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FENTANYL OXYGEN- NITROUS OXIDE HALOTHANE FOR PUERPERAL STERILISATION

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ABSTRACT: BACKGROUND: Puerperal Sterilization is one of the terminal contraceptive methods accounting for about 85% of all sterilizations in India. Various options are available to provide anaesthesia for puerperal sterilisation under laparoscopy. This study was aimed to evaluate the efficacy of fentanyl - Oxygen- Nitrous oxide- Halothane sequence in providing adequate intra-operative anesthesia with less awareness, rapid recovery and extended postoperative analgesia.

METHODS: Forty female patients of 20-40 years age group for puerperal sterilization were included in this study. With standard monitoring care, all patients were induced with fentanyl 2 mcg/kg, Oxygen-Nitrous oxide in the ratio of 50:50 with Halothane 0.5%. Halothane concentration was increased to 1% after 1 minute, 2% until the peritoneum was opened and maintained at 1% till the end of the surgery. **RESULTS:** Mean procedure duration was 20-30 minutes. Eye opening was observed within one minute in 3 patients, within 2 minutes in 29 patients and within 3 minutes in 8 patients. Verbal command response was in 2 minutes for 3 patients, 3 minutes in 29 patients and 8 patients in 4 minutes. Heart rate fluctuation was significant during the first 5 minutes (+/- 7.095) of surgical procedure. Fluctuation in systolic blood pressure was only 10-15% which lasted for few minutes in all these patients. There was no significant change in diastolic pressure and arterial oxygen saturation. Though two patients developed ventricular ectopics, it was subsided immediately after discontinuation of Halothane. **CONCLUSION:** Short acting fentanyl can be used safely with oxygen-nitrous oxide-halothane combination for short procedures like puerperal sterilization. This technique is safe as well as cost effective.

KEYWORDS: Halothane, fentanyl, oxygen, nitrous oxide.

INTRODUCTION: Puerperal Sterilization is one of the terminal contraceptive methods. It accounts for about 85% of all sterilizations in India. It is one of the National Health Programme in India. It can be done as an interval procedure, post-partum or at the time of abortion. It can be done in many methods of which minilaparotomy and laparoscopy have become very common. Minilaparotomy is a modification of abdominal tubectomy. The Pomeroy's technique and Uchida technique are in common use, of which Modified Pomeroy's technique is employed in our institution. Puerperal Sterilization requires adequate pain relief. It can be done under Local Anesthesia, Intravenous Sedation, General Anesthesia and Regional Techniques.¹

Till date the most commonly used techniques are i.v. Ketamine anesthesia and local infiltration. These procedures had the disadvantages of post-operative delirium and awareness respectively.² In this era, convention techniques cannot fulfill the criteria for day care surgery. This can be overcome by a combination of a short acting opioid and inhalational agents.³

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Narcotic analgesics are employed in all facets of care in surgical patients. They are used as:

1. Pre and post-operative analgesics.
2. Premedications to help prepare patients for surgery.
3. Anesthetic supplements as part of a neuroleptic or balanced technique.
4. A complete anesthetic in which a narcotic is the primary anesthetic.

Of all the available volatile anesthetic agents, Halothane is the cheapest and the most commonly available volatile agent in developing countries. It is very potent, non-irritable volatile agent used for induction and maintenance of anesthesia.⁴ So we have combined short acting effective opioid, fentanyl and a potent volatile agent, Halothane along with oxygen and nitrous oxide for induction and maintenance of anesthesia for puerperal sterilization cases.^{5,6,7}

AIMS AND OBJECTIVES:

AIM OF THE STUDY: To evaluate the efficacy of Fentanyl-Oxygen- Nitrous oxide-Halothane sequence in providing adequate intraoperative anesthesia with less awareness and extended postoperative analgesia.

OBJECTIVES OF THE STUDY: Minimal awareness.

- Good analgesia.
- Rapid recovery from anesthesia.

MATERIALS AND METHODS: This study was conducted in Rajah Muthiah Medical College and Hospital, Annamalai University, Annamalai Nagar from January 2004 to January 2006 after formal approval by ethical committee.

Forty female patients of 20-40 years age group for puerperal sterilization were included in this study

Informed consent was obtained from all the patients.

INCLUSION CRITERIA:

1. Physical status ASA 1.
2. Age 20-40

EXCLUSION CRITERIA:

1. Patients with chronic respiratory illness.
2. Patients allergic to opioids.
3. Patients with history of PIH, Eclampsia, recent jaundice.
4. Patients with diabetes mellitus
5. Patients with congenital/acquired valvular heart disease

All the patients were subjected to continuous ECG, pulse oximetry, Non-invasive blood pressure monitoring during the intraoperative and immediate post-operative period

PREMEDICATION: All the patients were premedicated with Inj. Glycopyrrolate 0.2mg im and Inj. Diazepam 0.2mg/kg body weight im 45 minutes prior to induction.

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PROCEDURE:

- Patients were placed in supine position.
- IV access was secured.
- Pre oxygenation with 100% oxygen through Bains circuit was done for 3 minutes.
- Inj. Fentanyl 2 mcg/kg was administered intravenously.
- Oxygen-Nitrous oxide in the ratio of 50:50 with Halothane 0.5% was administered. The concentration of Halothane was increased to 1% after 1 minute and 2% after minutes.
- The surgery was started after confirming the depth of anesthesia with loss of eyelash reflex and regular and smooth respiration (adequate abdominal muscle relaxation). The concentration of Halothane was maintained with 2% until the peritoneum was opened. Then the concentration of Halothane was reduced to 1% and was maintained till the end of the surgery. The recovery was confirmed with spontaneous eye opening and adequate respiration (rate and rhythm) and response to verbal commands. All the patients were subjected to continuous ECG, pulse oximetry, non-invasive blood pressure and respiratory rate monitoring during the intraoperative and immediate postoperative period for 30 minutes.

OBSERVATIONS:

DISTRIBUTION OF PATIENTS ACCORDING TO AGE: Age distribution among the age group of 20-40 years were as follows: 1.25 patients in the age group of 20-25 years 2.13 patients in age group of 26-30 years 3.2 patients in age group of 31-35 years.

DISTRIBUTION OF PATIENTS ACCORDING TO WEIGHT: All the patients weighed between 40-70kgs. Among these 15 patients weighed between 41-50kgs, 22 patients weighed between 51-60kgs and 3 patients weighed more than 60 kgs.

DISTRIBUTION OF CASES ACCORDING TO DURATION OF PROCEDURE: Duration of procedure lasted for 20-30 minutes time. Surgical procedure lasted for 20 mins in 24 patients, procedure lasted for 25 minutes in 15 patients. For only 1 patient the procedure lasted for 30 minutes

DISTRIBUTION ACCORDING TO RECOVERY (EYE OPENING): Eye opening time was taken as sign of recovery from anesthesia. Eye opening was observed within one minute in 3 patients. In 29 patients, eye opening was observed within 2 minutes and 8 patients eye opening was observed in 3 minutes.

DISTRIBUTION OF PATIENTS ACCORDING TO RECOVERY (RESPONSE TO VERBAL COMMANDS): Patient's response to verbal commands was considered as sign of good recovery. 3 patients responded to verbal commands in 2 minutes. 29 patients responded to verbal commands in 3 minutes and 8 patients responded to verbal commands in 4 minutes

HEART RATE AT VARIOUS INTERVALS: Heart rate variation was observed between 75-90 beats/minute in all patients over a period of 20 minutes. Heart rate during pre-induction was 84.95 +/- 6.324, after 2 minutes was 87.15 +/- 5.868, after 5 minutes was 86.65 +/- 7.095, after 10 minutes was 82.15 +/- 6.443, after 15 minutes was 82 +/- 6.469 and at the end of procedure 81.85 +/- 6.784 with a p value of <0.001. Heart rate fluctuation was significant during the first 5 minutes of surgical

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procedure. Heart rate attained pre induction value at the end of the procedure. A rise in heart rate did not have any systemic effect or warranted any intervention.

RESPIRATORY RATE AT VARIOUS INTERVALS: Respiratory rate was maintained in the range of 15-25 breaths/min. Respiratory rate during pre-induction was 14.48 $\pm$ 1.281, after 2 minutes was 23.48 $\pm$ 3.530, after 5 minutes was 25.33 $\pm$ 2.718, after 10 minutes was 16.25 $\pm$ 1.822, after 15 minutes was 15.60 $\pm$ 1.446 and at the end of procedure 15.60 $\pm$ 1.194 with a p value of <0.001 . Tachypnoeic states was observed for few minutes, which was nullified by deepening the surgical plane of anesthesia. During surgical procedure, 2-5 minutes after induction, this minimal change in respiratory rate was observed

BLOOD PRESSURE AT VARIOUS INTERVALS: Systolic blood pressure variation was observed between 100-120mmHg range. Systolic blood pressure during pre-induction was 117.65 $\pm$ 18.783, after 2 minutes was 115.30 $\pm$ 8.858, after 5 minutes was 107.45 $\pm$ 7.103, after 10 minutes was 107.30 $\pm$ 6.861, after 15 minutes was 108.2 $\pm$ 6.321 and at the end of procedure 109.2 $\pm$ 6.776 with a p value of <0.001 . Fluctuation in systolic blood pressure was only 10-15% which lasted for few minutes in all these patients. Systolic blood pressure returned to normal values at the end of the procedure. This variation in systolic blood pressure did not require any treatment.

Diastolic blood pressure fluctuation was observed in the range of 60-80 mmHg. It persisted in the normal range. There is no significant change in diastolic pressure. Diastolic blood pressure during pre-induction was 78 $\pm$ 4.051, after 2 minutes was 76.05 $\pm$ 5.574, after 5 minutes was 69.80 $\pm$ 5.317, after 10 minutes was 70.1 $\pm$ 5.002, after 15 minutes was 70.65 $\pm$ 4.583 and at the end of procedure 71.15 $\pm$ 4.365 with a p value of <0.001 .

In all these patients, there were mild rise in systolic blood pressure with the normal range of diastolic pressure, MAP change did not have any significance. Mean arterial pressure during pre-induction was 92 $\pm$ 4.851, after 2 minutes was 89.1 $\pm$ 6.172, after 5 minutes was 82.2 $\pm$ 5.140, after 10 minutes was 82.23 $\pm$ 4.737, after 15 minutes was 82.98 $\pm$ 6.282 and at the end of procedure 83.53 $\pm$ 4.114 with a p value of <0.001 .

SPO₂: Arterial oxygen saturation maintained within the normal range of 96-99%.

SIDE EFFECTS: 2 patients developed ventricular ectopics which subsided immediately after discontinuation of Halothane without treatment

DISCUSSION: Forty female patients of age group of 20-40 years belonging to ASA I posted for puerperal sterilization were selected for this study. All the patients were evaluated preoperatively for anesthetic fitness for surgery and an informed consent was obtained. They were pre-medicated with inj. glycopyrrolate 0.2mg and Inj. Diazepam 0.2mg/kg body weight intramuscularly 45 minutes before induction. Injection fentanyl 2 mcg/kg body weights was administered intravenously 3 minutes before induction with oxygen-nitrous oxide-Halothane sequence. All patients were assessed for induction, hemodynamic stability and recovery. Halothane is a very potent and most commonly used inhalational agent for induction of anesthesia. It allows rapid and smooth induction. The time of induction of anesthesia in this study was less (2-3 minutes) when compared to other studies where Halothane alone was used.^{8,9,10,11}

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This technique was found to provide good operating conditions and thus reducing the duration of surgery. The hemodynamic parameters were maintained throughout the perioperative period. There was a minimal reduction in the heart rate and blood pressure which was comparable with studies done by Hoch et al., Kikura et al, Piat et al, Canet et al, Sarnier et al, Tanaka et al, Michaloudis et al, Hall et al., McKinney et al.¹²⁻²⁴ Only 2 patients developed ventricular ectopics, which disappeared after discontinuation of Halothane without treatment.²⁵⁻²⁷ The recovery from anesthesia was smooth and fast. The patients recovered from anesthesia in 2-4 minutes. The postoperative period for all the patients was uneventful.

CONCLUSION:

TO SUMMARISE THE STUDY:

- Fentanyl – short acting analgesic.
- Halothane- a potent volatile agent.
- Nitrous oxide-Oxygen for induction and maintenance of anesthesia provided good analgesic effect, minimal awareness, minimal hemodynamic changes and early recovery.

The induction of anesthesia was smooth and rapid with combination of these drugs. It also provided better surgical conditions with good relaxation thereby reducing the duration. This sequence provided good anesthesia with minimal changes in hemodynamic parameters. This sequence can be used for short duration surgical procedures which allow early ambulation of patients. This technique is safe as well as cost effective.

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