A PROSPECTIVE RANDOMISED COMPARATIVE STUDY OF EVALUATION OF EFFECT OF PROPOFOL AND DEXMEDETOMIDINE TO REDUCE SEVOFLURANE INDUCED EMERGENCE AGITATION IN YOUNG CHILDREN UNDERGOING DAY CARE SURGERY

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ABSTRACT

BACKGROUND

In children Sevoflurane is associated with delirium upon recovery from anaesthesia, cause is not clear. It is called emergence delirium or emergence agitation. This is usually seen in first thirty minutes and it is described as a disturbance in children awareness and attention to environment with disorientation and perceptual alterations including hypersensitivity to stimuli and hyperactive motor behaviour in the immediate post anaesthesia period. Propofol is effective in preventing emergence agitation (E.A). Dexmedetomidine is reported to reduce the frequently of EA. So we have conducted a study to evaluate, the efficacy of propofol in comparison with dexmedetomidine, to reduce the Emergence agitation with Sevoflurane anaesthesia in paediatric patients.

MATERIALS AND METHODS

Patient selected for this study were randomly divided in to two groups, group A, is a propofol group, group B is dexmedetomidine group. The severity of EA was evaluated by using paediatric anaesthesia emergence delirium scale (PAED) devised by Sikich and lerma. Incidence of emergence agitation and PAED score were noted every 5 min up to first 30 min.

RESULTS

Regarding Incidence of emergence agitation and PAED score, we have found that number of patient with emergence agitation was more in propofol group than dexmedetomidine group at $T_{0,}$ T_{5} ,$T_{10,}$ T_{15} and T_{20} but not at T30. Accordingly the PAED score was high in group A that is propofol group then group B at T_{0} ,T_{5} ,T_{10} and T_{15} but at T_{20} and T_{30} it was same in both the group.

CONCLUSION

We have found in our study that dexmedetomidine is more effective than propofol in reducing the severity and incidence of emergence agitation. There is no significant difference in the duration of stay in patient in PACU but time of emergence was also delayed in dexmedetomidine Group.

KEYWORDS

Emergence Agitation, Dexmedetomidine, Propofol.

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BACKGROUND

There is a rapid growth of ambulatory surgery in recent past. This is possible because of development in the field anaesthesia. With the availability of short acting anaesthetic agent and good perioperative pain management day care surgery has become very successful. Paediatric day care surgery is performed more frequently and it is advised that patients can be admitted in hospital only when care they require cannot be provided in the home.

Sevoflurane is a fluoromethyl trifluoro-1-(Trifluoromethyl) ethyl ether. It is a clear, colourless volatile, nonirritating liquid widely used in day care surgery particularly in paediatric surgery because of its rapid recovery and non-irritation to air way. But in children Sevoflurane is associated with delirium upon recovery from anaesthesia, cause is not clear. It is called emergence delirium or emergence agitation.[1]

This is usually seen in first thirty minutes and it is described as a disturbance in children awareness and attention to environment with disorientation and perceptual alterations including hypersensitivity to stimuli and hyperactive motor behaviour in the immediate post

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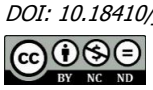

anaesthesia period. It is self-limiting, without any long term sequelae. [2]

But this short term episode can cause harm to patient and dissatisfaction to parent. Although the aetiology is not known but it is assumed that adequate pain control can reduce this episode. Various drugs have been evaluated for reducing this episode i.e. ketorolac, clonidine, midazolam, ketamine propofol and dexmedetomidine.

Propofol is short acting parenteral anaesthetic agent acts on GABAA receptor seems to be effective in preventing emergence agitation (E.A).[2] Dexmedetomidine is a centrally acting specific α-2a adreno receptor agonist causes sedation and analgesia. Sympathetic response to stress and noxious stimulus get blunted. It is reported to reduce the frequently of EA.[3]

So we have conducted a study to evaluate, the efficacy of propofol in comparison with dexmedetomidine, to reduce the Emergence agitation with Sevoflurane anaesthesia in paediatric patients.

MATERIALS AND METHODS

This study has been conducted in the dept. of anaesthesia Konaseema institute of medical science Amalapuram. It is a prospective randomized comparative study conducted during April 2014 to June 2017. Prior approval was taken from institutional ethics committee. A written informed consent was obtained from parent on pre designed consent form. A total of sixty patients during a period of 3 Yrs. were randomly selected for this study as per inclusion and exclusion criteria.

Inclusion Criteria

- Age:- 2 to 9 years.
- Sex:- Both.
- ASA score I, II.

Exclusion Criteria

- ASA score III, IV.
- Allergy to drugs.
- Any sedative or analgesic intake
- Any developmental disorder, Mental or neurological disorder.

Patient selected for this study were randomly divided in to two groups, group A, is a propofol group, group B is dexmedetomidine group. All the patients were evaluated preoperatively and were kept nil by mouth for solid and milk for 6 hr and 2 hr before from clear fluids.

In the operation theatre, the patients were attached with electro cardiogram, and multipara monitor and baseline values were recorded. All the vital parameters were recorded during whole procedure.

General anaesthesia was induced with 8% Sevoflurane with 60% N_2O in oxygen, via face mask. After orotracheal intubation anaesthesia was maintained with 60% N_2O in oxygen. To maintain end-tidal CO_2 of (35+4 mm of Hg) anaesthesia was supplemented by end tidal concentration of 2% Sevoflurane.

All the patients were given medication for control of pain and vomiting in post-operative period.

Just 10 min before surgery patient in group A were given Propofol 1 mg/I.V. and group B were given 0.3 µg/kg diluted in 10 ml NaCl 0.9%. After completion of the procedure Sevoflurane was replaced by 100% oxygen more than 5L/kg. When patient showed adequate recovery then transferred to post anaesthetic care unit (PACU).

Various parameters like heart rate, systolic BP, DBP, oxygen saturation duration of anaesthesia, duration of surgery, and time of emergence are recorded.

For evaluation of incidence of emergence agitation, the Watcha scale was used. [4]

1. Child sleeps
2. Child awake and quietly.
3. Cries but can be consoled
4. Cries but cannot be consoled.
5. Agitated and Hits around.

Score more than 3 considered EA (Emergence agitation). The severity of EA was evaluated by using paediatric anaesthesia emergence delirium scale (PAED). Devised by Sikich and lerman.[5] Incidence of emergence agitation and PAED score were noted every 5 min up to first 30 min.

Behaviour	Not at all	Just a little	Quite a bit	Very much	Extremely
Makes eye contact with caregiver	4	3	2	1	0
Actions are purposeful	4	3	2	1	0
A ware of surroundings	4	3	2	1	0
Restless	0	1	2	3	4
Inconsolable	0	1	2	3	4

Table 1. The Paediatric Anaesthesia Emergence Delirium (PAED) Scale Scoring

RESULTS

All the patients in two groups were comparable with respect to age, sex, weight and height. The difference in distribution of all these variables were not significant statistically P value≥0.05. With regard to duration of anaesthesia and duration of surgery all the patients in both the groups were comparable. In group A mean duration of anaesthesia was 52.3 min and group B it was 53.76 min, similarly the mean duration of surgery in group A was 30.26 min in group B it was 32.40 min which was not significant statistically P value >0.05.

Parameters	Group A (mean)	Group B (mean)	P value
Age (years)	4.30	4.63	0.47457
sex	12/8	13/7	
weight	18.94	18.53	0.777634
height	115.8 cm	118.90 cm	0.120985
Duration of anaesthesia (in mins.)	52.3	53.76	0.135908

Duration of surgery (in mins.)	30.26	32.40	≥0.05
Time of emergence	10.62	13.64	≤0.05
Duration of staying PACV	38.66	36.42	≥0.05
Nausea and vomiting	6	4	

Table 2. Demographic and Anaesthetic Data of the Patients

PAED score (mean)	Group A (n=30)	Group B (n=30)
T_o	12.46	6.96
T_5	9.26	4.26
T_{10}	4.32	2.14
T_{15}	2.24	1.20
T_{20}	0	0
T_{30}	0	0

Table 3. Comparison Between the Incidence of Emergence Agitation and PAED Score Between Two Groups

Incidence of Emergence Agitation (Number)	Group A (n-30)	Group B (n-30)
T_o	10	6
T_5	8	4
T_{10}	6	3
T_{15}	4	1
T_{20}	1	0
T_{30}	0	0

The duration of emergence was more in dexmedetomidine group then the propofol group, and was significant statistically. The mean duration of emergence in group B was 13.64 min and group A it was 10.62 min. Regarding duration of stay patient in the PACU was almost same for both the group there was no gross difference.

As per table -3 regarding incidence of emergence agitation and PAED score, we have found that number of patient with emergence agitation was more in propofol group than dexmedetomidine group at T_0, T_5, T_{10}, T_{15} and T_{20} but not at T30. Accordingly the PAED scare was high in group A that is propofol group then group B at T_0, T_5, T_{10} and T_{15} but at T_{20} and T_{30} it was same in both the group.

DISCUSSION

As we know that emergence delirium is self-limiting that develop during recovery form anaesthesia but exact aetiology is still unclear. It has been found in various studies that Sevoflurane is associated more frequently with the development of anaesthesia; cause may be its low solubility, rapid induction and recovery.[6] Various drugs have been used for the prevention of emergence agitation. In our study we have evaluated the comparative efficacy of propofol and dexmedetomidine on two groups of patients who were comparable to each other. We have found that duration of stay of patient in PACU is more in propofol group than dexmedetomidine group but not significant statistically. The time of emergence is more in dexmedetomidine and was statistically significant, which similar to the study of various authors.[7,8,9]

In present study, it has been found that incidence and severity of emergence agitation was reduced significantly in group B then in group A. Mean PEAD scare was significantly low in group B than group A, which is similar to the study of Monaz Ali et al, Sato M et al, Mountain and Smith Sume et al.[9,10,11]

The incidence of emergence of agitation was more in propofol group than dexmedetomidine group and is similar to the study of other authors.[7,13]

CONCLUSION

We have found in our study that dexmedetomidine is more effective than propofol in reducing the severity and incidence of emergence agitation. There is no significant difference in the duration of stay in patient in PACU, but time of emergence was also delayed in dexmedetomidine group.

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