

## PREANESTHETIC MEDICATION FOR CHILDREN

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*New York, N. Y.*

Received for publication July 12, 1949

THE establishment of effective principles for preanesthetic medication in children has been fraught with a wide variety of difficulties. The purposes of such medication have been submerged frequently in the routines of a busy hospital practice or based upon impressions drawn from experience with adults. Much that is practiced seems to be derived from a concept which assumes that a child is simply a small adult who has identical needs and responses to anesthesia and surgery. Among the reasons for the incomplete understanding of preanesthetic medication in children has been the paucity of adequate objective studies and controlled clinical observations in this important sphere of anesthesiology.

Although there is dispute concerning the proper role of hypnotics and opiates, it is generally agreed that preanesthetic medication with members of the belladonna group of drugs is useful and necessary to achieve reduction of secretion in the tracheobronchial tree and to prevent or minimize the development of undesirable reflex responses to surgical stimulation. Scopolamine has been advocated as the drug of choice by Leigh and Belton (1) as it possesses a higher order of efficacy in prophylaxis against the development of secretions than does atropine. Smith (2) prefers atropine on the basis of an extensive clinical experience.

Because of the lack of definitive clinical or scientific data, the present study was undertaken to gain information useful in evaluating the relative utility of scopolamine and atropine in identical dosage in children.

Conditions were standardized as far as possible. The only surgical procedure studied was the combined operation of tonsillectomy and adenoidectomy. The anesthetic agent, in all instances was ether preceded by vinethene induction. Open drop technic was employed for all patients until operation was begun at which time air insufflation of ether without an endotracheal airway was instituted. All patients were in excellent health at the time of operation and had been maintained on a standard institutional diet, common to orphanages in New York City before admission to Bellevue Hospital. The doses of both

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drugs were larger than is generally recommended and were arbitrarily set at 0.0002 Gm. for patients from 2 to 5 years, 0.0003 Gm. from 6 to 10 years, and 0.0004 Gm. from 11 to 14 years. No other premedicant was employed. Anesthesia was administered by physicians in resident training who were supervised by others with experience. Operation was completed by personnel in the early stages of surgical training. Bias in evaluation was minimized by "blind" testing in that neither the surgeons nor the anesthesiologist knew which drug had been administered.

Evaluation of the drug was directed primarily to the effect upon secretions. The drying effect was considered good if there was no mucus during anesthesia, fair if some mucus was elaborated, but did not impede the course of surgery or anesthesia, and poor if the quantity of mucus was sufficient to interfere with the maintenance of an adequate airway or the smooth conduct of anesthesia. Other effects of the drug were also noted but played a minor part in the decision as to therapeutic efficacy. The only variable which could not be controlled because of the peculiar needs of the clinic was the time of injection of the belladonna drugs prior to the induction of anesthesia.

TABLE 1  
COMPARISON OF THE DRYING EFFECT OF SCOPOLAMINE AND ATROPINE

	Scopolamine 153			Atropine 69	
	Cases	Per Cent		Cases	Per Cent
Good	112	73.2	Good	34	49.3
Fair	27	17.6	Fair	21	30.4
Poor	14	9.2	Poor	14	20.3

Two hundred and twenty-two consecutive pediatric patients form the basis of this report; all were anesthetized in a ten-week period in the spring season. One hundred and fifty-three of these patients received scopolamine and sixty-nine were given atropine. Table 1 summarizes the entire group with regard to clinical efficacy in inhibiting secretions from the respiratory tract during anesthesia. The greater benefits conferred by scopolamine are readily evident.

The relationship of the timing of the subcutaneous injection of the drugs prior to the induction of anesthesia is of considerable importance. Figure 1 illustrates this relationship. In this series of patients, maximum benefit with either atropine or scopolamine was observed when the drug was administered thirty-one to sixty minutes prior to induction of anesthesia. The greater efficiency of scopolamine is confirmed under these circumstances as well.

Although the sedative action of a drug is difficult to evaluate, especially in children, it was apparent that such an effect was common

after scopolamine and rare with atropine. Sedation is a decidedly useful property of scopolamine and lends further strength to the thesis of its observed superiority to atropine in other respects.

Opportunity was presented to study identical twin girls 10 years of age. One child was given 0.0003 Gm. of scopolamine forty minutes before induction of anesthesia. She became drowsy in twenty minutes and was subsequently anesthetized without the production of secretions. Her twin sister was given 0.0003 Gm. of atropine fifty-five minutes before induction. She remained alert, unlike the first child, and her tracheobronchial secretions were troublesome during anesthesia. If

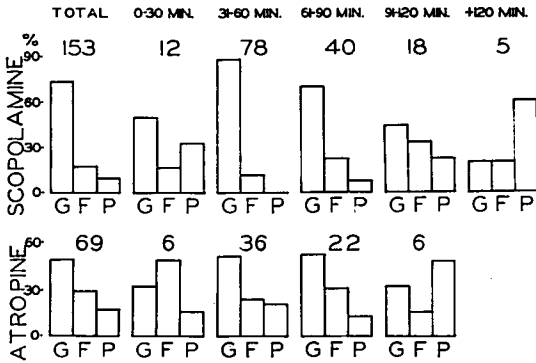


FIG. 1. The relative efficacy of scopolamine and atropine is illustrated as a function of the time of subcutaneous injection prior to the induction of anesthesia. The period thirty-one to sixty minutes is most desirable for both drugs, with scopolamine producing significantly more efficient drying of secretions. G is good; F is fair; and P is poor.

one can assume that identical twins are good comparative subjects for this type of clinical experiment, the difference in action between scopolamine and atropine is certainly striking.

#### SUMMARY

A study designed to evaluate the relative merits of scopolamine and atropine as premedicants in 222 children is presented. The method of study included the standardization of the possible variables. Drug dosage was set according to age; the operative procedure was tonsillectomy and adenoidectomy in all instances and the anesthetic agents were vinethene-ether administered by the same technic. The surgical team and anesthesiologist were not informed which drug had been given. It is concluded that:

1. Scopolamine is superior to atropine in its effect upon secretions in children under the conditions of this study.

2. Scopolamine affords psychic sedation frequently, whereas atropine does not.

3. Optimal effects are noted if the drugs are injected subcutaneously thirty-one to sixty minutes prior to induction of anesthesia.

4. Larger doses of belladonna drugs than are usually recommended for children are safe.

#### REFERENCES

1. Leigh, M.D., and Belton, M. K.: Premedication in Infants and Children, *Anesthesiology* 7: 611-615 (Nov.) 1946.
2. Smith, R. M.: Personal Communication.

#### ANNOUNCEMENT OF COURSES FOR HOUSTON MEETING

The Committee on Medical Schools and Postgraduate Education announces the inauguration of an instruction program on November 7th, 1950, during the Annual Meeting of the American Society of Anesthesiologists, Inc., at Houston, Texas. This program is patterned essentially after that of the Academy of Ophthalmology and Otolaryngology which has developed and used it with very gratifying results for the past 18 years.

Briefly, it consists of a series of one-hour lectures presented by selected and well-known instructors who will emphasize the academic and clinical aspects of their particular subject. The attendance of each lecture will be limited to approximately 25. Advance registration for these lectures will be available for members of the A.S.A. only, through the Headquarters Office in Chicago, for which tickets will be sold at \$1.50 per lecture. Unsold tickets for any one lecture will be available to other members and physicians beginning October 7th. No exchange of tickets will be permitted two weeks before the lectures are scheduled. These lectures will be illustrated by slides or blackboard diagrams and summarized by lecture outlines. A complete set of outlines covering all lectures will be made available through our Headquarters Office in Chicago at a nominal price. More details concerning this teaching program will be given later. A list of the lectures and lecturers is as follows:

#### LECTURERS AND SUBJECTS OFFERED

Adams, Charles—"Clinical Aspects of Intrav. Pentothal Anesthesia"

Adriani—"Saddle Block Anesthesia"

Alexander—"Pain and Block Therapy"

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