Anaesthesia for Anal Dilatation using Propofol Versus Sevoflurane in Peadiatric Patients

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ABSTRUCT:

BACKGROUND:

Anal dilatation is streaching of the anal incision gently with special dilators as a part of follow up after posterior sagittal anorectoplasty (PSARP) and pull through operations in peadiatric patients . Sevoflurane has many of the features of an ideal volatile anaesthetic agent with rapid induction which make it particularly useful in children . Propofol is the most desirable intravenous agent in outpatient anaesthesia because of rapid induction and recovery.

OBJECTIVE:

Is to compare propofol with sevoflurane as a single anaesthetic agent for anal dilatation in peadiatric patients that produce more rapid turn over of cases.

Patients and methods: 50 peadiatric patients who had anal dilatation with Hegar dilators allocated into 2 groups according to the anaesthetic agent used sevoflurane (S) or propofol(P) . The variables measured are the induction time(T1) and the time needed to achieve good relaxation(T2).

RESULTS:

T1 was shorter in group P(mean 60 sec)than group S(mean 86 sec)p value0,000(highly significant),T2also shorter in group P(mean 99.5 sec)than group S(mean 121.3 sec)p value0.012(significant) so both variables measured were shorter in case of using propofol with statistical significancy.

CONCLUSION:

Propofol produces more rapid turn over of short cases than sevoflurane and with no risk of malignant hyperthermia.

KEY WORDS: anal dilatation, sevoflurane, propofol.

INTRODUCTION:

Anal dilatation: stretching the anal incision gently with anal dilators is required and will begin at first postoperative visit (operation of anorectal malformation) by surgeon and then need to continue the dilatation at home[1]

Anorectal malformations include: [2]

1-Rectal atrasia or stenosis.
2-Perineal fistula.
3-Bulber-urethral fistula.
4-Imperforated anus.
5-Bladder neck fistula.
6-Prostatic fistula.
7-cloaca ,common channel.
8-vaginal fistula.

The success of the anoplasty operation depends upon the construction of a relatively large anus which may need to be dilated daily for 2 months. Failure to carry out regular dilatation results in anal stenosis and acquired mega colon which is extremely refractory to treatment [3].

Sever strictures have occurred in cases when the dilatation program was not carried out as prescribed or when the blood supply of the distal rectum was insufficient .Anal strictures may be the consequence of lack of discipline in the following protocol of dilatation .When trying to prevent discomfort for the patient s some surgeons dilate the anus once a week frequently under anesthesia .Two weeks after the repair , anal dilatation are started .A dilator that fits sungly into the anus should be used . This procedure is done twice daily by the parents .Every week , the size of the dilator is increased until the rectum reaches the desired size which depend on the patient age[2].

Anal dilatation has had an established role in the management of idiopathic constipation (4).

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Sevoflorane : inhalational anesthetic agent Fluoromethyl 2,2,2-trifluro- ethyl ether(CFH2-O-CH(CF3)CF3) was first described in North America in 1971,was first given to human volunteers in 1981 ,and has been used in clinical practice since 1990[5]

It is non flammable and has a pleasant smell . The blood gas partition coefficient of sevoflorane is 0.69. The MAC value in adults is between 1.7- 2% in oxygen.The MAC is higher in children 2.6% in oxygen and in neonates 3.3% and it is reduced in the elderly 1.48%[6]

Clinical uses of sevoflorane in inhalational induction is rapid (1-2 minute), and this method is well tolerated in both children and adults. It is poorly soluble in blood ,pleasant smelling and fairly non irritant to the upper airways .It therefore has a useful place as an induction agent. Various techniques have been used with success , either rapidly increasing inspired concentration from 0.5 up to 4-8% or by immediately breathing a high concentration 8% . The incidence of coughing is acceptably low[5].

So sevoflorane is a newer inhalational anesthetic agent which offers many advantages over other volatile agents.These are:

1-smooth fast induction.

2-rapid recovery.

3- ease of use , requiring conventional vaporizers.

Its disadvantages are:

1- production of potentially toxic metabolites in the body.

2- instability with carbon dioxide absorbers.

3- relative expense.[6]

Propofol (Diprivan)

2,6-Diisopropyl phenol IV anaesthetic agent, first used in 1977 and introduced into clinical practice in 1986 [7]. It is an IV sedative-hypnotic agent used for induction and maintenance of anesthesia as well as sedative.It is highly lipophilic which enhances its ability to cross the blood –brain barrier[8]. The development which has done most to change practice has been the introduction of propofol in an acceptable formulation, in Britain it is now the most commonly used intravenous induction agent being associated with more clear –headed recovery and a lower incidence of laryngospasm , causes less nausea and vomiting[9]. The high lipid solubility of propofol results in an onset of action that is almost as rapid as that of thiopental (one- arm –to brain circulation time). Awakening from a single bolus dose is also rapid owing to a very short initial distribution half- life (2-8 minutes),This makes it good agent for outpatient anaesthesia[10].Induction dose is 2-2.5 mg/Kg produces loss of consciousness in less than 1 minute and last 4-6 minutes because is cleared rapidly by both redistribution to fatty tissues and rapid clearance via the liver to inactive metabolites that are eliminated by the kidneys. In recovery the patients tend to have less residual cloudiness and psychomotor impairment than with barbiturates[8].

PATIENTS AND METHODS:

This comparative study carried out on 50 peadiatric patients of different sexes and their ages range between 2 - 4 years who had undergone anal dilatation with Higar dilators only (excluding manual dilatation) under general aneasthesia(GA) as a day case . Those patients were divided randomly into 2 groups each with 25 patients according to the type of aneasthesia used :

Group P had GA with propofol 2 mg/Kg single dose givin intravenously (i.v).

Group S had GA with sevoflorane (inhalation) starting with 5 % until loss of consciousness then decreased to 2%.

All patients have no premedication .

All patients have lidocaine gell used locally (on the anus) for analgesia and to lubricate the dilators.

Variables assessed are :

T1 group P is the time from injection to loss of consciousness

T1 group S is the time from turing vaporizer to 5% to loss of consciousness

T2 group P is the time from injection to loss of thigh muscle tone

T2 group S is the time from turing vaporizer to 5% to loss of thigh muscle tone.The time in this study measured in seconds.

(There is no significant clinical changes in heart rate noticed in all patients).

Statistical analysis

The variables measured of the 2 groups were analyzed by using t-test . P value< 0.05 was considered as statistically significant

RESULTS:

The demographic features of the patients in this study showed no significant differences regarding the gender , age and wieght between the two groups as shown in table1 and figure 1.

Table 1: Difference in demographic characteristics of study groups.

	Group S	Group P	p	Sig.
Gender(F/M)	1 / 1.8	1/1.15		
Age (months) (Mean ±SD) Range	35.9±6.59 24-47	36.8±7.16 35-49	0.422	NS
Body weight (Kg) (Mean ±SD) Range	15.3±4.72 12-16	13.95±3.88 11-15	0.437	NS

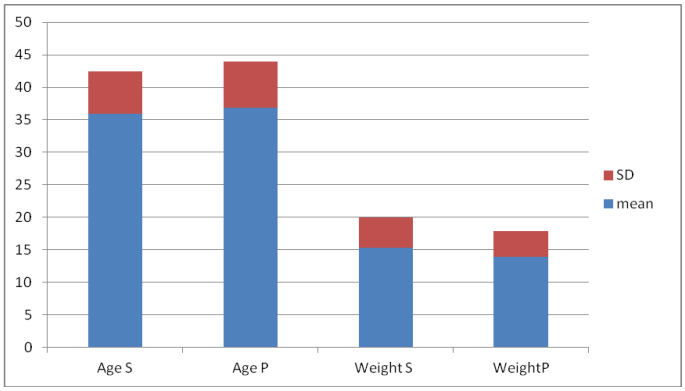

Figure 1: Difference in age and weight of study groups

The variables measured results are:
T1 which represent the time from beginning of induction of anesthesia to loss of consciousness of the patient was shorter in group P than T1 in group S and the difference is highly significant statistically as shown in table 2.

T2 which represent the time from beginning of induction of anesthesia to loss of thigh muscles tone(which mean good relaxation were achieved and anal dilatation can be done easily) was shorter in group P than T2 in group S and the difference is significant statistically as shown in table 3.

Table 2: Difference in T1 of study groups.

T1	N	Mean	Std. Deviation	Significancy		
				t-test	df	p-value
Propofol	25	60.0000	7.07107	-6.272-	38	0.000**
Sevoflurane	25	86.0000	17.13722			

** HS

Table 3 : Difference in T2of study groups.

T2	N	Mean	Std. Deviation	Significancy		
				t-test	df	p-value
Propofo l	25	99.5000	15.12231	-2.654-	38	.012*
Sevoflurane	25	121.3500	33.56263			

*S

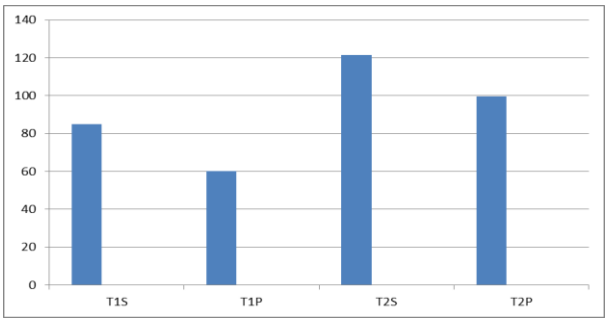

Figure 2: Difference in T1 and T2 of study groups

DISCUSSION:

Anal dilatation in peadiatric patients either manual (done with fingers), this dilatation have a role in the management of many conditions like chronic anal fissures [11] and long standing chronic constipation in childhood as 53% of cases showed evidence of hypertrophy of the internal sphincter on anorectal manometry and had a vigorous anal dilatation (to accept 4 fingers) under G/A[12] or dilatation done by special smooth peadiatric instrument (Hegar dilators) as part of postoperative follow up and management of mainly 2 types of operations : posterior sagittal anorectoplasty (PSARP)(a technique for the repair of high anorectal malformations) 2 weeks after the operation the suture is removed and the anus is calibrated with increasing sizes of Hegar dilators until pass the one that fits snuggly in the anus and then every week the size of the dilator must be changed to the next size larger[13] and pull through operations for Hirschsprungs disease[2].

In this study we deal only with anal dilatation done by Hegar dilators because firstly it is more frequent (done at least 1-2 times under G/A to every patient had PSARP or pull through operations so the list of peadiatric surgery operations contain one or more anal dilatation daily),secondly it is very short procedure and not painful (as the smooth Hegar dilators always lubricated with local anaesthetic gell) and G/A usually needed because children cannot be cooperative patients .

Anal dilatation as a day surgery by the definition of day surgery in the UK and Ireland is the patient must be admitted and discharged on the same day with the day surgery as the intended management , and each anaesthetist should develop techniques that permits the patient to undergo the surgical procedure with minimum stress and maximum comfort and optimize his/ her chance of early discharge[14], sevoflurane is generally considered to be the agent of choice for day-case anaesthesia with spontaneuos respiration for short cases [15] although sevoflurane may be associated with a high incidence of emergence agitation in preschool children [16] and wiser to avoided in patients susceptible to malignant hyperthermia [9]. Propofol is the principal intravenous induction agent for day- case anesthesia[16].

Comparing these tow agents in this study using anesthesia with single agent showed that the induction time with propofol is shorter with high significancy and the time needed to make the patient ready for the procedure (good relaxation achieved) is significantly shorter with propofol.

The result of this study agree with results of previous study show that propofol is an alternative anesthetic for short procedures and provides a smoother recovery with greater patients satisfaction than sevoflorane if it is used for maintenance of anesthesia in adult patients

CONCLUSION:

Propofol for anal dilatation in peadiatric patients facilitate more rapid turn over of cases than sevoflurane that decrease the interference with the operation list and have no risk of malignant hyperthermia.

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