Original Research Article

A comparative study of sevofluranne versus isoflurane with respect to recovery characteristics

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Abstract

Introduction: Pediatric anesthesia is a continuum of clinical care. It Begins with preoperative evaluation and continues through Consideration of fasting interval, premedication, induction, Maintenance, emergence, postoperative analgesia and care of Child in PACU. Anaesthetics used for paediatric anaesthesia should produce rapid and smooth inducton, rapid emergence and a short postoperative Recovery period with minimal adverse effect. Although Halothane is most commonly used for induction of Anaesthesia in children, anaesthesia may also be inducted with the Ether anaesthetics like Isoflurane, Enflurane, Desflurane and Sevoflurane. Nitrous oxide. Premedication, anticholinergics and rate of increase in the inspired Concentration have all been used to attenuate airway reflex Responses with variable success **Aims and Objective:** To study of sevofluranne versus isoflurane with respect to recovery characteristics. **Methodology:** After obtaining approval from the institution, we have undertaken, study of 60 paediatric patients, from the year 2000- 2001, at S.S.G.H., Vadodara. Selection of Patients60 paediatric patients between the age ranged from infants To 10 years of either sex and ASA physical status I and II were Taken up for this study. They were underwent a variety of elective General surgical procedures like urological, plastic, ENT and Orthopedics. Children having significant airway, cardiac, Respiratory, renal, hepatic or central nervous system diseases were excluded from the study. Standard physical examination and clinical laboratory tests like haemogram and urine examinations were done in every Patient. **Result:** Discontinuation of Volatile agent to Spontaneous Movement time (min), Extubation time (min), Emergence time (min), Interaction time (min) All these four variables of recovery characteristics in Group S. Were earlier and statistically highly significant as compared to Group I. From the table it is clear that the recovery hemodynamic characteristics like Heart rate, SBP, DBP were not significantly different in these two groups. **Conclusion:** Sevoflurane provides superior clinical Profile to Isofluraneinpaediatricpatients : a smoother and more Rapid induction of anaesthesia, a better haemodynamic stability and a significantly more rapid emergence and recovery from Anaesthesia.

Keywords: Sevoflurane, Isoflurane, Recovery characteristics.

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INTRODUCTION

Pediatric anesthesia is a continuum of clinical care. It Begins with preoperative evaluation and continues through Consideration of fasting interval, premedication, induction, Maintenance, emergence, postoperative analgesia and care of Child in PACU. Anaesthetics used for paediatricanaesthesia should produce rapid And smooth inducton, rapid emergence and a short postoperative Recovery period with minimal adverse effect[1]. Although Halothane is most commonly used for induction of Anaesthesia in children[2], anaesthesia may also be inducted with the Ether anaesthetics like Isoflurane, Enflurane, Desflurane and Sevoflurane.

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Nitrous oxide. Premedication, anticholinergics and rate of increase in the inspired Concentration have all been used to attenuate airway reflex Responses with variable success[3].Most data point to a significantly more rapid time to emergence and to orientation after Sevoflurane than after Isofluraneanaesthesia[4,5]. Sevoflurane, a volatile anaesthetic agent, is halogenated ether. It has rapid induction due to low blood: gas partition (blood: gas partition coefficient of 0.65 and fat: blood solubility 48 at 37°C). Desflurane is also halogenated ether. Low solubility of desflurane in blood and body tissues (blood: gas partition coefficient of 0.42 and fat: blood solubility 27 at 37°C) leads to rapid induction and recovery[6,7]. Sevoflurane is the most suitable agent for pediatric age groups because of its rapid onset of action, few intraoperative and postoperative complications, quick recovery and no risk of repeated sevoflurane exposure to patients.[8]

AIMS AND OBJECTIVE

To study of sevofluranne versus isoflurane with respect to recovery characteristics.

MATERIAL AND METHODS

After obtaining approval from the institution, we have undertaken, study of 60 paediatric patients, from the year 2000- 2001, at S.S.G.H., Vadodara. Selection of Patients60 paediatric patients between the age ranged from infants To 10 years of either sex and ASA physical status I and II were Taken up for this study. They were underwent a variety of elective General surgical procedures like urological, plastic, ENT and Orthopedics. Children having significant airway, cardiac, Respiratory, renal, hepatic or central nervous system diseases were excluded from the study. Standard physical examination and clinical laboratory tests like haemogram and urine examinations were done in every Patient. The essence of study was explained to the parents and written informed consent for operation and anesthesia was taken Fromthem. Pre-operative Preparation All the patients were kept "Nil by mouth" for 3-6 hours Accounting to age. All the patients were randomly allocated to receive Isoflurane or Sevoflurane for induction and maintenance of Anaesthesia. Group I (n=30) – patients received Isoflurane Group S (n=30) – patients received Sevoflurane Premedication After confirming fasting, premedication was administered 30 Minutes prior to surgery in preanaesthetic waiting room with oral Midazolam 0.5 mg/kg and Atropine 0.02 mg/kg in both the groups. Preinduction Assessment After 30 minutes of premedication, the patients were assessed for level of sedation; emotional status ans mask Acceptancy using the following scoring systems.

RESULT

Table 1: Recovery characterstics (Mean+SD)

Sr. No.	Variable	Group-I	Group-S	P value
1	Discontinuation of Volatile agent to Spontaneous Movement time (min)	3.49+0.82	2.16+0.66	<0.02***
2	Extubation time (min)	4.77+0.86	3.19+0.63	<0.02***
3	Emergence time (min)	16.64+3.95	4.69+0.70	<0.02***
4	Interaction time (min)	27.83+7.15	12.49+3.52	<0.02***

*** P value <0.02 – highly significant

All the four variables of recovery characteristics in Group S. Were earlier and statistically highly significant as compared to Group I.

Table 2: Haemodynamic variables (Mean+SD)

Variables	Rercovery
Heart rate (bpm)	
Group-I	+6.33+6.53
Group-S	+6+6.92
P value	>0.05*
SBP (mm Hg)	
Group-I	-2+3.25
Group-S	-4+4.47
P value	>0.05*
DBP (mm Hg)	
Group-I	-2.33+3.64
Group-S	-$+4.88
P value	>0.05*

*P value >0.05 – Non significant, **P value<0.05 – Significant, ***P value<0.02-Highly significant

From the table it is clear that the recovery hemodynamic characteristics like Heart rate, SBP, DBP were not significantly different in these two groups.

DISCUSSION

During recovery, mean fall in SBP was comparable in 100% Patients of both the groups,2+3.25 mmHg in Group I versus 4+4.47 mmHg in Group S (P>0.05). During recovery, mean fall in DBP in 100% patients of Group I was 3+4.27 mmHg versus 4+4.88 mmHg in 100% patients Of Group S, which was comparable in both the groups (P>0.05). Emergence time, in Group I was 16.64+3.95 mins and in Group S was 4.69+0.70 mins. So, emergence time was quite Earlier and statistically highly significant in Group S than Group I (P<0.02). Interaction time in Group I was 27.83+7.15 mins versus12.49+3.52 mins in Group S, which was earlier in Group S than Group I (P<0.02).The time to achieve Modified Alderte

Score >8 at 10 mins., 20 mins. And 30 mins. In Group I was 3.33%, 40% and 100%respectively. At 10 mins. In Group S, 100% patients were having Modified Alderte Score of >8. So, recovery as assessed by Modified Alderete score was quite faster with Group S as Compared to Group I ($P<0.05$).So, all the variables of recovery were achieved quite earlier With Group S than Group I. Similar observations were made by S.Johanet[2], Edward J.Frink[4],Naito Y[7]. , Christina C.[9] and Lerman J[10]. Naito[11] has noted emergence with Sevoflurane and N2O within4.3+1.1 mins. Christina has noted responcse to verbal command with Sevoflurane and N2O within 9.9+1.1 mins. And with Isoflurane and N2O within 13.9+1.3 mins. So, all the criterias of recovery were faster with Sevoflurane and Isofluraneinspite of comparable anaesthetic duration and Dose. Because of its lower blood: gas solubility, emergence from Sevoflurane anaesthesia was more rapid than with Isoflurane. Relative Insolubility of the agent in the blood, leads to rapid recovery[1,11,12]. Adverse Effects during Recovery No significant complications were observed in either group During emergence.

CONCLUSION

Sevoflurane provides superior clinical Profile to Isoflurane in paediatric patients: a smoother and more Rapid induction of anaesthesia, a better hemodynamicstability And a significantly more rapid emergence and recovery from Anaesthesia.

REFERENCES

1. Patel S.S., Goa K.L, - Sevoflurane – A review of its Pharmacodynamic and pharmacokinetic properties and its Clinical use in general anaesthesia. Drugs. 1996 April, 51 (4); 658-700.
2. Piat V., Dubois, M.C., S. Johanet – Inducation and recovery Characteristics and heamodynamic responses to Sevoflurane And Halothane in children – Anaesth Analgesia 1994 ; 79: 840-4.
3. H. Tsuchinda, Ken-ichi Nakabayashi, Symiho Seki, AkiyoshiNamiki – The effects of Sevoflurane, Isoflurane, Halothane And Enflurane on haemodynamic responses during an inhaled Induction of anaestheesia via mask in humans. Anaesth Analog. 1996; 82:821-6.
4. Edward J. Frink – clinical comparison of Sevoflurane and Isoflurane in healthy patients. Anaesth Analog. 1992; 74: 241-5.
5. Yurino M. and Kimurah H. – Vital capacity breath technique for Rapid anaestheticinducation – A comparison of Sevoflurane and Isoflurane – Anaesthesia. 1992; 47: 946-949.
6. Eerts TJ, Schmid PG. Inhaled anesthetics. In: Barash PG, Cullen BF, Stoelting RK, Cahalan MK, Stock MC, editors. Clinical Anesthesia. 6th ed. Philadelphia: Lippincott Williams and Wilkins; 2009. pp. 413–43.
7. Morgan GE, Jr, Mikhail MS, Murray MJ. Clinical Anesthesiology. 4th ed. New York: McGraw-Hill; 2006. Inhalational anesthetics; pp. 155–78.
8. Redhu S, Jalwal GK, Saxena M, Shrivastava O P. A comparative study of induction, maintenance and recovery characteristics of sevoflurane and halothane anaesthesia in pediatric patients (6 months to 6 years).J AnaesthesiolClinPharmacol 2010]; 26:484-7.
9. Christina Campbell, Michal L., Mahrawold, Deborah D., Milar – Clinical comparison of Sevoflurane and Isoflurane when Administrered with Nitrous oxide for surgical procedures of intermediate duration. Canandian Journal Anaesth. 1995 42:10 884-90
10. Lerman J., Davis – P. J, wellborn – LG – induction, recovery And safety characteristics of Sevoflurane in childrenUndergoing ambulatory surgery – A comparison with Halothane. Anaesthesiology, 1996 Jun: 84(6): 1332-40.
11. Naito Y., Tamai S., Shingu K., Fulimori R., Mori K. – Comparison between Sevoflurane and Halothane for Paediatric ambulatory anaesthesia – British Jouranl of Anaesthesia. 1991 October; 67 (4) : 387-9.
12. Skirt JA, Berger JM, Sulivation SF: Lack of anythrmogenicity ofIsoflurane following administration of aminiphyline. Anaesthesia Analog 1983; 62: 568-571.

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