In all the patient's drugs were administered according to bodyweight.

Intravenous agents are used commonly for induction of anaesthesia followed by inhalational agents for maintenance but the problem with this technique is the transition phase from the time of induction to maintenance. The rapid redistribution of the intravenous

agent could lead to a lightening of anaesthesia before an adequate depth is achieved with the inhalational agent. This has promoted the discovery of 'single agent' anaesthesia, which encompasses problems associated with a transition phase[31]. Propofol is used globally for total intravenous anaesthesia because of its favorable recovery profile and lower incidence of side effects. Sevoflurane is useful in adults and children for both induction and maintenance of anaesthesia in outpatient surgery. In the list of currently used anaesthetics, the physical, pharmacodynamic, and pharmacokinetic properties of sevoflurane match with those of the ideal anaesthetic. The characteristics include inherent stability, low flammability, non – pungent odor, minimal airway irritation, low blood: gas solubility allowing rapid induction of and emergence from anaesthesia, minimal end-organ effects, minimal effect on cerebral blood flow, low reactivity with other drugs and a vapour pressure and boiling point that enables delivery using standard vaporization techniques[32]. The availability of this agent makes it an ideal alternative option for volatile induction and maintenance anaesthesia (VIMA)[33]**.**

5.1 Onset of loss of consciousness

This parameter was assessed by loss of eyelash reflex, breath holding and muscle relaxation. Once induction was done in both groups, the onset of loss of consciousness was noted to be faster in the propofol group (mean =40.5 sec.) than in sevoflurane group (mean =69.33 sec) as shown in table 16. This is in concurrence with Ahila, R (2008)[34] who concluded that induction was slower and with more complications with sevoflurane anaesthesia. A. Thwaites et al. (2001)[35] did a study on inhalation induction with sevoflurane versus intravenous induction with propofol and conclude that induction of anaesthesia with sevoflurane was significantly slower compared with propofol. This is in concurrence with our study

5.2 Blood pressure and pulse rate effects

There was not much difference in the haemodynamic parameters like blood pressure and pulse rate in our study. The slight rise in SBP 1 min after intubation (p=0.443) and there was a minimal fall in DBP at the time of intubation (p=0.341) which was not significant statistically as shown in table n11, table 12 and table 13.

5.3 Mean Arterial Pressure (MAP)

In our study there was a significant rise in MAP 1min after intubation in both the groups which was comparable (p=0.011); propofol group had110.8 and sevoflurane group had 114.77 as shown in table 12

5.4 Intra operative side effects

In our study, we found that induction with sevoflurane is associated with more complications like nausea, vomiting and bronchospasm as shown in table 9

5.5 Post-operative nausea and vomiting

In our study, we found that there was a higher incidence of PONV in the sevoflurane group (60% cases i.e18 patients out of 30) than in propofol group (23% cases that are 7 cases out of 30) as shown in table 9. The lower incidence of postoperative nausea and vomiting in the propofol group may be related to its 'intrinsic' antiemetic property.

5.6 Aldrete and PADSS scoring for Recovery

Though statistically not significant, phase I recovery was shorter with propofol (mean Aldrete score= 9.43/10) then sevoflurane (mean Aldrete score= 9.47/10) as shown in table 15. In our study, we also found that the phase II recovery time post induction and maintenance of anaesthesia with propofol (mean PADSS=9.47/10) and sevoflurane (mean PADSS8.43/10) were comparable as shown in table 15.

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