

## **A new induction mask for infants and small children OR Columbus's egg in a new shape**

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### **Introduction**

Anesthetizing a frightened, screaming child is in many cases a difficult task. Children are afraid of the unknown environment and are unprepared to encounter foreign and strange people, dressed in unusual cloths, who try to separate him/her from his/her own parents. At the same time parents of a screaming child might be as stressed as, if not more, than their own child. A parent is unprepared, too, to face the odd environment of the operating room and rather than helping the little patient, the mother or the father could make the situation even worse. Small children fear the separation from parents, older ones are afraid of not waking up after anesthesia. Many children become agitated, increase their muscle tone and struggle to escape from anesthesia and nursing personnel. The phenomenon of pre-operative anxiety is very frequent and represents a serious problem for the pediatric anesthesiologist and the operating room (OR) team. The stress produced by struggling with the patient in the operating room, and forcing him to accept one or another method of anesthesia induction could lead to a post-traumatic stress syndrome (PTSS), sometime very difficult to treat. Some 60 % of the small children may develop in the postoperative period symptoms which witness negative behavioral changes, very similar to those of PTSS: nightmares, development regression, fear from further medical procedures, etc.

A large series of proposals to deal with this serious situation proved to be, at best, partially successful such as use of sedatives, parent presence in the OR, pre-anesthesia hospital tours, offering narcotic lollipops to the child just before surgery, etc. Neither of them solves the problem and some of them could be accompanied by untoward side effects. For instance, bringing the patient with one of the parents to the operating room might produce an effect completely different from the desired one. Parents do not know how to behave in the operating room and their own anxiety could aggravate the child psychological condition. Premedicating the patient, either orally or intra-muscular or intra-rectal, each has its own drawbacks and does not solve the problem in the majority of cases. Pre-operative narcotics could produce chest rigidity and delay emergence from anesthesia.

### **A new approach**

Previous experience accumulated on children who needed ion therapy for respiratory conditions showed that the incorporation of a pacifier into an inhalatory mask creates a device which is easier accepted by the little patient, who sees it as part of his daily equipment. One cannot forget that the modern trend is to offer each child a pacifier for replacing the bad habit of finger sucking. This means that for a vast majority of small children a pacifier is not a foreign, but rather a familiar object.

The proposed inhalatory mask is very light, it is brought in various colors and can be easily used by the child in connection with a pacifier. Actually it becomes a toy to play with during the day and to go to sleep with at night. The main idea of using this combination is to give the child the chance to get accustomed to the device few days before the planned anesthesia and surgery. The child is supposed to gradually consider this device as something to which he/she is already accustomed. He is to be encouraged to breath through the mask and have in the same time the pacifier in the mouth. Thus, connecting the mask to an anesthesia circuit, not necessarily in the operating room but also (or mainly) in the pre-anesthetic room, while the child is kept in the hands of one of the parents and still having the mask on his/her face, proves to be an easy and efficient way to induce inhalatory anesthesia.

Using a very powerful inhalatory drug, such as sevoflurane, which is also lacks pungency, could produce a satisfactory anesthesia induction in less than one minute.

The above method could also be tried when the patient is planned for emergent or semi-emergent surgery. Even a short time, an hour or two, of getting accustomed with the device could significantly alleviate the child stress and prevent the need for using force in order to anesthetize him.

### **The results of a pilot study**

During three consecutive months we conducted a pilot trial in two Romanian clinical hospitals, in which 111 children have been anesthetized for various surgical procedures and for whom induction to anesthesia was performed by using the special mask to which the child's pacifier was attached.

All of them received the mask, some of them a few hours but most of them at least 48 h before anesthesia, and they used the pacifier together with the mask during the period preceding surgery. Parents and the anesthesiologist in charge with the patient filled up a five-part questionnaire which included questions pertinent to the preoperative period as well as to the induction process.

Five patients refused to use the pacifier adapted to the mask.

All the remaining 106 children were admitted to the hospital in the morning of surgery while they used the pacifier attached to the induction mask. The anesthesia circuit was connected to the induction port of the mask and sevoflurane was used in all cases for induction.

The average time for induction was 33 s.

#### **The parents opinion about the use of the mask for induction.**

80 % reported that it was very easy to put the child to sleep in his/ her bed with the pacifier connected to the mask and that the child accepted the mask without any difficulty. They considered, in 95 % of cases, that the use of the special mask reduced the child's anxiety.

90 % considered the mask use very important or important for the

induction process and 80 % found the induction of anesthesia by using the mask a very simple procedure.

The anesthesiologists' opinion about the use of the mask for induction

In 90 % of cases they defined the mask as very easy or easy to use. In the same percentage they thought that the use of the mask had a positive influence on the induction procedure, by preventing the child's agitation.

Finally, 85 % of them considered the use of the special mask for induction as important or very important for preventing child struggle against the procedure.

#### **Conclusions**

It becomes obvious that this special mask abolishes the use of the so-called "gorilla technique" of anesthesia induction, during which three or four adults force the child to lay still down and accept the anesthetic mask.

The proposed device is friendly, easy to use and presents a solid solution for preventing the pre- and post-operative stress in pediatric anesthesia and surgery.

In our pilot study both parents and anesthesiologists' opinion about the mask was that this device has a definite place in the anesthesia equipment for small children, those who still use the pacifier on an everyday basis.

A further study would look for the impact of the EASYHALE mask use on the percentage of symptoms related to negative post-operative behavior, described in the literature for small children.