ESSAY ON PAEDIATRIC PRE-ANAESTHETIC MEDICATION

BY

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SUMMARY

Each anaesthetist is different and desires different results from his premedicating drugs. No patient, physician, hospital environment, or drug is perfect. The four—two human, one physical and one chemical—must be blended together with art and sympathy for salubrious results. An attempt must be made to evaluate results obtained in an objective manner.

"Now, what I want is Facts. Teach these boys and girls nothing but Facts. Facts alone are wanted in life. Plant nothing else, and root out everything else. You can only form the minds of reasoning animals upon Facts: nothing else will ever be of any service to them. This is the principle on which I bring up my own children, and this is the principle on which I bring up these children. Stick to Facts, sir!"

Charles Dickens, *Hard Times*

If the number of scientific papers being published about pre-anaesthetic medication can be used as an index, we may proudly proclaim to the shade of Thomas Gradgrind and to the world in general that we anaesthesiologists know "facts" about pre-anaesthetic medication. Unfortunately, not all of the "facts" seem to correlate. A review of the literature would possibly indicate that there are either many right answers or no right answers. Perhaps it is both; perhaps all of the answers or "facts" presented in the literature are correct, but they are not always correct in all places and at all times. The only "facts" regarding pre-anaesthetic medication that are the same throughout the world are that there is a person who administers the anaesthetic agents; there is a patient; the anaesthetic state is induced in some location; and drugs are sometimes given to the patient prior to induction of the anaesthetic state. The essay will be composed of a brief discussion of these four "facts" or factors (plus a few digressions).

THE PHYSICIAN

We tend to be egocentric and feel other humans measure the world by the same yardstick we use.

Based on lectures given at the Royal Berkshire Hospital, Reading, July 1, 1963, and the Royal Infirmary, Bristol, July 3, 1963.

The tribal Zulu is different from the European physician who treats him (Findlay, 1960), and the American child is different from his adult physician. Our vision is clouded by what we want to see—we think the other physician, or the patient, wants to see (or experience) the same things we do. This is not the case.

When civil riots occur out in the wide world, we know there is a failure of understanding and communication between groups. When a colleague comments about his work, "Mighty smooth induction, wasn't it?", and you nod your head "Yes" but think "He's all thumbs, and rough as a corn cob", the failure of communication is more subtle.

In pre-anaesthetic medication each physician may want to see a different result, and any two physicians looking at the same result may therefore form different subjective impressions. To confuse further the evaluation of results the patient may have different desires and may not be able to communicate his feelings. It is not difficult to find examples that will support this argument. That different physicians want different effects from pre-anaesthetic medication can be easily demonstrated by the number of scoring scales that have been devised. Very interesting and amusing results have been obtained when different scoring systems have been used on the same data. By using different scoring scales on the same raw data, it is possible in some instances to declare the patient medicated both "satisfactorily" and "unsatisfactorily". A. G. Dougherty's article (1959) is a classic exposition of this dictum. This state of our science would make a worthy theme for a Gilbert Maize.
and Sullivan opera. Even if everybody used the same scoring scale, it does not follow that evaluations will be the same (fig. 1). Using an evaluation scale previously developed in our hospital, my results indicated that the children I had medicated must have been better adjusted than the children observed in a previous study. In the scoring scale used, points were allowed for the child’s upset behaviour prior to medication, as well as passive behaviour prior to induction of the anaesthetic state. Even if the agents I was studying had been perfect, which they were not, the performance scores I would have obtained would have been low in comparison to those of the previous study. The patients in my study did not receive as many points for prior upset condition. Both studies were in the same hospital with the same type of patients, but different people were looking at the children.

In another study, the children all suffered from the same disease, received the same medication (on a weight basis) and experienced the same type of general anaesthesia and the same operation. In this study, the results of pre-anaesthetic medication were very closely correlated with the person who administered the anaesthetic. The greater the ability of the anaesthesiologist to communicate with the child, the greater the degree of satisfaction with the medication.

It is pleasant to quote Lord Kelvin: “I often say that when you can measure what you are speaking about, and express it in numbers, you know something about it; but when you cannot measure it, when you cannot express it in numbers, your knowledge is of a meagre and unsatisfactory kind; it may be the beginning of knowledge, but you have scarcely, in your thoughts, advanced to the stage of Science whatever matter may be.” With Kelvin on our tongue we can smile and pontificate about our clinical research data, the chi squares, standard deviations and probabilities. This is fine, but upon what is our data based? The American Society of Anesthesiologists had a “physical risk” scale that was rather simple, but checking anaesthesia records in different hospitals showed variation in risk scaling for a given disease from hospital to hospital, and from person to person within a hospital. Of course, the same type of patient can be a different risk depending upon
who administers his anaesthetic! In some instances, the differences in scaling were due to ignorance, or misunderstanding of the system, and not due to a difference in “outlook” or evaluation by an observer. This is another example of evaluation based on more egocentric than “purely” scientific scaling. This example is presented here as an introduction to the problem that I will term the “compounding” error. By this I mean the gathering together of data from multiple sources and giving them all equal weight; then treating this body of data as though it were “facts” and from these “facts” deriving more “facts”, often by sound statistical methods misused on these uncertain facts. In some large series, differences in outlook and true errors probably cancel each other and a fairly good mean is found. Volume studies show trends and have great value, but the tendency to give data from such studies non-Delphic precise qualities just because the number of cases is large (or because of the prestigious name of the reporting institution) may be dangerous. As an example, not too many years ago an article was published in a surgical journal based on an extremely large volume of anaesthetics. The article, using data from the large volume of cases, rather “knocked” a muscle relaxant. The data presented also seemed to indicate that spinal anaesthesia was very safe, but the authors did not appear to be as interested in this part of their data. The philosophy of being “for” one thing rather than “against” another is more attractive to me but this again shows a difference in outlook. The data in the study cited also could have been used to show that the supervision of residents, and the clinical ability of the people supervising, was not up to the mark. It would thus appear that in this study the same data could be used to indicate either that an inanimate pharmacological agent was at fault, or that a system and people were at fault. It is not pleasant to shatter your own ego; it is easier to have an inanimate pharmaceutical as a scapegoat.

It is interesting to consider the response of the profession to reports of hepatic damage following use of a new anaesthetic agent (though the drug is not used for pre-anaesthetic medication it makes an interesting example for this discussion). Internists wrote one of the reports and this seemed rather like having family “dirty wash” aired by the neighbours. It is better to know about, and take care of your own “dirty wash”. The reports were followed by a response in some areas that could be called an “ostrich reaction”—don’t look at it and it will go away. One wonders if the clinical evaluation of premedicant drugs is not infrequently similar—“we do it this way all the time, so it can’t be all that bad”. It isn’t “all that bad”, but as physicians we should be alert to protect the unusual patient. In defence of the anaesthetic agent in question, the argument was advanced that such-and-such a number of anaesthetics had been performed using it (based on the number of bottles distributed). Following this supposed number of administrations, only a few cases of hepatitis or hepatic necrosis had occurred. This was specious reasoning; death to the patient means the same to him and to his family if it is reported or unreported in the scientific literature. A parallel in the field of pre-anaesthetic medication is the anaesthetist who does not observe his patients before and after the anaesthetic. Time of onset of the agent and duration of action of the agent will not be learned unless we observe patients. If we watched, we might be startled to see how well children do act, and how labile a factor our pre-anaesthetic medication is in terms of psychic well-being. A skilled anaesthetist can overcome an unsuccessful premedication almost as surely as poor handling can ruin good premedication. To return to the hepatotoxic inhalation agent, little has been written about the preservative used with it. As the anaesthetic agent is vaporized, the preservative is left behind; more fluid is added, leading to more preservative, and so on. A slight parallel exists in pre-anaesthetic medication; this is the carrier fluid in oral agents. Alcoholic carrier solutions will cause an increased incidence of postoperative vomiting in a group of patients as compared with a control group receiving their medication in a non-alcoholic menstruum.

THE PATIENT

The patient is an individual, as is the doctor. The normal paediatric patient progresses through several phases. As an infant he is not truly human in character and attempts at “psychic sedation” are open to questioning; there is no psyche! From this earliest level the patient moves through stages of awareness, but does not yet possess the ability to communicate. Remember, the child may cry.
because he misses his mother, or he hurts, or because he doesn’t have his special blanket. The child may be unable readily to communicate this information—to nurse or physician. A little time spent comforting the child may alter the results of medication, or the need for medication! It is always interesting to find that dry napkins will stop crying in many infants faster than morphine.

The mentally retarded child, the emotionally upset child, and in some cases the deaf and dumb child, will also be unable to communicate. Even though the mentally retarded child cannot communicate, do not believe he is devoid of perception; the retarded child often has great empathy for adults. They also generally have an enduring memory for unpleasant experiences.

As the child develops, his sense of time develops. Until the child has feeling in “depth” he does not require bedtime sleep medication the night before surgery. What will happen to the child tomorrow is too far away to cause worry. As the child becomes older and can communicate, the value of the pre-operative visit for psychic conditioning becomes more important. The doctor can talk with the child; some attempt can be made to explain why he is in hospital. The explanation is given only if the child would like to know; many children prefer to play rather than use the time talking to an adult.

The child may have a primitive sense of the cause of illness. He may feel he was guilty of some misdemeanour or sin and hospitalization is part of his punishment. The pre-operative visit can be used for reassurance, but if the child is not curious about his illness, there is no need to discuss it.

As a side point, the child who screams over and over for “mother” and cannot be reached in attempts at communication probably has been poorly prepared by “mother”. The child whose parents have lied to him (“You’re going to a picnic”) would be an interesting subject for follow-up study. One wonders about the adequacy of the parents and what stage of maturity the child will reach as he becomes an adult.

The child will reflect his cultural and ethnic background. If mummy expects “junior” to cry when the doctor or nurse takes him to the operating theatre, “junior” will cry. Sometimes, after you and “junior” have gone down the corridor and around the corner, you can point out to “junior” that mummy can no longer see him. When aware of the lack of his audience, “junior” often stops crying.

**SURROUNDINGS**

No drugs have been mentioned, only the anaesthetist and the patient. Both anaesthetist and patient are products of their environments and reflect their backgrounds. Their interplay when they meet for the induction of anaesthesia is crucial. Where will they meet—in a quiet induction room, or under the lights of the operating theatre where nurses run about setting up the instruments for the case while the patient has the anaesthetic state induced? Is the pre-anaesthetic reception or waiting area pleasant, or does the “recovery room” also double as the reception room? Can the new patient see, or hear, the bandaged postoperative patients? Environment or stimulation can change a drug’s “score”. A patient can be graded to be in plane 2 of stage III anaesthesia, but extended exploration of the abdomen and over the dome of the liver can suddenly change this grade to stage I or stage II analgesia. The blood level of the anaesthetic agent has not changed, but the “anaesthetic level” has.

A child can be well “sedated” with a calm psyche—excellent grades on a scoring system. Passage through a door then brings the child into the recovery room in its double role as reception station for the operating rooms. The patient’s eyes grow rounder, the pulse may quicken, little balls of water appear at the corners of the eyes. If the patient does not cry, it does not mean he is not worried. He may be spending all of his emotional energy holding back the tears. Of course, in some children such exposure may have no emotional significance. This is possibly due to the previously mentioned lack of development of a time sense or of feeling in depth.

Of these three factors, patient, surroundings, and physician, the surroundings are probably most easily changed and attempts should be made to have physical facilities suit the psychic well-being of the patient.

**DRUGS**

*New attempts at drug evaluation.*

In an attempt to bypass human errors and weakness, a machine has been designed to evaluate the
results of premedication by the measurement of the amplitude of the sympatho-galvanic reflex. It is a noble idea, but the sympatho-galvanic reflex depends upon a complex sequence of perception of stimuli; integration of the afferent impulses and the response of a sympathetic nervous system effector circuit leading to a cholinergic end body. This means that block at any point along the complex circuit would interrupt response. An anticholinergic drug will flatten the sympatho-galvanic reflex without providing “psychic sedation”.

Psychic sedation.

What is “psychic sedation”? I don’t know. The best I can do is offer the patient physiological sedation and hope there is a pharmacological frontal lobotomy. The physically sedated child may be just as frightened as the unsedated child; he may be too sleepy to show it.

If this is the case, why order pre-anaesthetic medications for children? The well-adjusted child handled by a skilled, compassionate anaesthetist in pleasant surroundings probably needs no medication. The child who has night terrors following his hospital experiences is probably like the soldier with battle fatigue (or Joseph Conrad’s “Lord Jim”)—there was probably a shaky emotional foundation that cracked under a strain that would be handled by an adequate person. Unfortunately, it is not always possible to correctly guess a child’s emotional stability. We have all been fooled by the young patient who is a brick when we expected a bawl, and vice versa. The pre-anaesthetic medication is prescribed as a crutch to help the patient ease through what may be a challenging period.

The narcotic addict takes morphine to escape from the realities of life; the postoperative patient takes morphine to escape from the realities of surgical pain; the alcoholic takes drink to black out his surroundings; the soldier takes a “snort” before the charge to dim the realities of his dangers. Pre-anaesthetic (or pre-operative) medication can probably be ordered with similar scaling—if the patient is emotionally upset and must escape his surroundings, rectal basal hypnosis (as with methohexitone)* may be used to turn off the lights of reality. If the anaesthetist is clumsy with children, rectal basal hypnosis is indicated to spare the child from the physician’s boorish technique. Other patient indications for complete chemical removal from environment are: multiple anaesthetics (burns, deformities, etc.); inability to communicate, as in the mentally retarded child; some cases of hyperkinetic or “disturbed” children (these are perhaps the most difficult patients, both to evaluate as to need of basal medication, and to prescribe the correct dose to induce sleep); the children of overprotective parents; and the children of some physicians (for some reason the children of psychiatrists often tend to fall into this group).

For the average child some pre-anaesthetic medication probably helps with a type of “Dutch courage”. The drugs used are probably not too important. It is important that they be given at the proper time in an adequate dose. If narcotics are used, the incidence of postoperative vomiting will be increased. Oral medications avoid the trauma of a needle, and the administration of the drugs is less expensive although more demanding of the nurse’s sympathy and skill. The carrier solution for oral medications must be alcohol-free (as previously noted) or the incidence of postoperative vomiting will be increased. Mixtures of chloral hydrate and hyoscine have a wide margin of safety, are inexpensive, and are rapidly eliminated by the body. I do not know if they produce “psychic sedation”, but I find they work about as well as other medications and with less hang-over. The waking-up period is part of the anaesthetic experience and should not be ignored by the anaesthetist.

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REFERENCES


*Rectal methohexitone; 10 mg/lb (22 mg/kg).
La médication préd-anesthésique en pédiatrie

SOMMAIRE

Chaque anesthésiste diffère de ses confrères, chacun désire des résultats différents de ses médicaments de préd-anesthésie. Aucun patient, aucun médecin, aucun milieu hospitalier, aucun médicament — n'est parfait.

Les quatre facteurs, dont deux humains, un physique et un chimique devront être combinés avec art et sympathie pour obtenir des résultats bénéfiques. On devra tenter d'évaluer de façon objective les résultats obtenus.

BOOK REVIEW


This is a splendid book! Into its 140 pages the authors have packed as much information as there was food on a Mrs. Beaton picnic (early editions). Coming from such a centre as the Respiration Unit at the Churchill Hospital, Oxford, one would, of course, expect a monograph of high standard. But, though a monograph, it contains as much of value as most full-size textbooks.

The book is divided into three sections. First, a general review of the treatment of respiratory failure from a practical aspect. Respirator control, the indications for, and performance of, a tracheostomy, and, later, the care of the tracheostomy; the care of the lungs (with excellent paragraphs on physiotherapy) and care of the limbs in a paralyzed patient. There is a most intriguing technique described for the protection of the eyes with a fibrine film. Electrolyte balance, bladder care, ventilation monitoring and weaning from artificial respiration are dealt with briefly but clearly; and there is a very pertinent section on record keeping.

Then follow 50 pages on the physiology of respiration and circulation in both normal persons and in patients suffering from respiratory insufficiency; and so on to the physiology of artificial respiration. The final section deals with the problems peculiar to different diseases treated by artificial respiration; poliomyelitis, acute polynéuritis, tetanus, chest injuries, myasthenia gravis, barbiturate poisoning, and so on. The information in this section is clearly and precisely given and should prove of enormous value to those suddenly confronted with problems of this sort and who are not entirely familiar with the unexpected pitfalls. The final chapter on apparatus and transport is also valuable.

The book is well written and very readable though the way in through the first few pages is slightly abrupt; and some of the figures are not completely clear. Printing and production are good throughout.

This book is strongly recommended to anaesthetists, physicians and neurologists of all grades, and all others who may be called upon to treat patients in acute respiratory failure.

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