

Original article:

Comparative Analysis of Characteristics of Recovery from Anaesthesia with Isoflurane and Halothane in Day - Care Surgery at a Tertiary Care Hospital

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ABSTRACT

Background: The rapid elimination of anesthetic gases allows a fast recovery and early discharge of the patient. A similar spectrum of pharmacological activity is produced by the three commonly used volatile agents – halothane, isoflurane and enflurane. The present study was conducted to compare characteristics of recovery from anaesthesia with isoflurane and halothane in day - care surgery.

Materials & Methods: In the present study 100 ASA grade I and grade II patients were divided into two groups i.e. isoflurane 1.5 % in group – I or halothane 1.5 % in group – II patients. The intermediate recovery was tested every 15 minutes by the psychomotor tests. The data obtained finally was statistically analyzed by using analysis of variance (ANOVA) and P value less than 0.05 was considered significant.

Results: Group I opened the eyes on command I 4 min 45 sec whereas group II patients opened eyes in 9 min 28 sec. There was a significant difference between the two groups. Group I gave response on giving date of birth in 5 minutes 46 sec whereas group II gave response in 10 min 35 sec. The isoflurane group responded earlier than halothane group. Choice reaction time was earlier in group I. Perceptive accuracy test, Peg board test, Card sorting test, Trieger dot test was more accurate in group I. Finger taping score was more in group I.

Conclusion: The present study concluded that the isoflurane group responded earlier than halothane group. Choice reaction time was earlier in group I. Perceptive accuracy test, Peg board test, Card sorting test, Trieger dot test was more accurate in group I. Finger taping score was more in group I. Therefore, isoflurane is better than halothane.

Key words: Isoflurane, Halothane, Psychomotor Tests.

INTRODUCTION

The practice of performing surgery under general anesthesia in an outpatient setting is certainly not new. Nicoll operated on several thousand children during the early 1900's and Waters described an out-patient anesthesia clinic in 1919.¹ However it has gained much of importance in the recent times as it offers certain advantages like 1) reduced cost of medical care 2) less time away from work 3) less opportunity for unnecessary medical investigations 4) reduced number of patient awaiting surgery.² The major emphasis in day care surgery is placed

on anaesthetic technique which has quicker induction, minimum interference with patient's hemostasis, shorter awakening time, shorter time to response to verbal command, quicker return of psychomotor functions to normal and minimal postoperative side effects so that patients may be discharged within hours of such procedures.³⁻⁵ The present study was conducted to compare characteristics of recovery from anaesthesia with isoflurane and halothane in day - care surgery.

MATERIALS & METHODS

A prospective clinical study was carried out in the Maharaja Agrasen Medical College, Agroha, Hisar, Haryana (India) among 100 ASA grade I and grade II patients to compare the recovery characteristics. Before the commencement of the study ethical clearance was taken from the ethical committee of the institute and informed consent was taken from the patient after explaining the study. Study was conducted for one year duration from Mar 2007 to Feb 2008. Preoperative investigations were done in accordance with Roizen' s guidelines.⁶ NPO orders were given as follows. All patients were instructed for a restriction of solids for 8 hrs and oral clear fluids were allowed for upto 2 hrs. before surgery. Patients were premedicated with oral 0.5 mg alprazolam night before surgery. To maintain a protocol all patients were given 150 mg of ranitidine P.O. and 10 mg of metoclopramide P.O. one hour before surgery as aspiration prophylaxis and to reduce PONV. Intramuscular diclofenac 75 mg half-an hour before induction of anaesthesia was also given as premedication. After pre-medication, the patient was wheeled into operating room and transferred onto operating table. After recording the vital parameters, an intravenous line was secured and connected to a slow 0.9% normal saline drip. Glycopyrrolate 0.2 mg I.V. was given. Patient was induced with 1% propofol 2 mgkg⁻¹; slowly i.e every 4 ml in 10 seconds until the eyelash reflex was obtunded. On abolition of eyelash reflex patient was maintained on spontaneous ventilation by using Magill's circuit with N₂O 6 Lts; O₂ 3 Ltrs. and isoflurane 1.5 % in group – I or halothane 1.5 % in group – II patients. Intraoperative pulse rate, blood pressure and oxygen saturation were vigilantly observed. At the conclusion of surgery, recovery from anaesthesia was judged on the basis of the following criteria: Asking the patient every one minute till he opens his eyes on command and gives his name, date of birth or date of marriage. The intermediate recovery was tested every 15 minutes by the following psychomotor tests: 1. Choice reaction time 2. Perceptive accuracy test 3. Finger tapping test 4. Peg board test 5. Card sorting test 6. Trigger dot test. Along with the psychomotor tests clinical parameters i.e. pulse rate, blood pressure, oxygen saturation and respiratory rate were checked at regular intervals. All throughout operation and in the post operative period vigilant observation was kept to notice any of the complications. The patients were given fitness for discharge or "Home Readiness" by anaesthesiologist after 6 hours using pre set criteria. The data obtained finally was statistically analyzed by using analysis of variance (ANOVA) and P value less than 0.05 was considered significant.

RESULTS

In the present study 100 ASA grade I and grade II patients were divided into two groups I.e. isoflurane 1.5 % in group – I or halothane 1.5 % in group – II patients. Group I opened the eyes on command I 4 min 45 sec whereas group II patients opened eyes in 9 min 28 sec. There was a significant difference between the two

groups. Group I gave response on giving date of birth in 5 minutes 46 sec whereas group II gave response in 10 min 35 sec. The isoflurane group responded earlier than halothane group. Choice reaction time was earlier in group I. Perceptive accuracy test, Peg board test, Card sorting test, Trieger dot test was more accurate in group I. Finger taping score was more in group I.

Table 1: The average response time

| | Opening eyes on command Mean ±SD | Giving date of birth Mean ±SD |
|-------------------|---|--|
| Group – I | 4 min 45 sec ±50 sec | 5 min 46 sec±54 sec |
| Group - II | 9 min 28sec±1min 15 sec | 10 min 35 sec±1min25 sec. |
| P value | < 0.05 | < 0.05 |

Table 2: Average values of results for psychomotor tests

| Test | Group-I | Group-II | p-value |
|-----------------------------------|----------------|-----------------|----------------|
| Choice reaction time | 6.5 sec | 9.5 sec | 0.00 |
| Perceptive accuracy test | 98% | 87% | 0.00 |
| Finger tapping test score. | 45 | 39 | 0.00 |
| Peg board test | 96% | 85% | 0.00 |
| Card sorting test | 98% | 88% | 0.00 |
| Trieger dot test | 96% | 92% | 0.00 |

DISCUSSION

Patients undergoing minor surgical procedures on a day-stay basis need a general anaesthetic technique which is associated with rapid recovery, minimum postoperative morbidity and a rapid return to "street fitness". Several drugs used in anaesthesia, in particular the benzodiazepines, barbiturates and many other general anaesthetic agents, depress psychomotor function.⁷

In the present study 100 ASA grade I and grade II patients were divided into two groups i.e. isoflurane 1.5 % in group – I or halothane 1.5 % in group – II patients. Group I opened the eyes on command I 4 min 45 sec whereas group II patients opened eyes in 9 min 28 sec. There was a significant difference between the two groups. Group I gave response on giving date of birth in 5 minutes 46 sec whereas group II gave response in 10 min 35 sec. The isoflurane group responded earlier than halothane group. Choice reaction time was earlier in group I. Perceptive accuracy test, Peg board test, Card sorting test, Trieger dot test was more accurate in group I. Finger taping score was more in group I.

There was statistically significant difference in average response time to open eyes on command and to tell name between two groups. We found that early recovery following isoflurane was more rapid as compared to halothane. This finding of our study is also supported by study done by Wren al7 which found that recovery from isoflurane was markedly faster.⁸

A study conducted by Goyal N et al (2006) also found that psychomotor recovery was quicker with isoflurane

than with halothane. Results of the psychomotor tests to assess the intermediate recovery also showed the significant difference between the two groups. More number of patients were able to sit up at half an hour and stand at two hours in the isoflurane group compared to halothane group. The study concluded that isoflurane is a useful and better anaesthetic over halothane and offers a clear advantage when used for maintenance of anaesthesia for operations of short duration performed on a day-care basis.⁹

CONCLUSION

The present study concluded that the isoflurane group responded earlier than halothane group. Choice reaction time was earlier in group I. Perceptive accuracy test, Peg board test, Card sorting test, Trieger dot test was more accurate in group I. Finger taping score was more in group I. Therefore, isoflurane is better than halothane.

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