

# Introduction to Anesthesia

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**THE PRINCIPLES OF SAFE PRACTICE**

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## *THE PRINCIPLES OF SAFE PRACTICE*

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## DEDICATION

To a surgeon who recognized the need for the development of anesthesiology, and contributed to its growth with vigor and enthusiasm — *Dr. I. S. Ravdin*

## PREFACE

THIS BOOK is a descendant of a smaller work privately printed in 1949 and circulated in the Department of Anesthesiology of the Hospital of the University of Pennsylvania. It was called "Organization and Procedures." A second and larger edition appeared in 1953. The third lineal descendant is now being made available to others.

Much of the teaching of anesthesia is by word of mouth. Beginners seek to learn countless details that cannot be found in general texts. This is the lore of anesthesia that must be passed on from individual to individual. A good bit of the material gathered in this volume might be classified as being in this rather shadowy area, including such topics as the philosophy of records, surgeon-anesthetist relations, the value of death reports, hazards of the immediate postoperative period, the treatment of immediate postoperative pain and excitement, and the determination of the depth of general anesthesia.

The subjects and the manner of their presentation represent the thinking and ultimate distillation into teaching practice of the senior staff at Pennsylvania augmented and refined by all who came within teaching range. One who contributed much to the early editions and whose influence may be discerned in the present volume is Austin Lamont. We mention him with respect and give thanks to others who will find bits of their practice and philosophy in print.

Chapters dealing with fundamental aspects of certain techniques and with basic considerations of the drugs used in anesthesia have been included in the hope that such material can contribute to the safer practice of anesthesia. These are guides; they contain what we believe to be established precepts, but they are not provided in detail nor can they be regarded as complete.

We have intentionally omitted discussion of most of the specialized aspects of anesthesia such as hypothermia, deliberate hypotension,

hypnosis, the technical considerations of regional anesthesia and problems of the treatment of pain. These comprise advanced study in the field. We believe that the student for whom this book is intended should not be confronted by them until later in his training.

We trust that this book will be instructive for all students of anesthesia and those in other fields who would learn a little something of this specialty. We hope that it may be a useful introductory volume of interest before one proceeds to wider reading. Although we have listed only a few references as guides for further study, it has not been our intention to slight individuals who have made important contributions. Doubtless omissions and reasons for disagreement will be found.

Dr. Henry L. Price, Dr. Ronald Woolmer and others of our associates have contributed valuable suggestions. Miss Sally Van de Water has performed yeoman service as our secretarial assistant. We acknowledge these various contributions with gratitude.

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# I

## The Preanesthetic Period

## Preanesthetic Rounds

EVERY person who is to be given an anesthetic should be seen by his anesthetist the day before operation. When this is not possible a member of the anesthetic staff should act as a substitute and transmit his findings to the person who will give the anesthetic. Preparation for anesthesia begins at the time of this preanesthetic visit. There is no substitute for talking to a patient, listening to his problems, observing his characteristics and acquainting him with the procedure planned. Indeed, if these goals are accomplished the amount of preanesthetic medication needed to allay apprehension may be reduced. The visit is a subtle educational process for both anesthetist and patient. The patient learns what an anesthetist has to offer him, and if false concepts about anesthesia exist they can be altered. Preanesthetic rounds have much to offer in the teaching of beginners.

### PROCEDURES IN PREANESTHETIC ROUNDS

The following suggestions are to be considered in making rounds. One should review the patient's past and present hospital records, focusing attention particularly on prior anesthetic experiences, physical abnormalities, personal habits, and on the physiologic alterations produced by disease. A summary of the important preoperative findings, including laboratory examinations, should be written on the anesthetic chart. Ability to tolerate the adverse effects of anesthetics and operation depends largely upon the functioning of the respiration and circulation, and the action of liver, kidneys and endocrine glands. An anesthetist should be prepared to evaluate a patient's condition along these lines. He should also discern what the proposed operation may mean from the standpoint of position on the operating table, time involved and physiologic change expected. An operative permit should be signed, particularly for minors.

When important data are lacking or further examinations are indicated, the patient's surgeon should be consulted. Rarely should there be disagreement over the safe preparation of a patient for operation. In an emergency standard practice may have to be abandoned. A patient may need anesthesia and operation even though a recent meal or an exceptionally low hemoglobin level should dictate delay. Although anesthesia is crucial, it is only a small part of the total surgical experience. Surgeon and anesthetist should devote their attention to the broad aspects of recovery from the entire experience.

When the anesthetist has accomplished these preliminaries he should have a plan of action in mind and is then ready to visit the patient. The interview with the patient must be an unhurried, tactful one with care taken to avoid irritation on both sides. Let the patient converse within limits, but stick to the point. If the patient is eating or receiving special treatments it may be better to visit at another time.

The following method of procedure is suggested for conducting the interview: Introduce yourself by name, explaining who you are and that you will provide anesthesia for the operation. The patient may not have been told by the surgeon of the final decision to operate. If so, the anesthetic procedure can be described as it may take place at any future time. Learn about previous anesthetic experiences, unusual reactions to drugs, and the type and extent of physical activity the person can tolerate. Inquire of habits, particularly prior ingestion of drugs such as barbiturates, cortisone, insulin, reserpine, digitalis, chlorpromazine, and any substances which may affect the conduct and course of anesthesia. During the interview try to assess the individual's emotional state of mind.

Search for physical characteristics which will make the administration of anesthesia technically difficult. The plethoric short-necked individual may develop respiratory tract obstruction readily; the husky athletic man usually needs a great deal of anesthetic, whereas the asthenic old woman will require little. Inquire about the condition of the teeth and remind the patient to remove dentures before coming to the operating theatre.

Once these preliminaries are over, inform the patient of the plans for anesthesia. Reactions to these suggestions will vary. Some will accede readily, others fear the face mask or the venipuncture and seek oblivion for the whole procedure. Some worry about postoperative nausea, vomiting and pain. Many fear spinal anesthesia, having heard that headache or permanent paralysis may ensue.

In making the final decision never be unyielding. Choose the best

anesthetic for the patient in conformity with the capabilities and preferences of anesthetist and surgeon. Most patients will accept the physician's word when confidence is inspired. In selecting spinal anesthesia be certain there are no neurologic contraindications. It is within reason to inspect and palpate the spine or caudal area, and to test the effect of the operative position on the circulation and respiration.

One should see to it that the patient secures a good night's sleep. He should be told how the preoperative medication will be given, not to eat or drink beforehand, when he will be taken to the operating area, the immediate postoperative events, and the plan of observation in a recovery room. Remind patient and relatives of the delay in returning to the ward because of the recovery room stay. Avoid discussing what is in the surgeon's domain. The patient's relatives may be troublesome in their efforts to help plan for their kin's welfare. They can be gently sidetracked.

When the anesthetist leaves the patient he should complete the preoperative section of the anesthetic record, assign a physical status classification, write the appropriate preanesthetic orders, and add to the patient's chart a note summarizing the results of the preanesthetic visit.

### NOTES ON THE HOSPITAL RECORD

An anesthetist is frequently asked by an internist or surgeon to evaluate a patient. His appraisal should not be transmitted verbally, but should be added to the patient's permanent hospital record, either as part of the progress notes or on a formal consultation sheet. A consultation of real value can be written if the foregoing suggestions for the preanesthetic visit are followed. It might take the following form: a brief résumé of the patient's condition and physical status; a statement of the difficulties likely to be encountered during anesthesia and operation; suggestion for preanesthetic medication, choice of anesthetic agent and technique, with reasons for each, and finally, a request for further examinations or supportives which might be required during operation.

## Physical Status or "Risk"

ONE USED to refer to the surgical patient as a good or poor "risk," a term involving an estimate of prognosis from the standpoint of either mortality or morbidity. A consideration of the factors which influence the outcome in an individual case suggests that the term as ordinarily used by surgeon or anesthetist is unsound and should be abandoned. To evaluate a "risk" completely would necessitate foreknowledge of such variables as the reliability of suture material to be used, adequacy of sterilization of instruments, availability of drugs, the responsibility of those in charge of postoperative nursing care, and a host of other aspects which cannot be assessed for each patient. A patient anesthetized by a medical student and operated upon by a junior surgeon has less chance than would the same patient in the hands of an experienced anesthetist and surgeon. Under these circumstances the patient's condition has not changed, but the likelihood of survival has been materially increased. The patient's prognosis is also more favorable if the personnel responsible for his care are not tense or exhausted. Again, his condition remains the same but the risk is diminished. In addition to the patient's preoperative physical condition, therefore, the success or failure of an anesthetic or operation depends upon many unrelated factors.

Not only is the term "risk" basically incorrect, it is frequently misused. Too often a patient is characterized as a "poor risk" only *after* a catastrophe has occurred. This is a conscious or unconscious effort to cover up errors in diagnosis, management, judgment or technique. Original appraisals and decisions were at fault, or sufficiently skilled personnel were not available, yet the outcome is explained on the basis of the patient's being a "poor risk." Improvement in patient care does not lie in this direction.

### CLASSIFICATION OF PHYSICAL STATUS

The term "physical status" is obviously more accurate and preferable, and can be assigned a numerical rating. The classification of the American Society of Anesthesiologists is as follows:

*Class 1.* A patient who has no organic disease or in whom the disease is localized and causes no systemic disturbance.

*Class 2.* A patient exhibiting slight to moderate systemic disturbance which may or may not be associated with the surgical complaint and which interferes only moderately with the patient's normal activities and general physiologic equilibrium.

*Class 3.* A patient exhibiting severe systemic disturbance which may or may not be associated with the surgical complaint and which seriously interferes with the patient's normal activities.

*Class 4.* A patient exhibiting extreme systemic disturbance which may or may not be associated with the surgical complaint, which interferes seriously with the patient's normal activities, and which has already become a threat to life.

*Class 5.* A patient who is operated upon in an emergency who would otherwise be in Class 1 or 2.

*Class 6.* A patient who is operated upon in an emergency who would otherwise be in Class 3 or 4.

*Class 7.* The rare person who is moribund before operation, whose preoperative condition is such that he is expected to die within 24 hours even though not subjected to the additional strain of operation.

At the University of Pennsylvania we see no reason to reduce four categories of physical status to two, merely because the patient has appeared as an emergency. We therefore use five classes, i.e., Classes 1-4 and Class 7 above, and add the letter E in emergency situations. Thus a patient ordinarily in Class 2 would become 2-E in an emergency.

Assignment of a numerical rating to the patient, although admittedly often difficult, pays dividends. It forces an over-all appraisal of the patient's physical condition, and focuses attention on such factors as the skill of the anesthetist or the likelihood of problems arising during anesthesia. A higher classification may alert an anesthetist to monitor a patient's progress with an electrocardiograph or to provide other safeguards. In reviewing clinical records the relationship of the anesthetic course to the physical status of the patient is always of interest. It permits easier comparison of one anesthetist's cases with those of another. The allegation that cardiac arrest occurs just as frequently in healthy surgical patients as in ill individuals can be proved only in this manner. The safety of a particular drug or technique is more readily determined with the aid of such ratings. They form an integral part of proper anesthetic management.

## The Choice of Anesthesia

AN ANESTHETIST skilled in a variety of anesthetic techniques can so apply these that a particular problem may usually be solved in one of several ways. Thus, gastric resections have been and can be satisfactorily performed with any of the following: continuous spinal anesthesia; single dose spinal anesthesia supplemented with thiopental and nitrous oxide; cyclopropane; closed system ether; open drop ether; anesthesia with or without endotracheal tubes; field block with or without splanchnic block. In short, it is difficult to state categorically that there is an indication for a particular type of anesthetic for most operations or most complicating diseases. Skillfully managed, any one of a number of agents and techniques can usually be applied, the final selection often being a matter of individual preference.

The once popular examination question is unjust which presented a patient facing an operation and which required the student to select from a prescribed list the one and only anesthetic procedure that fitted the condition outlined. We are now more concerned with *why* a particular method is selected. The choice of method should be defined and fortified by *reasons* for so doing. If the latter be valid, who are we to argue the cause of spinal against general anesthesia or of intravenous versus rectally administered anesthesia?

This point of view concerns itself with the realization that the skill of the anesthetist, his knowledge of the surgeon's methods, the accepted procedures in the community, the specific request and former anesthetic experiences of the patient, must all be considered in the final choice.

This does not mean that certain indications and contraindications have not been accepted by most anesthetists. Among the latter might be listed the administration of spinal anesthesia to patients with pre-



existing neurologic disease, or of cyclopropane, thiopental or *d*-tubocurarine to patients with allergic bronchial asthma because of the tendency toward bronchiolar constriction.

It is to be expected that as knowledge of drugs used in anesthesia increases, and as one learns more about the pathologic physiology of disease, it will be possible to select the preferred anesthetic management more intelligently. The need for greater understanding of the effects of anesthetics on man has stimulated the research efforts of many workers. When the results of these programs are correlated with data obtained from the study of disease, a real advance in anesthesia will have taken place.

We do not believe that an internist called as a consultant to evaluate the physical status of a patient scheduled for operation can logically suggest the type or method of anesthesia to be used. Few internists have accompanied their patients to the operating room, have watched the problems of induction or maintenance of anesthesia, realize the difficulties posed by the bodily habitus of the patient, or appreciate the requirements of individual surgeons. Until they have practical, first-hand experience with the conduct of anesthesia it is unwise for them to insist upon a particular course, especially when dealing with anesthesiologists of modest background and experience.

Our concept of the teamwork between internist and anesthesiologist can be illustrated by what we expect of a cardiologist when asked to see a patient with heart disease. This consultant can best provide the pathologic diagnosis and assess the degree of functional impairment. He can decide whether the patient is in the best possible condition or whether further bed rest, use of diuretics, digitalis, and the like, will improve the chances for a successful convalescence. He can point out complications which may arise and how to treat them, during and immediately after operation. In short, each specialist is expected to contribute to the patient's well-being with his special fund of knowledge.