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RESEARCH ARTICLE
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OPEN LABEL RANDOMIZED STUDY TO COMPARE ETOMIDATE AND PROPOFOL FOR GENERAL ANESTHESIA IN AMBULATORY ANAL AND PERIANAL SURGERIES.

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Abstract

Background: - In present times many anal and perianal surgeries of shorter duration are preferably performed on day care basis leading to decrease in hospital stay and financial burden on patient. We conducted randomized clinical study to compare propofol and etomidate for general anaesthesia in ambulatory anal and perianal surgeries.

Methods: - 60 adult patients of age groups (18-60 years) ASA grade I and II posted for anal and perianal surgeries of 25-30 minutes duration were randomly divided into two groups. Group I (E) n=30 patients received etomidate as bolus dose of 0.1mg/kg IV followed by 0.05mg/kg every 4 minutes and in Group II (P) n=30 patients propofol as bolus dose of 1.5 mg/kg IV followed by 0.5mg/kg IV every 4-5 minutes as induction agent till completion of surgery. Hemodynamic parameters (SBP, DBP, HR) Variations and oxygen saturation were recorded at various time intervals. Clinical characteristics like pain at injection site, any adverse effects like incidence of myoclonus, nausea & vomiting, anaphylaxis were also recorded.

Results: - The two groups were statistically comparable regarding demographic characteristics and duration of surgery. Systemic SBP, DBP& HR were significantly decreased in propofol groups as compared to etomidate group. There was statistical no significant difference between clinical variables (recovery time and patient satisfaction) between two groups. However pain at injection site and incidence of respiratory depression was statistically significant between two groups. Regarding incidence of anaphylaxis, nausea, vomiting, myoclonus difference between two groups were statistically non-significant. However, incidence of myoclonus was in etomidate group.but was antagonized by premedication with inj. fentanyl or midazolam.

Conclusion: - We conclude that etomidate can be better alternative to propofol due to minimum local side effects like pain on injection, less incidence of PONV where variation of hemodynamic parameters are of concern especially in patients having medical co-morbidities in shorter duration day care surgeries.
Limitation of our study is that we have not taken into account incidence of thrombophlebitis, further study is also needed to establish the safety of patients with etomidate in poor left ventricle function, hypotension and shock.

INTRODUCTION

In today's era many anal and perianal surgeries of shorter duration are performed on day care basis. This is associated with earlier hospital discharge and decreased financial burden on patients[1]. Earlier these surgeries were performed under low spinal anesthesia but this leads to urinary retention and post spinal headache in some patients and leads to increase hospital stay[2].
For day care surgeries ideal anesthetic agents should provide sufficient sedation, low pain score, increased patients satisfaction, less incidence of adverse effects leading to fast recovery and earlier discharge[3].
Now after the intervention new general anesthetic agents having earlier recovery profile have in use for various procedures such as gastroscopies, endoscopic retrograde cholangiopancreatography (ERCP) and cardioversion[4]. These comparisons have emphasized etomidate more suitable drug for sedation and analgesia with little hemodynamic instability and adverse effects[5].
So we hypothesized that propofol and etomidate can be used for sedation and analgesia in anal and perianal surgeries of shorter duration on day care basis. Hence, the present study was conducted to compare clinical effects, intraoperative hemodynamic stability, postoperative side effects between etomidate and propofol in ambulatory surgeries of anal and perianal region.

AIMS AND OBJECTIVES

- To compare clinical variables(hemodynamic stability,pain at the injection site, need for assisted ventilation during surgery, recovery time, postoperative pain score, and patient's satisfaction between etomidate (group-I) and propofol (group-II).
- To compare incidence of intra-operative and post- operative side effects between two groups.

MATERIAL AND METHODS

This open label randomized study was conducted at Punjab Institute of Medical Sciences after approval of Institutional Ethical committee (**IEC No. IEC/21/36**) and registration of clinical trial (**CTRI No.CTRI/2021/08/035482**) on 60 adult patients of age group (20-60yrs), ASA grade I & II posted for anal and perianal surgeries of 25-30 minutes duration.

Exclusion criteria: - h/o Chronic respiratory illness, h/o of coronary artery disease, h/o renal failure, Adrenal dysfunction, hemodynamic instability, allergy to propofol or etomidate. A written informed consent was obtained from all patients participating in the study. After intravenous cannulation with a 20 G cannula, patients were placed in lithotomy position and infusion of ringer lactate was started at 4-5ml/kg/hr. Premedication with injection glycopyrrolate 0.01mg/kg ,inj ondansetron 0.8mg /kg were given. Injection butorphanol 0.02mg/kg iv was administered for intraoperative analgesia in both the groups. There after patients were randomly allocated into two groups by computer generated random numbers. In the etomidate groups - I (E) 0.1mg/Kg I/V bolus dozes and 0.05mg/kg reinfused every 4-5 minutes till the completion of surgery.
In propofol group (II) 1.5mg/Kg of propofol was administered intravenously as bolus doze followed by 0.5mg/kg every 4 minutes till the completion of surgery.
Patients were monitored for NIBP, ECG, Heart rate and Oxygen saturation. values were recorded as baseline before Induction(To), immediately after the bolus dose of induction anesthesia agent for

research(T_1), 5 minutes and 10 minutes after bolus doze (T_5, T_{10}) and before transfer to the post anesthesia care unit (T_r).

Clinical variables include, pain at the injection site, need for assisted ventilation during surgery, recovery time(time between transfer of patients to PACU and full wakefulness with Ramsay sedation score), pain Score (in post anesthesia care unit by modified bromage scale). Patient's satisfaction score[6,7,8.] was assessed by a 0 to 10 visual analogue scale in Post anesthesia Care Unit.

Any incidence of adverse effects like nausea and vomiting, myoclonus were observed intraoperatively and postoperatively and appropriate interventions were done. If myoclonus occurred inj midazolam was administrated. If there is incidence of apnea, head extension, placement of oral airway, bag mask ventilation was performed. In case of nausea,vomiting inj ondansetron 0.8mg/kg was administered.

Data was analyzed using the SPSS version 18 software (SPSS, Inc. Chicago, IL, and USA). Quantitative variables were reported as mean ± SD and compared using a t-test or a Mann-Whitney U test. ANOVA for repeated measures was applied to analyze repetitive quantitative data. Qualitative variables were expressed as frequency and compared using a chi-square test. A P-value <0.05 was considered as statically significant.

RESULTS

The present study was conducted in department of anesthesia at PIMS, Jalandhar to compare clinical profile, hemodynamic variations and side effects of propofol and etomidate for general anesthesia in ambulatory anal and peri anal surgeries.

Demographic Parameters

Variables	Group-I	Group –II	p-value
Age (years) mean + SD	42 + 10.60	44.52+11.08	0.259
Sex (M/F)	25/35	28/32	0.26
Weight (kg) Mean + SD	61.62+8.00	58.42+6.26	0.28
Height(cm) Mean+SD	140+2.09	142+3.01	0.279
Duration of Surgery(mins) Mean+SD	30+4.09	35+3.62	0.37

Table 1

Table 1 shows demographic profile characteristics between two groups.on inter group comparison data was statistically non-significant (P > 0.05)

Hemodynamic Variations

Variables		Group-I	Group -II	p-value
HR	T_0	88+8.6	87+7.2	0.25
	T_1	92+10.5	77 + 8.6	0.001
	T_5	84 + 8.2	75 + 8.2	0.001
	T_{10}	88 + 7.2	72 + 6.9	0.001
	T_r	87 + 4.8	76 + 4.2	0.001
SBP	T_0	130 + 3.1	131 + 4.2	0.79
	T_1	126 + 2.8	124 + 3.8	0.43
	T_5	125 + 3.0	118 + 2.0	0.001
	T_{10}	124 + 4.2	108 + 4.0	0.001
	T_r	120 + 2.8	112 + 2.6	0.001
DBP	T_0	88 + 4.0	86 + 2.8	0.061
	T_1	90 + 2.8	81 + 3.2	0.004
	T_5	88 + 4.0	76 + 4.0	0.001
	T_{10}	80 + 2.7	69 + 3.8	0.001
	T_r	78 + 5.0	74 + 6.2	0.018
Oxygen Saturation (Mean) %	T_0	99	99	0.43
	T_1	98	97	0.42
	T_5	97	95	0.38
	T_{10}	96	94	0.42
	T_r	96	95	0.42

Table 2

Table 2 shows hemodynamic and oxygen saturation variation between two groups. Variation of heart rate, systolic blood pressure, diastolic blood pressure from the basal line was more with propofol than etomidate group and on inter group comparison data was statistically significant however there was mild variation of oxygen saturation from basal line between two groups.

Clinical Variables

Variables		Group-I	Group -II	p-value
Resp. depression		Present-08 Absent-22	Present-23 Absent-7	0.0001
Recovery Time (mins)	Time to Eye opening	2.8 + 3.2	2.5 + 3.6	0.26
	Time to obey commands	4.8 + 1.4	4.3 + 2.0	0.18
Patient Satisfaction		3.5 + 0.2	3.3 + 0.1	1.000

Pain score

Pain scoring	Etomidate	Propofol
0	26	18
1	2	5
2	2	4
3	0	3

p-value 0.018

Myoclonus Grading

Myoclonus grade	Etomidate	Propofol
0	27	30
1	2	0
2	1	0
3	0	0

p-value 0.35

Adverse effects

Variables	Group-I	Group -II	p-value
Nausea, Vomiting	8/30	12/30	0.12

Table 3

Table 3 shows clinical variables (pain at injection site measured by using four-point grading scale, respiratory depression, recovery time and patient satisfaction between two groups) 3 patients in propofol group had grade 3, 4 patients had grade 2, 5 patients had grade 1 and 18 patients had no pain at injection site in propofol group while on contrary in etomidate group 26 patients had grade 0, 2 patients had grade 2 and none patient had grade 3 pain at injection site. On inter group comparison data was statistically significant. Significant respiratory depression was noticed in 20 patients of propofol group as compared to only 8 patients in etomidate group and data was statistically significant. Regarding recovery time and patient satisfaction score both groups had similar results.

Regarding myoclonus activity none of the patient in propofol group had incidence of myoclonus and only one patient had incidence of grade 2 myoclonus which was statistically non-significant. Incidence of nausea and vomiting was also statistically non-significant.

Discussion

Many anal and perianal surgeries of shorter duration are performed as day care procedures to increase patient satisfaction, earlier hospital discharge and decrease financial burden on the patient. Earlier low spinal anesthesia was used for these short duration surgeries which leads to hemodynamic instability, urinary retention, post spinal headache and results in increased hospital stay.

Subsequently with the invention of newer general anesthetic agents having shorter half-life was tried in gastroenterology interventional procedures on day care basis with promising results. The

present study was performed in department of Anesthesia at PIMS Jalandhar on 60 adult patients (ASA grade 1 &2)18-60 years undergoing anal and perianal surgeries of shorter duration as day care treatment under propofol and etomidate as induction agent
(Group I- Etomidate group (E) & Group II- Propofol group (P)
Regarding demographic profile (mean age, mean weight, mean height, sex and duration of Surgeries) both groups was similar (P>0.05) as hemodynamic instability of various degrees depends upon many factors like age, sex, body weight and height of patients.
Regarding variation of hemodynamic variables in our study patients who received etomidate as induction agent showed more stable hemodynamic profile as compared to propofol and data was statistically significant (P<0.05). skinner etal[9] in their study also had similar results showed that induction with Propofol leads to less fall in blood pressure as compared to etomidate and data was statistically significant. Similar results were obtained by Beheshtran E etal[10] and Pathak etal and Masoudifarm[11] who compared hemodynamic responses during laryngoscopy and intubation after Induction with etomidate& propofol found that there was statistically significant fall in systolic and diastolic blood pressure in the propofol group as compared to etomidate group. (P<0.05). The Probable reason for this hemodynamic instability may be impairing of baroreceptor reflex mechanism.
Another clinical variable pain at injection site was more in propofol groups as compared to etomidate group in our study and difference was found to be statistically significant. Similar Results were obtained by Altmayer p etal[12], Nyman etal[6] and Saricaogluetal[7] in there study concluded that even after the addition of lidocaine in the propofol pain incidence was more in propofol group than etomidate group. M.Marger. etal[13] also found similar results while comparing. Propofol and etomidate as induction agent conduct that pain at injection site was more in propofol group than in etomidate group[17]
Regarding incidence of apnea in both the groups. Patients induced with propofol had more incidence of respiratory depression as compared to etomidate group and data was Statistically significant (p<0.05). Hossinzedeh etal[14] also observed similar finding they concluded that respiratory depression was more in the propofol group than etomidate group and data was Statisticallysignificant.

Another clinical variable of our study was incidence of Myoclonus activity in both the groups. Out of 30 Patients in etomidate group only two Patients had grade 1 myoclonic movements, one patient had grade II myoclonic movements but no myoclonic movements were observed in propofol group. on intergroup comparison data was statistically significant. Probable reason for lesser incidence of myoclonic in etomidate group was due to premedication with opioid before induction EbruKelsakeatal[15] also noticed myoclonus in 2 out of 30 patients who were induction with etomidate conclude that incidence of myoclonic can be decreased upto 30-40 after premedication with opioids like fentanyl.
Schwarzkopf kretal, Isitmiz etal[16,17,18]also observed in their study that midazolam and fentanyl used in premedication are efficacious in reducing myoclonic movements.
Our secondary objectives were incidence of PONV in both the groups. In our study eight Patients out of 30 in etomidate group and 12 Patients out of 30 in Propofol group had incidence of postoperative nausea & vomiting .on intergroup comparison data was statistically nonsignificant. Mayer M etal and Pierre M etal[13] also observed similar results and conclude that incidence of pain was comparable between two groups.
Regarding recovery time and in Patients satisfaction we found that recovery (time to eye opening 2.8+0.6 mins), time to obeying commands (5.02+1.6 mins) in propofol group and in etomidate group was(time to eye opening 2.5+0.5 mins and time to obeying commands 4.01+1.4 min). Patient satisfaction score was 3.5+0.2 and 3.3+0.1 in etomidate & propofol group respectively. On inter group comparison data was statistically nonsignificant for both the variables.

CONCLUSION

We come to the conclusion that etomidate can be better option to propofol since it has fewer local side effects such as discomfort during injection and less frequent nausea and vomiting especially in patients with pre- existing medical comorbidities.

LIMITATIONS

Our study's main flow is that we failed to account for the prevalance of thrombophlebitis.Additional research is also required to determine the safety profile etomidate in patients with poor left ventricle function, hypotension and shock.

CONFLICT OF INTEREST - NIL.

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