

COMPARATIVE STUDY OF PROPOFOL-NITROUS OXIDE(N₂O) WITH CONVENTIONAL BALANCED ANAESTHETIC TECHNIQUE FOR DAY CARE LAPAROSCOPIC SURGERY.

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ABSTRACT:

Objective: This study was carried out to evaluate and compare induction characteristics and maintenance of two anaesthetic techniques, haemodynamic stability, recovery profile, incidence of postoperative nausea vomiting (PONV) and home readiness. **Methods:** In a prospective, randomized study, 100 ASA 1-2 females of age ranged 18-45 years were selected. Pre-treatment with inj. Gycopyrrole 0.2mg and inj.Ranitidine 50mg IV, inj. midazolam 0.03mg/kg and inj.fentanyl 2mcg/kg was similar for all the patients. Maintenance of anaesthesia was O₂+N₂O+halothane in one group and O₂+N₂O+Propofol infusion in other group. Post operatively recovery was assessed at using Aldrete score and .Nausea and vomiting was assessed using Belville score. **Results:** Intraoperatively haemodynamic parameters were comparable in both the groups (p<0.05).Recovery was earlier and clear headed in propofol group (8.8±2.5 hours vs 12±4 hrs, p<0.0001), even incidence of minor sequele were less (p<0.001) in propofol group as compared to conventional balanced anaesthesia. **Conclusion:** propofol-N₂O compares favourably to thiopentone halothane-Nitrous oxide for maintenance of anaesthesia during short or day care procedure with remarkable early and rapid recovery with propofol and less PONV.

KEYWORDS: Day care surgery, conventional balanced anaesthesia vs. intravenous anaesthesia, postoperative recovery, post operative nausea vomiting.

INTRODUCTION:

Laparoscopy has become a routine procedure particularly for sterilization or diagnostic purpose and is undertaken increasingly on day care basis.(1) The availability of rapid and short acting IV anaesthetic and analgesics have increased the interest in the use of continuous

IV injection as alternative to standard or conventional inhalational technique for maintenance of anaesthesia. (2) Propofol due to its rapid induction, smooth maintenance, and better recovery of cognitive and psychomotor function, very low incidence of postoperative

nausea vomiting (PONV) becomes the drug of choice for total intravenous anaesthesia (TIVA) as well as day care procedures. This study was planned to evaluate and compare induction characteristics and maintenance of two anaesthetic techniques in terms of haemodynamic stability, recovery profile, incidence of postoperative nausea vomiting (PONV) and home readiness.

METHODS:

A Prospective randomized study was carried out after approval of hospital ethics committee and a written informed consent by all patients. 100 female patients of ASA I-II, 18 to 45 years of age, scheduled for elective diagnostic and therapeutic gynaecologic laparoscopic procedure were selected. Patients having clinically significant cardiovascular, pulmonary, hepatic, renal, haematologic or history of allergic reactions to any study drugs were excluded. Minimal necessary investigations were obtained in all the patients.

In the preoperative room, patients body weight and vital parameters were noted. An IV line was established on non dominant hand using 20 G intracath. On table, all patients were pretreated with inj. glycopyrrolate 0.2mg iv and inj. Ranitidine 50mg iv, 10 minutes prior to induction. After preoxygenation with 100% O₂ for 3 to 5 minutes, inj. midazolam 0.03mg/kg BW and inj. Fentanyl 2mcg/kg BW were given followed by induction.

Patients were randomly allocated to one of the two anaesthetic techniques.

Group -1: conventional balanced anaesthesia. induction with iv thiopentone 5-7

mg/kg and maintenance with O₂+N₂O+halothane.

Group-2: induction with iv propofol 2-2.5mg/kg and maintenance with continuous propofol infusion using infusion pump at the rate of 12mg/kg for first 10 minutes, 9mg/kg for next 10 minutes followed by 6mg/kg till the end of surgical procedure (P.M.R.M De et al). (3) In all the patients, trachea was intubated using iv suxamethonium 1- 1.5mg/kg and ventilation was controlled manually with respiration rate of 12-16/min. using O₂+N₂O(60:40) and vecuronium as muscle relaxant in both the groups.

Induction dose, induction time in seconds and quality of induction was assessed in all the patients. The inspired halothane concentration and propofol infusion were adjusted to maintain a comparable depth of anaesthesia. (K. Korttila et al 1990). (4) Halothane administration and propofol infusion were stopped five minutes before completion of surgery while N₂O was stopped just at the end of the procedure.

Monitoring of clinical parameters like pulse rate, systolic BP, SPO₂, EtCO₂ was carried out throughout the procedure. In all patients, residual neuromuscular blockade was reversed with inj. Neostigmine 0.05mg/kg and inj. glycopyrrolate 0.01mg/kg and extubation was done after adequate reversal. Postoperative analgesia was provided with inj. diclofenac 75mg IM to all patients. Intraoperative and postoperative side effects and complications were noted and managed appropriately.

Recovery was assessed by modified Aldrete score. A total score of 8 or more was considered to shift the patient to recovery room. Postoperative nausea and vomiting was

assessed using Belville score.(A.Rudra et al2002).(5)Home readiness was considered in patients having Aldrete score of 10,stable vital signs for atleast an hour,tolerating oral fluids and ambulated,pain free,no or minimal nausea.

The results were subjected to statistical analysis by paired and unpaired 't' test,chi-square test,fischer's exact test Yate's connection.P value of <0.05 was regarded as statistically significant.

RESULTS:

The groups were identical regarding age and weight (table 1).

Table1. showing Demographic data in both the groups.

	GROUP 1	GROUP2
Mean Age(Yrs)	26.1±4.66	26.78±5.06
Mean Weight(Kgs)	49.40±10.33	48.74±9.36

The time required for induction in Group 2 was more as compared to Group 1(40.88±7.75 vs 39.04±5.52 sec) p<0.05. but the difference was insignificant.This was because of pain on injection by propofol.

Table.2-pressor response at intubation.

	Group 1	Group2
Mean pulse rate	109.74±17.57	99.94±16.84
Mean systolic BP	128.08±17.49	117.86±17.76

The pressor response due to laryngoscopy and intubation increased the systolic blood pressure and pulse rate significantly(p<0.05) in group1 as compared to group 2.(tab.2)

Recovery as assessed by modified Aldrete score shows highly significant difference in consciousness and activity in propofol group(p<0.001) with total score of 10 at the end of anaesthetic in 37 patients in group 2 as compared to only 16 patients in group 2 .

The patients in propofol group were suitable for discharge with mean time of 8.8 ±2.5 hrs as compared to 12± 4 hrs in thipentone-halothane.s

Table .3 Post operative nausea vomiting.

Belville score	No. of patients in group 1	No. of patients in group 2	P value
No symptoms	13	29	P<0.001
Nausea	36	18	P<0.001
Vomiting	18	10	P<0.05

Table 3. shows that propofol-fentanyl was associated with less PONVsignificantly as compared to inhanational technique with halothane-fentanyl.The overall post operative side effects considered as minor sequelae were also found in much more number of patients in group 1 as compared to group 2.

DISCUSSION:

As a part of fast tracking, emerged the term "day care surgery or procedure." Balanced general anaesthesia is a standard concept which provides all components of anaesthesia like amnesia, analgesia and areflexia, but due to advent of various pharmacological agents it is not only restricted to conventional method like thiopentone-N₂O- inhalational agents. Alternatives like propofol and short acting opioids can also provide similar conditions, in fact with better quality of recovery postoperatively.

Overall quality of induction was smooth in majority of patients though better with thiopentone. Injection pain with propofol could have led to comparatively longer induction time. The inspired halothane concentration and propofol infusion rate were increased in response to elevation in SBP and HR exceeding 20% of baseline values. Conversely the rate was decreased in response to decrease in SBP and HR by 20% than baseline values, suggested by K. Korttila et al 1990⁹. Haemodynamic parameters were almost comparable in both the groups. Better obtundation of pressor response at laryngoscopy and intubation was seen in propofol group. Thiopentone decreases the sympathetic output from central nervous system, while propofol may decrease sympathetic nervous system activity to a greater extent than parasympathetic activity resulting in predominance of parasympathetic activity and decrease in pulse rate through out the procedure.

Our results were in accordance with that of L. Herregods et al 1987, (6) Hugovan Aken et al 1987. (2) showing that combination of propofol and fentanyl induced decrease in pulse rate.

The rapid recovery of propofol is because of its pharmacokinetic properties. Clearance of propofol from plasma exceeds hepatic flow emphasizing the tissue uptake, possibly by lungs as well as metabolism is rapid and extensive with no much cumulative effects. On the other hand recovery was in conventional group as metabolism of thiopentone occur at slow rate and metabolized form of thiopentone i.e. pentobarbitone being active and having longer half time thus prolonging recovery. This was further added up by metabolism of halothane as it has maximum fat: blood coefficient i.e. 51 and high solubility in blood thus causing delayed recovery.

Propofol in contrast to thiopentone is effective for preventing PONV in patients undergoing laparoscopic procedures. The antiemetic effect of propofol may be due to antagonist effect of 5HT₃ receptor and also sedative effect due to modulation of subcortical pathways. N₂O may also influence PONV due to stimulation of vestibular system.

In conclusion, propofol-N₂O compares favorably to thiopentone halothane-Nitrous oxide for maintenance of anaesthesia during short or day care procedure with remarkable early and rapid recovery with propofol and less PONV.

Though for longer duration, more stressful operations, the use of propofol-nitrous oxide may not appear to offer any clinically significant advantage over balanced anaesthesia and increased need of opioids, it can be advocated for anaesthesia in ambulatory or day care surgery.

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Graph showing postoperative side effects and complications in both the groups

