Premedication, Preanesthetic Evaluation and Postmedication in Oral Surgery

by

Harold W. KROGH,*

The present paper is concerned with premedication, preanesthetic evaluation and postmedication. It must be clearly understood, however, that I'm speaking from the viewpoint of the office practice of oral surgery, using sodium methohexitol as the principal agent.

Premedication

Wise, Tillman and Crawford list five desired effects from premedication: 1) to allay fear and apprehension, 2) to reduce the metabolic rate, 3) to reduce reflex irritability, 4) to reduce the total amount of anesthetic agent necessary, 5) to facilitate and decrease the time necessary for induction.

1) The quickest and kindest way to allay fear and apprehension is to put the patient to sleep quickly and pleasantly with an I. V. barbiturate anesthetic rather than wait for the slow effects of a premedicant drug.

2) Reduction of the metabolic rate is not necessary or economically feasible in an ambulatory practice. It is, however, important to recognize the degree of rise above normal in order to gauge the induction dose.

3) Reflexes are defense mechanisms of the body and should be looked upon as desirable, not something to be abolished. It would be unfortunate for instance, if the vocal chords did not react to saliva, blood or other substances and allowed the bronchi to become contaminated.

4) It is true that the effective use of premedication will reduce the amount of anesthetic drug necessary. However, the patient and the oral surgeon will usually pay for this reduction with delayed reaction time because premedicants are longer-acting than the newer barbiturates.

5) The time necessary for the average induction is about 30 seconds which should be fast enough to please most oral surgeons.

For these reasons, the large majority of our patients are best handled without premedication.

There are, however, many patients for whom more than one anesthetic drug is indicated. If the patient is judged to be resistant to anesthesia and the operation is to be of some magnitude, we prefer to administer intravenously any additional depressant drugs in the dental chair or on the table, either before induction of anesthesia or soon thereafter, rather than an hour before surgery. The dosage must be reduced to allow

for the more effective direct injection into the blood stream. These variations obviate a long wait, often an extra injection, and provide a more accurate control of pharmacologic response. Patients whose chair systolic pressure is low even though they are obviously apprehensive are given their additional depressants after induction because we have found them very prone to syncope when induction was delayed.

**Premedicants**

If one uses, as we do, sodium methohexitol which is not a profound anesthetic, for long procedures on resistant types, we administer intravenously 50 to 75 mg. of nembutol and wait four or five minutes before beginning anesthesia for surgery, or inject the nembutal after induction of anesthesia in the usual way. This makes for smoother maintenance, good postoperative pain control and only slightly, if any, prolonged recovery time.

Atropine is given to dry up secretions and by many in the belief that it abolishes harmful reflexes, in particular the vago vagal; a doubtful effect from the dosage usually given. Like the other premedicants, atropine takes about five minutes to act when administered intravenously. By depressing the parasympathetic system it relatively stimulates the sympathetic system and thus, when used alone, may contribute to quicker recovery. In the early days of intravenous anesthesia it was thought to be essential, perhaps a hold-over from the days of irritating inhalants. We do not use atropine, although I have no objection to its use.

Phenergan, basically an antihistamine but with some hypotensive properties, is often combined with demerol and has many adherents. I do not use it either alone or in combination. Morphine I found to depress respiration too much and often seemed to induce vomiting. Formerly we frequently used demerol immediately preoperatively as we now use nembutal for resistant patients and to control post-operative pain. Satisfactory pain control after nembutal is the rule even though the barbiturates are supposed to have poor analgesic properties. Presently we administer demerol at the conclusion of the operation to patients in whom we anticipate considerable post-operative discomfort and who have not needed other long acting depressants. This sequence leads to equally good pain control and a shorter recovery period.

**Preanesthetic Evaluation**

Preanesthetic evaluation should be concerned primarily with the capability of the body to transport oxygen from the nose and mouth to the lungs, and from the lungs to the blood and by perfusion the blood to all cells, and especially with the reserve oxygenation mechanism. Involved then are the external and internal respiratory systems and the circulatory system’s efficiency to perfuse the tissues, including the ability of the red cells to carry oxygen. Equally important is the reverse transport and elimination of CO₂.

I like Monheim’s definition of preanesthetic evaluation, i.e., “to create a sense of awareness in oneself and surgical team”. “Awareness” must be understanding and informed to be effective. Reports of most accidents under general anesthesia include the note that at some point it was “noticed that the patient was in difficulties”. Obviously someone’s awareness was not active since the unphysiologic condition must
have been developing before this note was made. It is the immediate recognition of
the first signs of abnormality which is needed. Meticulous attention must be main-
tained to detect and correct any deviation from the normal.

Any man who thinks he is always equally aware of his surroundings and that
his mind never wanders during the day is deluding himself. Attention and concentra-
tion ebb and flow. It is essential to recognize this fact and to ensure that one is oper-
ating at peak efficiency when it is needed; one must be exquisitely attentive, especially
when handling the poor risk.

Many years ago the late Dr. Charles Adams said that anyone who can walk a
block and sleep on two pillows or less can withstand a short, properly given general
anesthetic using an intravenous barbiturate. Has this statement stood the test of time?
I think it has; and this test would probably suffice for about 99 percent of our pati-
ents. Admittedly the limitation “short and properly given” will be interpreted dif-
ferently by each of us and at different times in our careers as our skills are gained or
lost.

This criterion, however, is too simple to satisfy most oral surgeons and our lack
of satisfaction compels us to seek more detailed information concerning the physical
status of our patients. Some of us are content to scrutinize minutely, take and record
the blood pressure, evaluate the pulse and ask a few pertinent questions, whereas others
depend upon information gained from the answers to questions contained in lengthy
checklists. This might be called the direct and the indirect approach.

The information obtained from preanesthetic examination, no matter how detailed,
is of little or no value unless it registers on the consciousness of the anesthetist and
surgeon.

Several years ago I wrote that “The physical status of each patient should be
evaluated briefly in terms of oxygen reserve, which is low even under the best of cir-
cumstances. Questions concerning the physical condition of a patient should be directed
towards determining the degree of limitation if adf, of physical activity, the best index
of oxygen reserve. Much more useful information will be gained and less apprehension
produced by asking about the patient’s daily activities than by asking if he has heart
trouble, and so forth; or by filling out a detailed history sheet. Here an exception
should be noted; if there is a suggestion that the patient may have had rheumatic
fever, the specific question should be asked and if answered in the affirmative, he should
receive antibiotic or chemotherapeutic protection and the anesthesia managed in accord-
dance with the impaired circulatory system.

As a rule, a woman with children who regularly does her own housework or a
man who goes to work every day can withstand a short, properly given general anes-
thetic.”

1. Solid food and fluids

Children are booked preferably for the early morning and come without having
had food or drink. Adults are permitted solid food up to four hours before operation
and fluids other than milk up to two hours. Those with morning appointments are
urged to have their usual coffee or tea two hours before coming to the office. Those
for the afternoon are asked to omit lunch but to take coffee or tea as indicated above.

2. Observation

When the patient comes into the surgery one can immediately observe the age,
weight, posture, gait and apparent state of his health. Skin color and texture will range from the pink of health to the cachexia of malignant disease. A quick glance at the ankles will tell whether or not there is gross edema. Physical abnormalities may be due to anatomic variations or functional disturbances as the result of chronic disease. We should note whether these skeletal abnormalities may have any influence on the maintenance of the patient’s airway. The age may influence a choice of anesthetic drugs and the amount of drug which will be needed. Old age carries with it not only the infirmities which come as a result of many years of life, but also the accumulated results of accidents and diseases acquired along the way. Those who have had more than their share of life’s vicissitudes should receive more delicate care. The proportion of senior citizens in our country is rising, and no doubt in most of the world as well, and bids fair to continue to rise in the foreseeable future so that it is certain that the proportion of bad risk patients in our practices will also increase.

Obesity, always a hazard, is even a greater one when it makes the maintenance of an airway difficult. Edema may be due to an impaired circulatory system or malfunctioning kidneys or liver or combinations thereof, and is always an unfavorable sign.

3. Examination and questions

With the patient seated in the dental chair the rate and character of the pulse are determined and evaluated. Most of our patients are apprehensive, with elevated pulse rates and blood pressures. Many pulses which are regular in other surroundings will become arrhythmic in our offices. Patients with rapid, thready pulses sometimes require more drugs than one would estimate from observation of their physical condition and blood pressure. Those with rapid bounding pulses are no particular problem; while usually needing more than average quantities of drugs, they metabolize them quickly. One should be on the lookout for rapid pulses with irregular arrhythmias because they may denote a rheumatic fever background. Essentially normal-feeling pulses with arrhythmias which occur in regular fashion are not of too much concern, although worthy of a few questions. One should beware of arrhythmias when accompanied by periodic pain. Pulse rates go up, at times rather sharply, during induction. In evaluating the pulse one can obtain solace by remembering the words of Monheim who says that “a perfect pulse is a luxury, not a necessity”.

The blood pressure, along with the pulse, furnishes an important clue to the metabolic rate at the starting point of anesthesia and hence the amount of drug which will be necessary for induction and maintenance and the length of the recovery period. It should be measured and recorded so that if there are subsequent changes in the pressure we can know whether up or down. Patients with low blood pressure need relatively smaller amounts of drug than those with high. It is good practice to give patients with high blood pressure oxygen during the operation and perhaps carry them a little deeper in order to reduce the pressor effect of pain impulses. Dr. Driscoll has shown that the almost universal belief that barbiturates cause a drop in blood pressure under the conditions in which we work is not scientifically established. Actually there is a nearly universal rise in blood pressure and pulse rate. He has also shown that nitrous oxide and oxygen given with the barbiturates decrease the rise in blood pressure.

We can now observe the patient’s respiration and by questions estimate his reserve effort. Because we work in the airway, respiration is an exceedingly important function to us. If the patient is breathing with an effort while sitting in our chair, it is obvious
that his respiratory function has been impaired and will withstand poorly any further
curtailment of pulmonary exchange. The oldtime oral surgeon had a sound reason for
locating his offices on the second floor with a flight of stairs to climb, because patients
who can negotiate a flight of stairs without distress can withstand a session with an
oral surgeon.

At this time the patient is asked whether or not he is on regular medication and,
if answered in the affirmative, an attempt is made to find out what the medication is,
how long he has been on it and, if possible, the dosage. A good many patients who
are on regular medication do not know the name of the drug they are taking and in
some instances why. Americans seem to be taking an increasing amount of medication.
A survey in my office of 100 consecutive patients showed 15 to be on regular medica-
tion which may not be a true average, but which does indicate that questions are in
order. A question regarding drug allergies is also asked.

4. The role of oxygen

Oxygen, rather than the dog, is man's best friend. It's the most important factor
in maintaining life; the adult body reserve is only about a litre; the rate of use is
between 200 and 300 cc per minute while at rest; and this rate may increase 12 to 16
times under great muscular effort or emotional stress and create an oxygen deficit. It
is our task to see that no deficit is created while we are operating upon a patient.

5. Functional reserve

Functional reserve is lowered: in the respiratory system by ventilation defects
such as obstruction or central depression, by lung tissue alveolar defects such as caused
by infarction or emphysema; in the circulatory system by cardiac defects, coronary
artery disease or myocardial insufficiency; in peripheral vascular defects such as shock
(which we rarely see other than psychogenic shock or syncope); and in the secondary
system caused by damage or disease in the liver, kidneys or malfunctioning endocrine
glands.

6. Significant daily medication

In general it should be said that patients who are on daily medication should take
it the day of operation, and continue on subsequently. This should be stressed when
the appointment is made, otherwise medication is likely to be omitted on the day of
operation. It is astonishing how many patients do so in spite of advice to the contrary.

1) Anti-coagulants

Anti-coagulants are becoming less uncommon as more of our population develops
circulatory system disease. I believe with several others who have published data, that
it is not necessary or desirable to take patients off of anti-coagulants preceding oral
surgery. It might be desirable, however, to decrease the prothrombin time and the
extent of surgery, but it is likely more harm has been done by taking the patients
completely off than by any subsequent blood loss following the removal of teeth.

Unless your professional standing is secure, it may be advisable to use the hospital
for these and other serious heart conditions.

2) Tranquilizers

Tranquilizers tend to be hypotensive in action, simulating the drugs which are
specifically given for hypotensive effect. It should be remembered that hypotensive
patients need less depressant drugs than normo-tensive individuals and hence can more
easily be over-medicated.

3) Hypotensives

When patients are on hypotensives we ask what their blood pressure was when they were put on hypotensive drugs, and check that against the pressure just taken. Too great a spread would make us very cautious, and in severe differences might make us postpone elective procedure. The normal hypertensive effect of the dental chair is usually good for 30 or 40 points, enough to cancel out temporarily most hypotensive drug effects.

4) Hormones

Hormones must be given consideration in planning our work. Our office procedure for diabetics on hypoglycemic drugs is to have them take their usual hypodermic or oral drugs and to satisfy their breakfast caloric requirements with orange juice about 8 o’clock in the morning, and then do the operation at 10 o’clock with rather strict attention to hemostasis so that the next meal will be taken. Controlled diabetics heal normally although some physicians like to cover them with antibiotics. Patients on steroid therapy are handled in a routine manner but some physicians increase the dosage on the day of the operation. We have not seen many patients recently who say they had been on steroids and have discontinued their use. These who have been on steroids for protracted periods, and then taken off, constitute a hazard and should be protected by the injection of the drug preceding the operation.

The routine use of the male or female sex hormones need not be taken into account when planning the anesthesia, although the underlying physical conditions being treated may influence our technic.

5) Dietary Suppressants and Emotional Enhancers

Thyroid extract is used in the treatment of myxoedema or to increase the metabolic rate for any reason, most commonly in our practice to control or reduce weight, usually in women. Frequently it is combined with dietary suppressants which double as emotional enhancers. Its purpose is to increase the metabolic rate. These patients will therefore tend to require more anesthetic drug but will also recover quickly.

6) Anticonvulsants and Antispasmodics

The barbiturates themselves are fine anticonvulsants; accordingly, patients on anticonvulsants do very well and present no anesthetic problem. I can’t remember having seen evidence of an epileptic seizure under barbiturate anesthesia. Patients on antispasmodics are usually high strung individuals who tend to be very apprehensive.

7) Cardiac Regulators

Patients taking cardiac regulators must be handled with caution and respect, meaning with small dosage, maximum oxygen and short procedures.

7. Significant blood findings

The most significant, clinically apparent blood finding is anemia. Anemia lessens the oxygen-carrying capacity of the red blood cells, therefore, patients who are anemic have a poorly functioning link in the oxygenation mechanism, transport oxygen to the tissues less efficiently and metabolize barbiturates slower. Anesthesia must be induced and maintained with this in mind. They also tend to bleed freely and heal slowly. Often patients say that they bled excessively after the removal of a tooth, no matter
how long ago, but give no other history of bleeding difficulties. Such a statement then means that they bled excessively after a tooth was removed. However, there are a few who have serious inherited, drug or disease-induced bleeding problems. These patients should have preoperative bleeding and clotting studies and assistance from a hematologist if indicated. The anticoagulant-induced prolonged bleeding time has already been discussed, though I normally suture rather more than usual and oftentimes insert an absorbable hemostatic into the sockets.

8. History suggesting heart disease

A history of rheumatic fever suggests a damaged heart and calls for protection against blood-borne bacteria, and the administration of oxygen during induction and maintenance. More than 50 percent of the patients with rheumatic hearts who come to our office do not volunteer that they have had rheumatic fever, but are picked up by evaluating the pulse and asking a direct question. I think this represents a failure on the part of physicians to advise these patients to warn the oral surgeons so that suitable protective drugs may be administered before removal of teeth. Fortunately we now have types of oral penicillin which give effective blood levels in a very few minutes, making it unnecessary to delay surgery.

No trouble is experienced eliciting a history of other diseases of the heart.
We operate on an infrequent patient with congenital heart disease or who has had surgical correction of anatomical defects in the heart.
Coronary occlusions are on the increase. Patients who have had coronaries become their own worst enemies, and few there are who can live normally thereafter. One must sympathize with their apprehensive state but it certainly increases their blood pressure and pulse rate and thus oxygen demand. I like not to operate less than six months after the attack. These patients are started on oxygen before venipuncture unless the nose piece causes them to become more apprehensive. In that event, oxygen is administered as soon as consciousness is lost. They withstand well the barbiturates given with oxygen alone or with oxygen and nitrous oxide.

1) Vaso-dilators

Angina is caused by ischemia and coronary insufficiency leading to hypoxia of the myocardium precipitated by effort or excitement, therefore persons with this condition have a low functional reserve. Nitroglycerine is the common drug used to relieve the pain of an attack. It is good prophylaxis to place a tablet under the tongue while preparing these patients for operation.
Occasionally a patient will develop the signs of impending syncope. If the venipuncture has already been made we try to get him asleep before syncope is complete. If unsuccessful, oxygen is administered, the chair reclined, his legs elevated and anesthetic withheld until the circulation has been restored. After blood pressure and pulse return to normal, he can then be returned to the sitting position or operated on while supine.

In operating upon patients with heart disease: minimum depressants, maximum oxygen and a well-trained anesthesia-surgical team really pay off.

9. Symptoms and signs of circulatory deficiency

May be indicated by really high or very low blood pressures. With extremely low blood pressure there may not be sufficient force in the heart muscle to adequately
perfuse the tissues; and in the very high pressure the heart may be working near its capacity. In either case the oxygen reserve will be low. After the pulse reaches a certain rapidity it becomes less efficient because the chambers do not get a chance to fill between beats. The character of the pulse has been commented on previously.

Dyspnea is always a sign of low oxygen reserve and for extreme caution and not to be ignored, either before or during surgery. It most often accompanies congestive heart failure when caused by heart disease. Cyanosis is a signal that all is not well. It means that there is reduced hemoglobin, probably indicating a high CO₂ level in the blood and a low oxygen level. It may be indicative of a congenital heart, severe anemia, hypercarbia, or unsaturated hemoglobin.

Weakness is manifested by a decrease in the ordinary strength of the individual who, for instance, could formerly climb a flight of stairs with ease but now finds he must rest part way up or he may develop angina or claudication in the legs.

Edema, when due to circulatory deficiency, will be accompanied by a higher than normal venous pressure and often the superficial veins will be distended due to failure of the right side of the heart to do its job.

10. Symptoms and signs of respiratory deficiency

The symptoms and signs of respiratory deficiency are coughing, asthmatic wheezing and dyspnea. Coughing denotes an irritation in the airway. It varies from the tickle in the throat to the deep, brassy cough of the person in congestive failure. Coughing is of concern to us because it interferes with the rhythm, rate and depth of breathing and hence may decrease the minute volume of air reaching the lungs. Productive cough has an additional disadvantage. Asthmatic wheezing is due to difficulty during expiration, and increases the respiratory effort. Dyspnea denotes an inefficient respiratory mechanism and is marked by labored, difficult or irregular breathing.

11. Respiratory diseases

If the operation is to be a short one for the relief of pain we do not put it off because of a cold. Of course, elective procedures are delayed.

Dyspnea, as before stated, is a serious condition, this time due to failure of external oxygen or CO₂ transport.

Bronchiectasis can be very annoying and even dangerous. The patient should cough up as much exudate as possible before the beginning of an operation.

1) Bronchial dilators

The bronchial dilators are prescribed for patients with emphysema, a disease of the alveoli in the lung accompanied with prolonged expiratory phase of respiration. Many persons have some impairment of respiratory function due to emphysema, so it becomes a matter of judgment which cases are accepted and how much work is done at one operation. A patient with emphysema has no difficulty in the inspiratory phase. The difficulty is in the expiratory phase when the lungs are unable to expel their contents effectively, thus reducing tidal volume. (Bronchial spasm in my experience is exceedingly rare.)

2) Antihistamines

Asthmatics, of course, are not seen in our offices during an acute attack. We have had no difficulty in caring for them in between attacks. The antihistamines will afford protection against possible bronchial spasm associated with asthma and so may be
The number of lung cancer patients who have had total or partial lobectomies and need our services is increasing, and presents no insuperable problems.

For this group of diseases we should remember the external oxygen transport system is impaired and therefore oxygen in greater concentration than in the air should be supplied.

12. C. N. S. Diseases

We see a small percentage of patients with central nervous system diseases and they should not frighten us except possibly the hemiplegics.

Epileptics do very well under barbiturate anesthesia as do the spastics and those with Parkinsonism. The spastics and Parkinsonism patients are particularly grateful.

Dementia patients pose no particular problem in the use of anesthetic drugs but may be difficult office patients, both before and after surgery.

Hemiplegics and patients who have had intracranial hemorrhages must be handled with great care and dispatch and a prayerful thankfulness when they are safely on their way.

The differential diagnosis of syncope may be difficult, but those we encounter will more than likely be psychogenic in origin although vaso-motor collapse and strokelets may be encountered.

13. Significant disease syndromes

There are some significant syndromes which do not fall into any of the categories discussed.

Alcoholism is a problem for everyone concerned with it, although alcoholics do very well under barbiturate anesthesia. They generally take a good bit of it but metabolize it quickly. If the alcoholic also has cirrhosis then of course he may be very ill and a poor risk.

Arthritis may be problems if their neck and cervical region are so involved that the head cannot be straightened if needed to provide an adequate airway. Sometimes their arms and hands are so deformed that venipuncture may be difficult. A little ingenuity is often called for to get them comfortably and accessibly arranged in the dental chair.

Cirrhosis is a serious disease but does not preclude the use of general anesthesia. Some physicians think that because the barbiturates are at least partly destroyed in the liver, patients with liver disease should not have anesthesia with barbiturates. This belief has not proven to be true in my experience. Minimum dosage is imperative.

Pregnancy probably shouldn’t be classified as a disease, but the patients in this condition should receive special handling in the form of an increased oxygen supply. I prefer not to do elective surgery in the first trimester.

Postmedication

The patients of those of us who use the intravenous barbiturates are fortunate because these barbiturates engender a feeling of euphoria which is a tremendous asset in the post-anesthetic phase. The enthusiasm with which our patients receive the news that their operation is over is a joy and a gratification to the oral surgeon which never seems to grow old. After the euphoria has worn off, we must then be prepared to
protect our patients against possible pain emanating from the operated area. Aspirin is a time-tested remedy for pain about the head and is given routinely when little or no pain is anticipated. Many patients prefer anacin or bufferin or empirin, and either carry or have these tablets at home. We give our patients empirin tablets. We have gotten out of the habit of giving barbiturates by mouth because it seemed to us some of these patients came back the next day slightly hung over. Darvon compound is our present drug of choice, being dispensed in either the 32 or 65 mg. capsules. Darvon compound has displaced our old favorite, empirin and codeine, because it has fewer side effects and seems to be about equally effective. Some patients prefer Zactirin and if so, we prescribe it. Demerol is given but rarely, because we believe that pain control can usually be achieved without using a possible addictive drug. But when other drugs are ineffective we have no hesitance in prescribing it for a short period of time. Morphine is only used for the rare patient who develops pain in the chest in the immediate post-operative period.

Total operative hazard formula

Those of you who are mathematically inclined might be interested in the Stubbs’ formula for determining the operative hazard. \((H)\) stands for the operative hazard which equals \((P)\), the physical status of the patient, in terms of functional deficiencies, times \((R)\) the relaxation needed, times \((O)\) the magnitude of the operation planned, divided by \((Sc)\), the competence of the surgeon, times \((Ac)\), the competence of the anesthetist.

You may assign your own numerical values to these symbols and come out at about what the operative hazard should be for any given operation. The higher the values below the line the lower the operative risk.

We cannot change the patient’s \((P)\) physical status at the time of operation but we need little \((R)\) relaxation and the magnitude of the \((O)\) operation can be reduced by dividing it into stages, if advisable. Best of all, we can continuously increase our skills \((Sc)\) in surgery and \((Ac)\) anesthesia so that the blessings of general anesthesia may be offered to more people not in the best of health.