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An Observational Prospective Study in Tertiary Care Teaching Hospital at Katihar to Evaluate, Compare and determine the incidence of PONV with intra-operative use of Nitrous Oxide and Medical Air or General Anesthesia in patients undergoing Breast Surgery

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Abstract | **Original Research Article**

Aim: The main objective of this trial was to evaluate, compare and Determine the incidence of PONV with intra-operative use of N_2O (Nitrous Oxide) and Medical Air or General Anesthesia in patients undergoing Breast Surgery. ***Material and Method:*** 80 ASA 1 & 11 Female patients whose age > 18 years and admitred for Breast Surgery between April 2018 to June 2019 were included in this observational prospective study done a Katihar Medical college and Hospital, Katihar, Bihar. Patients were equally divided in 2 groups, in which Group A received oxygen & Medical Air (Fio2 0.4)(N=30) and Group B received oxygen & Nitrous oxide (Fio2 0.4) (N=30)]. Fentanyl (2 microgram/kg) and Propofol (1- 2 mg/kg) were induced in all patients and maintained with sevoflurane, 40% oxygen with air/N2O and vecuronium bromide (0.08mg/kg). All the patients were reversed with glycopyrrolate (0.02mg/kg) and Neostigmine (0.05mg/kg). As injection dexamethasone 4mg all the patients received PONV prophylaxis As per recent PONV guideline at the start of surgery and also at the end of surgery they received injection ondansetron 4mg iv. All patients also received injection diclofenac 1.5mg/kg dosing at the end of the surgery and repeated 8hrly in the post-operative period. When pain score goes above 4 on NRS or as per demand, paracetamol 15mg/kg iv was given as rescue analgesia. PONV was recorded in periodic interval which consists of 1st hr, 6hr and 12hr post operatively. ***Result:*** In Group A incidence of PONV was only 3.3% where as it was 26.4 % in Group B with a p value of <0.023. At 6 hr the same was 0 in Group A whereas it was 20% in Group B with a p value of <0.023. At 12 hr. hr the same was 1 in Group A whereas it was 14 in Group B with a p value of <0.0002. Dose of paracetamol was comparable in both the groups. ***Conclusion:*** PONV incidence was significantly less in group A which consists of Medical Air as compare to Group B which consists of Nitrous Oxide.

Keywords: Nitrous Oxide, Medical Air, Tertiary care teaching Hospital, PONV incidence.

INTRODUCTION

One of the feared and incapacitating side effect of surgery is Post-operative Nausea Vomiting (PONV) is associated with significant morbidity that leads to prolonged hospital stay and delayed recovery [1]. PONV is estimated to found in 30 - 40% of normal population which rises in certain circumstances up to 75-80% especially in high risk group patients [2]. It has already been documented that as per as PONV is concern as compare to men, women are 2 -3 times more susceptible [3]. In absence of prophylactic treatment PONV increases upto 80% in breast surgery [4].

As an anaesthetic carrier gas, Nitrous Oxide (N2O) widely used [5]. it not only potentiates the incidence of PONV but also has analgesic and sedative properties. As an alternate vehicle for anaesthesia, Medical Air (MA) is an environment friendly, inert and safe option [6].

The main objective of this trial was to evaluate, compare and Determine the incidence of PONV with intra-operative use of Nitrous Oxide and Medical Air or General Anesthesia in patients undergoing Breast Surgery.

MATERIAL AND METHOD

This was a nonrandomised observational projective study which was initiated after getting departmental ethics committee approval. 80 ASA 1 & 11 Female patients whose age > 18 years and admitred for breast surgery between April 2018 to June 2019 were included in this observational prospective study done a Katihar Medical college and Hospital, Katihar, Bihar.

Patients were equally divided in 2 groups [Group A: received oxygen & Medical Air (Fio2 0.4)(N=30); Group B: received oxygen & Nitrous oxide (Fio2 0.4) (N=30)].

Fentanyl (2 microgram/kg) and Propofol (1- 2 mg/kg) were induced in all patients and maintained with sevoflurane, 40% oxygen with air/N2O and vecuronium bromide(0.08mg/kg) and patients were intubated with CETT of size 7mm. All the patients were reversed with glycopyrrolate (0.02mg/kg) and Neostigmine (0.05mg/kg). As injection dexamethasone 4mg all the patients received PONV prophylaxis as per recent PONV guideline at the start of surgery and also at the end of surgery they received injection ondansetron 4mg iv.

All patients also received injection diclofenac 1.5mg/kg dosing at the end of the surgery and repeated 8hrly in the post-operative period. When pain score goes above 4 on NRS or as per demand, paracetamol 15mg/kg iv was given as rescue analgesia. PONV was recorded in periodic interval which consists of 1st hr, 6hr and 12hr post operatively.

All the patients were shifted to post anesthesia care unit after tracheal extubation and discharge from the hospital or followed up till 24 hrs in post-surgery ward which ever was earlier. Patients informed confined was filled up by the patients and submitted to the investigator before they enrolled to the current study.

All data was analysed through a statistical software and P value <0.05 was considered as statistically significant.

RESULT

Table 1 depicts patient's demographic details. The demographic parameters of both the groups was almost same and they are almost like mirror image.

Table-1: Patients' Demography

Parameters	Group A	Group B	P value
Age (Years)	39.21±10.2	42.52±12.1	
Weight (Kg)	55.71±8.4	58.84±9.2	
Duration of Surgery (Min)	116±12.4	118±12.8	

Mean arterial pressure and Pulse rate were recorded from pre-induction, every 15 mints till 120 min for both the groups and it was comparable (Table 2)

Table-2: Mean arterial pressure and Pulse rate

Time	Group A	Group B
Before	85.11 ± 8.1	85.12 ± 7.8
After	87.13 ± 7.8	87.48±6.4
15 Mins	88.31 ± 8.2	88.12 ± 7.9
30 Mins	86.14 ± 7.4	86.48±6.1
60 Mins	86.18 ± 7.9	86.12 ± 7.6
90 Mins	84.18 ± 7.6	84.49±5.8
105 Mins	80.12 ± 7.6	80.17 ± 7.1
120 Mins	80.12 ± 7.6	82.34 ± 7.3

In Group A incidence of PONV was only 3.3% where as it was 26.4 % in Group B with a p value of <0.023. At 6 hr the same was 0 in Group A whereas it was 20% in Group B with a p value of <0.023. At 12 hr. hr the same was 1 in Group A whereas it was 14 in Group B with a p value of <0.0002. Dose of paracetamol was comparable in both the groups.

DISCUSSION

Nitrous Oxide is one of the primitive anaesthetics used in medical practice and is more than 200 years old. It has been postulated that as anaesthetic its clinical use is more than 150 years old. Without decreasing the concentration of oxygen it cannot be used effectively that may be delivered. The use of nitrous oxide is a contraindicated due to the increase of cerebral blood flow thus in maximum cases with raised intracranial pressure [7, 8]. There were several other conditions such as for vit efficiency in children is contraindicated for its use [9, 10]. There is little large scale study available which established the beneficial effect of nitrous oxide foe use as a anaesthetic purpose [11, 12].

We initiated this study to find out at our hospital that traditional use of nitrous oxide as a carrier gas in general anaesthesia could be avoided where the new anaesthesia machines allow the combination of oxygen and air as carrier gas and there are inhalational agents (e.g., Sevoflurane) as controllable as nitrous oxide and new I/V agents. The authors in this study as a substitute for nitrous oxide used the mixture of oxygen with Medical Air. Aggarwal *et al.*[10] have proved that undergoing general anaesthesia ventilation with

nitrogen/ oxygen in young healthy patients if compared with the use of nitrous oxide/oxygen or pure oxygen, ventilation with nitrogen/ oxygen mixture (FiO2 0.4) improved pulmonary gas exchange.

In our study, fentanyl (2 microgram/kg) and Propofol (1- 2 mg/kg) were induced in all patients and maintained with sevoflurane, 40% oxygen with air/N2O and vecuronium bromide(0.08mg/kg). All the patients were reversed with glycopyrrolate (0.02mg/kg) and Neostigmine (0.05mg/kg). As injection dexamethasone 4mg all the patients received PONV prophylaxis as per recent PONV guideline at the start of surgery and also at the end of surgery they received injection ondansetron 4mg iv. All patients also received injection diclofenac 1.5mg/kg dosing at the end of the surgery and repeated 8hrly in the post-operative period.

One of the feared and incapacitating side effects of surgery is Post-operative Nausea Vomiting (PONV) is associated with significant morbidity that leads to prolonged hospital stay and delayed recovery [13]. PONV is estimated to found in 30 - 40% of normal population which rises in certain circumstances up to 75-80% especially in high risk group patients. It has already been documented that as per as PONV is concern as compare to men, women are 2 -3 times more susceptible. In absence of prophylactic treatment PONV increases upto 80% in breast surgery.

Efficacy group A in preventing PONV in patients undergoing Breast Surgery under General Anaesthesia is better than Nitrous Oxide group.Future studies should try and determine that patients in whom Medical Air may be most beneficial in prevention of PONV.

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