

PREOPERATIVE AND POSTOPERATIVE CARE OF ACUTE SURGICAL CONDITIONS OF THE ABDOMEN*

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THE surgeon long ago established his art upon the basic fundamentals of asepsis, hemostasis, gentle handling of tissues, astute diagnostic ability and personal integrity. The past fifteen years have brought many improvements in surgical technic but the reduction of surgical morbidity and mortality has been greatest since these fundamentals were combined with skilled preoperative and postoperative care. The more acute the surgical condition, the more applicable becomes this statement. Thus is affirmed the pertinent fact that surgical technic must not be divorced from surgical therapeutics. This is the thought Sir William Osler sought to convey when he stated, "A surgeon should be a physician who operates." Careful preoperative and postoperative care can virtually fulfill Lord Moynihan's desire that, "Surgery has been made safe for the patient and now the patient must be made safe for surgery." There are very few surgical emergencies that do not permit fundamental preoperative care and all surgical patients merit enlightened postoperative care. This applies to every operative procedure as not one is of "minor" surgical status. Surgery of any nature can be a dangerous method of therapy.¹

PREOPERATIVE TREATMENT

When a patient suffering from an acute surgical condition of the abdomen presents himself, the surgeon does more than evaluate the primary disorder. It is necessary to weigh the severity of pain, amount of anxiety, possibility of shock, presence of dehydration, existence of hemorrhage, probability of infection, the nutritional state and concurrent disease. To answer and thus

effectively deal with these problems an inventory must be taken. This includes a history, physical examination and a laboratory investigation.

Inventory. This period, short though it may be, allows for careful surgical planning. The surgeon seeks to secure the patient's confidence and cooperation.² Failure to prepare a patient psychologically may complicate skilled surgery or minimize its benefits. A methodical history not only aids in revealing the proper diagnosis but provides an orderly, useful source of material for later analysis. It may ward off complications by the patient revealing such conditions as a drug idiosyncrasy, alcoholism or a state of hemophilia.³ In this manner the physician not only wins the patient's regard by his interest and thoroughness but is rewarded by facts that contribute to a purposeful diagnostic pattern.

A physical examination should be a well planned, conscientious search for every vestige of information pointing to the patient's specific complaint and his general state of being. More diagnostic errors are committed from lack of observation, or slipshod interpretation than from not knowing the disease *per se*.⁴ Too frequently an examination includes only the region of apparent pathological disorder. Do not formulate a diagnosis on impression; gather facts, all the facts. During an examination it is well to have the patient alone, well covered, as comfortable as possible, in good light and with the bladder and rectum empty. The examiner should gently proceed with an orderly, complete scrutiny, keeping his eyes and ears alert. Examine the suspected area last. Record at once in writing the findings and impressions. Such

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a commitment stands later as irrefutable evidence of one's diagnostic skill or of its lack.

The laboratory offers valuable assistance in the preoperative examination. Certain tests will be utilized to evaluate the specific surgical complaint, others to reveal the patient's general surgical status. For example, an elevation of the blood's non-protein nitrogen may necessitate a careful genitourinary tract investigation, or call for dietary or medical management; it may influence the choice of anesthesia and the extent of purposed surgery. A hemoglobin value below 60 per cent may be ominous.⁵ The presence of an elevated blood pressure is cause for vigilance; a very low blood pressure is cause for concern. A normal electrocardiogram is a vote of confidence but not insurance against cardiac complications. It is in this manner the surgeon evaluates the many aids the laboratory can offer. When properly selected a laboratory investigation can reasonably predict a patient's surgical tolerance.

Immediate Preoperative Period. This period covering from a few minutes to several hours must be expertly utilized as every minute counts. The surgeon need be explicit in his instructions to his surgical assistants and the nursing staff. Standing orders which are generally applicable to patients with acute surgical conditions of the abdomen include:

Record your observations of the patient's pertinent actions and comments.

Call the laboratory at once for desired tests and assist in obtaining specimens.

Give nothing by mouth and aspirate (do not wash) the stomach if food has been recently taken.

Pass a Levin catheter through the nostril and institute gastric suction.

Oral hygiene is instigated and false dentures removed from the mouth.

Select and indicate the most acceptable vein for intravenous fluid .

If intravenous fluids are to be started, (1) select a vein not likely to be disturbed, (2) introduce a No. 19 gauge needle, (3)

secure it firmly in place, (4) do not lower the fluid flask or pinch its tubing to check the needles position.

Catheterize female patients and leave a clamped catheter in place.

Catheterize male patients if a residual is suspected. Leave catheter in place if the surgical procedure is apt to prove prolonged.

One and one-half hours before surgery exclude visitors from patient's room.

Cover the eyes with cotton and place cotton fluffs in the ears; hold all in place by a towel fitted to the head.

Administer preoperative medication and request quiet of roommates and hospital personnel.

Note and record patient's general response every thirty minutes thereafter.

Chart, x-rays and special equipment are made ready to accompany the patient.

Deliver the patient to the surgical room at the appointed time.

Preoperative Medication. The choice of preoperative medication is largely determined by the constitutional state of the patient being operated, the procedure to be executed and the anesthetic to be used. Properly administered preoperative medication should relieve the patient's anxiety, reduce or eliminate the excitement stage of anesthesia, minimize the amount of anesthetic required, lessen the tendency to shock and render recovery possible with less effort and fewer complications.⁶ There is no one drug or combination of drugs that is ideal. The amount used must be individualized and under no circumstance should amounts be routinized.⁷ This applies especially to the oft used "quarter and hundred and fiftieth."⁸ Divided doses of preoperative medication are to be preferred to hazarding overdosage. Basal anesthesia should never be allowed to so depress or confuse a patient that he cannot identify himself just before receiving an anesthetic.⁷ All drugs available for preoperative sedation may produce idiosyncracies. Morphine is probably the most frequent offender although probably the most useful drug. Given hypodermically it requires at least

one hour to exert its maximum effect although this action can be obtained in ten minutes if given intravenously.⁸ Barbiturates are especially valuable due to their soporific effect and ability to modify the toxic qualities of a local anesthetic.^{7,9} They are more useful from the standpoint of comfort than they are safe, however.⁸ Scopolamine may occasionally produce periods of excitement. Hyoscine may predispose to more postoperative complications than related drugs.^{9,10} Paraldehyde is a safe and effective drug which may be given orally or rectally.¹¹ The use of atropine sulfate, although time honored, does not merit the tendency to its routine use. In acute abdominal surgery the Jackson Clinic finds frequent use for sodium phenobarbital one and $\frac{1}{2}$ gr. orally or 3 gr. rectally one and one-half hours before surgery. One hour before surgery pantopon $\frac{1}{3}$ gr. and often scopolamine $\frac{1}{150}$ to $\frac{1}{300}$ gr. are given hypodermically.

Skin Preparation. The skin site of a purposed surgical incision should receive careful attention. Gentle cleansing with mild solutions is sufficiently effective to render undesirable harsh scrubbing and strong solutions.¹² The presence of hair in an operative field may not be as surgically offensive as numerous skin nicks made in its unskilled removal. It is well to prepare a large skin area.⁴ Open wounds, the umbilicus and sinuses may be sealed with collodion. Exercising aseptic technic and utilizing white soap, sterile water and cotton balls gently scrub the skin for two minutes. Next shave the area cleanly with a sharp blade, wash away all loose hair and continue gentle scrubbing for eight more minutes. Use plenty of white soap. Rinse the skin with sterile water. If a tinted germicidal dye is desired zephiran (1:1000) or merthiolate¹³ are permissible. Skin prepared as just described is as well prepared as by any method. The skin should be prepared just before surgery. In the event that more than an hour elapses after the above preparation and before surgery the skin merits another five minute scrub just

before draping using the above technic. It is well to remember that the skin is not rendered "sterile" by any ritual of preparation, but the method just reiterated has physiological merit and proven virtue.

SPECIAL PREOPERATIVE SURGICAL PROBLEMS

Poor Risk Patients. Many patients who must submit to surgery due to an acute abdominal complaint are poor risks. This condition may be due to the primary disorder but it is often the result of an associated state.^{14,15} The "poor risk" cannot always be anticipated but the very young and the aged are generally not good risks.¹⁶ Children require greater surgical care as they tolerate pain poorly, are emotionally unstable, cooperate reluctantly, are unpredictable in accepting nourishment, fall easy victims to infection and have water, acid-base and nitrogen equilibriums that are readily disturbed.¹⁶ These tendencies demand careful preventive measures. The aged surgical patient is becoming more prevalent. When handled carefully they tolerate surgery well but are more prone to circulatory and renal failure, pulmonary complications, embolic phenomena and slow tissue repair.¹⁷

Diabetic Patients. Joslin states that over 50 per cent of all diabetic patients receive surgical care some time in their life.¹⁸ Statistical studies further show that the number of diabetics has doubled in the United States in the past decade.¹⁸ In emergency surgical cases particularly accompanied by infection the operative risk and mortality are greater in the diabetic.¹⁹ Every effort must be made to control the diabetes as certain symptoms of diabetic acidosis (i.e., nausea, vomiting, abdominal pain and leucocytosis) may simulate or mask an acute surgical condition of the abdomen. Not infrequently an acute abdominal lesion may precipitate a diabetic acidosis.¹⁸ When this occurs, combat dehydration and acidosis with large amounts of fluids, glucose and insulin.²⁰ Keep in mind that the most prominent symptoms of prothamine hypoglycemia are nausea, vomiting,

headache and dizziness,²¹ thus rendering differentiation from acidosis at times difficult. Protect the patient with a high carbohydrate intake covered with sufficient insulin as judged by blood sugar determinations. The diabetic subjected to surgery especially when infection is present will demand substantial increases in insulin.^{18,21,22} Spinal anesthesia is ideal for the diabetic patient. Once operated upon the diabetic becomes an excellent candidate for postoperative complications.

Cardiac Patients. Patients with suspected or recognized cardiac lesions cause the surgeon considerable concern. The blood pressure and the electrocardiogram frequently do not aid in evaluating the heart's work capacity. Very often a more valid and simple cardiac test is the heart's response to exercise or the patient's reiteration of his ability to exercise. It is necessary to keep in mind the often wide latitude between heart disease and heart failure. It is true that surgical patients with angina pectoris, syphilitic aortic insufficiency, aortic stenosis and heart block may be subjects for sudden death.²³ Render the cardiac patient free of pain with an opiate, alleviate anxiety by a barbiturate and promptly fortify the heart muscle with digitalis when indicated. During surgery be doubly vigilant to avoid a fall in the blood pressure.²⁴ Following surgery instigate measures to prevent distention and vomiting, assist the patient to move freely, give parenteral fluids slowly and in well tolerated amounts and do not allow the patient to exert himself. The inhalation of oxygen spares the heart, reduces respiratory effort, hastens the recovery of the nerve centers and assists in preventing distention and pulmonary congestion.

Gastrointestinal Patients. Acute disturbances of the gastrointestinal tract early exert a profound biochemical disturbance in the patient. Special evaluation must be given to the presence or absence of obstruction, the electrolytic balance, store of protein and the presence of infection.²⁵ When acutely involved the gastrointestinal tract

must be placed at rest by withholding oral nourishment, emptying the stomach through a Levin catheter and when indicated decompressing the small bowel by means of a Miller-Abbott tube. The value of the Abbott-Rawson tube for simultaneous gastric suction and intestinal alimentation is recognized. In event barium has been administered as a diagnostic medium see that it is removed before surgery. Preoperative catharsis has no place in these cases.¹¹ The value of an enema utilizing a mild solution has its indications. These patients, due to reduced oral intake, vomiting and diarrhea, suffer from water and electrolytic balance disturbances calling for careful but often copious amounts of parenteral fluids. Hypoproteinemia may produce obstructive edema of intestinal suture lines and should be corrected by whole blood and amino acids. The need for additional vitamin C and vitamin B complex is present and vitamin K is of value even though jaundice is not present. Too frequently these patients receive inadequate calories during the first seven, even fourteen days postoperatively. Do not calculate the nourishment intake in terms of cubic centimeters of fluid but rather in calories derived from Grams of carbohydrate, fat and protein.

POSTOPERATIVE TREATMENT

Immediate Postoperative Period. The period immediately following surgery and for four hours thereafter is an especially vital one for the patient.¹⁴ This is all the more true if a general anesthetic has been given. The value of a surgical recovery ward devoted exclusively to postoperative care for the patient's first twelve to thirty-six hours is recognized. In its absence adequate standing orders in the hands of competent lieutenants are essential. Orders applicable to the immediate postoperative period of acute abdominal cases include:

Transferal from operating table: Do not suddenly alter a position that has been long maintained.¹ Support the spine in its physi-

ological position. (The anesthetist at this time will supply a listing of the patient's general state, blood pressure, pulse, respirations and medications recently given).

Transportation on operative cart: Do not leave the patient alone for a moment. Keep him well covered. See that the patient's chart accompanies him.

Transfer from cart to bed: Have the bed warm and flat. Lift, do not drag the patient into bed. Cover lightly (excessive covering contributes to restlessness and water loss by sweating).²⁶ Do not place pillows beneath the knees (they invite vascular complications). A moderate Trendelenburg posture is useful (it aids cerebral circulation, lightens the cardiac load and facilitates bronchial drainage).

Maintain a free airway: Have at hand a mechanical airway, tongue forceps, mouth gag, emesis basin and towel.

Inventory of the patient's condition: Note and record at least every thirty minutes for three to five times the patient's blood pressure, pulse, respirations, etc. Watch dressings for soilage, and properly connect drainage tubes.

Special equipment: Intravenous fluids, gastric suction and intranasal oxygen are used routinely; have the equipment ready.

Assist in recovery of motion: As a patient awakens from a general anesthetic he will often be confused and given to moving about. This is favorable to recovery and sedation should not be given in this "restless" period. Turn or assist the patient to do so. Move the limbs through their range of motion. Encourage deep breathing and gentle coughing.

Bladder care: Aid the patient to urinate. Do not delay catheterization especially when intravenous fluids have been given. When catheterization must be repeated request orders for special bladder care.

Oral hygiene: Moisten the lips, allow the mouth to be rinsed and the teeth to be brushed. Gum may be chewed; later glucose candy sucked upon.

Reassure the patient: Good nursing care allays apprehension, has a sedative effect

and favors the return of physiological processes.

Postoperative Pain. Pain is often the first companion of a patient postoperatively. It is usually preceded by discomfort, restlessness, fatigue and insomnia. It is more readily controlled early in its onset than when anxiety and exhaustion become its comrades.²⁷ When not definitely contraindicated surgical patients deserve sufficient anodyne to provide comfort during the first two or three postoperative days. Morphine or one of its fractions (i.e., pantopon) is the best drug. Demerol is to be recommended for its anodyne and antispasmodic virtues. Such medications do not lend themselves to "p.r.n." ordering or as a compensatory medium for inadequate nursing care or rough surgical technic. Skilled nursing care and judgment in administering an anodyne contributes much to the prevention and to the control of pain. Too frequently a hypnotic drug (i.e., chloral, paraldehyde, bromides, barbiturates, etc.) is administered in hopes that it will relieve pain. These drugs are designed to produce somnolence not to relieve pain. The excellent pain alleviating qualities of acetylsalicylic acid are useful.

Fluids Postoperatively. It is not valid to assume that a patient can readily survive a postoperative period of nutritional withdrawal by calling upon stored constituents. It is true that a preoperative surplus of water, salt, carbohydrate, protein, fat and vitamins fortify in part a patient's postoperative needs, but only for a few hours.²⁸ Ideally all these substances are given orally; however, when this route is not available they are given rectally, subcutaneously, intravenously, intramuscularly, intraperitoneally and so forth. In certain instances one or a combination of these routes may be superior to others. Do not become wedded to any one method. Too frequently the safe, economical and, when properly used, easy administration of rectal nourishment is neglected. Intravenous alimentation is widely utilized and the sub-

sequent comments pertain to this method of fluid administration.

Water. Water constitutes 70 per cent of the body weight and stands second only to oxygen as a vital physiological substance.²⁹ The amount of water received by a surgical patient is as important as the dose of any other potent therapeutic agent.³⁰ Water participates in two major functions, namely, the elimination of waste (via the urine and the bowel) and the dissipation of heat (via sweat and the respiratory tract). The former has first claim upon the body's water and the latter upon that which remains.³¹ The water a surgical patient will require depends upon the amount vaporized, passed as urine, used to replace abnormal losses (i.e., vomiting, drainage, etc.) and that needed to overcome a previous state of dehydration.³² The amount of water necessary to fulfill these needs is not easily ascertained. A number of laboratory tests (i.e., hematocrit determination, blood specific gravity, blood plasma's electrolytic pattern, etc.³³) are of assistance but they are not specific. Certainly the surgeon should not wait for clinical symptoms of dehydration to signal the need for water. Nor should he rely upon an order to "force fluids" which is an unscientific request and if carried out literally could be dangerous.³²

A gross but workable estimate of water balance can be secured by the careful measurement of the amount of fluid consumed and the amount of urine excreted. An output of 500 cc. may be adequate provided the urine is concentrated to a specific gravity of 1015 or above. Urine whose specific gravity is below 1015 may require 1500 cc. to complete its excretory task.³² The average patient will require at least 2,000 cc. of water each twenty-four hours and certain patients may need twice this amount. The amount of water retained within the body depends upon the "holding" qualities of the electrolytic ions (i.e., sodium, potassium, calcium, chloride, etc.).^{15,34} When these components are low, water promptly passes through the renal mechanism and is lost, when present

in excessive amounts water is fixed in the tissues and edema may result.

Salt. The normal salt requirements varies from 5 to 10 Gm. daily which maintains a blood chloride level near 560 mg. per 100 cc. of blood and more than 1 Gm. in the urine. The major functions exerted by salt are: (1) maintenance of the acid-base balance, (2) retention of fluid in cellular tissue, (3) maintenance of tone in the intestinal musculature and (4) it is bactericidal.⁵ The need for salt is markedly increased in the presence of pyrexia, vomiting, diarrhea, aspiration or loss of small bowel content, previous dehydration, etc.³² Symptoms of salt deficiency (hypochloremia) develop when the blood level falls below 450 mg. per 100 cc. The symptoms may include mental depression, fatigue, nausea and stupor.³⁵

So-called physiological saline has become a favorite solution for parenteral administration either alone or as a vehicle. The popularity of this solution is questionable when given in more than 2,000 cc. quantities. One thousand cc. of a 1 per cent solution of sodium chloride supplies the average need of 10 Gm. of salt. The merits of a hypotonic saline solution (i.e., 0.45 per cent sodium chloride) are evident when it is recognized that isotonic and hypertonic sodium chloride solutions may cause fluid withdrawal from the intracellular compartments.³⁶ Ringer's solution has special indications when potassium and calcium are needed.³¹ Hartman's solution is one of choice in the presence of acidosis.⁵

Glucose. Glucose administered intravenously is a ready source of food; it helps prevent acidosis, protects the kidneys by sparing the body's protein, assists the liver to maintain a glycogen balance, acts as a diuretic and is an essential metabolite in muscle contraction, especially of the heart.⁵ A 5 per cent glucose solution in water is isotonic and provides about one hundred calories per each liter. The body has no difficulty utilizing glucose except when given too rapidly or when a state of diabetes is present. Winslow has shown that the daily

administration of 3,000 cc. of 5 per cent glucose in distilled water given at a rate of 300 to 500 cc. per hour is well tolerated and 98 per cent utilized. (It is well to remember that when 5 per cent glucose is added to a 1 per cent solution of sodium chloride a hypertonic solution results). When additional calories are desired a 10 per cent glucose solution may be utilized although it may temporarily cause tissue dehydration and resulting thirst.

Protein. The necessity of protein for the post-surgical patient has long been recognized but an adequate source and mode of administration is not easily available. The incidence of hypoproteinemia in post-surgical patients is high.^{37,38,39} Those especially prone to develop this condition are patients with bleeding peptic ulcers, cancer of the gastrointestinal tract, bowel obstruction and intestinal fistula.⁴⁰ In the presence of hypoproteinemia fluids tend to leave the blood vessels and the administration of large amounts of sodium chloride solution only accentuates this process. Signs of hypoproteinemia may include lassitude, asthenia, slow wound healing, ascites, edema of suture lines and abdominal distention.^{24,35,41} Blood plasma is a fair source of protein but whole blood is superior due in part to the value of hemoglobin as a protein source. The cost of either substance to combat hypoproteinemia is high as 10,000 cc. of whole blood may be required. To maintain a normal nitrogen balance following surgery as much as 70 Gm. of protein are required each twenty-four hours.³⁹ (1,125 cc. of blood plasma provides approximately 70 Gm. of protein). An amino acid solution prepared by the hydrolysis of casein is available in a 5 per cent concentration. (Amigen is an example). About two-thirds of the contained protein is available (approximately 33 Gm. per 1,000 cc.).³⁵ The solution is in general well tolerated, although relatively expensive and low in protein when used as its sole source. To such a solution may be added glucose, salt, vitamins and sulfanilamide.

Elman³⁸ states "That for surgical or other patients not able to take food by mouth, a simple plan may be drawn up in which all of the nutritional elements can be introduced intravenously in a volume of 3,000 cubic centimeters. This amount of water is probably necessary in most cases for maintaining water balance and providing a urinary output of about 1000 cubic centimeters or more per day. Of the three liters, one liter at least should contain five per cent protein digest and five per cent dextrose. Of the other two liters one will contain five per cent dextrose in water and the other isotonic solution of sodium chloride, which can be injected subcutaneously, thus relieving the patient of the long period required for the administration of three liters of fluid into the vein."

Vitamins. The added need for all the vitamins by surgical patients is well established. Virtually all may be given other than orally. Certain members are more essential than others, namely, vitamin K, C and the B complex. The need for vitamin K (menadione) in the newborn, the pregnant female, jaundiced persons and certain patients with atopy is recognized.⁴² To operate a patient with the prothrombin below 60 per cent of normal is hazardous. The daily dosage of menadione is 2 to 4 mg. It may be given orally, intravenously or intramuscularly. When given orally supply 1 to 3 Gm. of bile salts daily. Cevitamic acid deficiencies occur in starvation, ulcers of the gastrointestinal tract, gastritis and other states. Besides symptoms related to scurvy its deficiency may prevent the proper deposition of collagen in a surgical wound.¹⁴ Vitamin C should be given these patients in amounts ranging from 500 to 1000 mg. daily, taken orally or parenterally. The members of the vitamin B complex are especially indicated in deficiency states, alcoholism, central nervous system disturbances, diabetes, hyperthyroidism and following copious amounts of intravenous fluids. Their dosage under acute surgical circumstances must exceed the therapeutic ones. In administering water

soluble vitamins fractionate the dosage or a wasteful renal spill will occur.⁴³

Oral Nutrition. Following the opening of the abdomen a functional physiologic ileus develops. Its duration depends largely upon the extent and duration of trauma (either chemical or physical) that the abdominal tissues have sustained. Its presence is indicated by an absence of peristalsis and its disappearance by a return of the intestines' normal motility as determined by auscultation. This return may require as long as eighteen hours but this period can be shortened by gentle operative handling of tissues and the judicious administration of oral nourishment. Early feeding tends to decrease so-called gas pains, lessens the possibility of ileus and may assist in preventing a mesenteric thrombosis. The withholding of oral nourishment usually has little place in modern surgical care unless the taking of food jeopardizes the integrity of the intestinal tube itself. In the event a long period of withheld oral nourishment is anticipated as after a gastrectomy, a tube (Abbott-Rawlson or plain catheter) may be introduced through the wound and into the intestine and used as an avenue of nourishment. The problem in every case, however, is an individual one not given to routine consideration. Should nausea develop, vomiting result or intestinal distention ensue it is well to withhold oral nourishment but in their absence oral nutrition may be given shortly after surgery. Liquids of preference include hot water or tea followed by fat-free broth, gelatin, cold water and semi-solid food. By the third day a selected general diet is usually tolerated. Fluids prone to provoke distention include grape juice, orange juice, milk and certain flavored carbonated beverages. Frequently a patient has a consuming desire for a certain food which is often well tolerated when other substances may be rejected. Early oral nutrition often assists the bowel in producing a spontaneous stool circumventing catharsis and enemas.

Ambulation. Sufficient evidence is avail-

able not only to recommend early rising of surgical patients but to demand it. This practice was suggested by Emil Reis of Chicago early as 1889 and followed extensively abroad. It is now receiving its righteous recognition in this country as a major surgical contribution. The empirical use of eight or ten days of postoperative bed rest is in general traditional and unphysiological. Many surgical complications are the direct outgrowth of immobilization associated with bed rest. This is especially true when the abdomen and lower thoracic region is encompassed by a tight binder. Surgical incision plus the binder splint the abdominal muscles, limit the diaphragmatic excursion with resulting tendency to pulmonary complications, reduced cough reflex and lessened vital capacity.⁴⁴ Circulation in and about the wound is inhibited and tissue repair proceeds more slowly. Leithauser demonstrated that patients permitted to rise early following surgery regain their normal vital capacity in two to seven days while those kept in bed require seven to fourteen days. Certainly it is unphysiological to place tissues at rest if their circulation is thereby diminished and slowed. If circulation is slowed, healing is delayed, clotting is facilitated and embolism becomes likely. If disuse causes tissues to lose their full functional purpose, stimulate them and prevent this loss by assigning them their physiological task early in surgical recovery.⁴⁵ True, early rising presupposes certain surgical rules, namely, adequate pre- and postoperative care, careful hemostasis, accurate, gentle wound approximation with well chosen sutures, asepsis and psychic fortification. Early rising is defined as standing or walking in the first twenty-four postoperative hours. Patients may require encouragement and assistance in arising from bed as soon as their postoperative recovery permits. Careful expression of air from the peritoneal cavity at the time of peritoneal closure reduces reaction from this source when the patient arises.

The virtues of early rising are: (1) accelerated healing of tissues, (2) reduced disruption of the wound, (3) minimal thrombic and emboli formation, (4) less gastric and intestinal distention, (5) fewer bladder complications, (6) fewer enemas, (7) reduction in the amount of nursing care needed, (8) greater opportunity for self-help by the patient, (9) improvement of the patient's morale, (10) less asthenia, and (11) shortened hospital stay with resulting economy.⁴⁶

Certain surgical situations or circumstances preclude early rising. Some of these conditions include: (1) fulminating peritonitis, (2) advanced cardiac disease, (3) pancreatitis, (4) hemorrhage not surgically controlled, (5) extensive phlebitis, (6) advanced cachexia and/or jaundice, and (7) large drains and/or temponades.²⁴

Postoperative Complications. Complications that develop postoperatively generally reflect upon the care and foresight of the surgeon. It is his duty to anticipate the complications that may occur and circumvent them. Complications arise mainly from trauma which may be mechanical, infectious, chemical or psychic in nature.¹ The surgeon who operates with minimal trauma will in turn minimize subsequent complications. It is wiser to be adept at preventing complications than skilled in their treatment.

Trauma of mechanical origin accounts for most surgical complications. The more prevalent causative factors are failure to practice scrupulous hemostasis, exposing serosal surfaces and allowing them to become cool and dry, blunt dissection, mass ligation of tissue, indiscriminate crushing of blood vessels, rough handling of other tissues, tension upon visceral structures, prolonged mechanical retraction, allowing hollow viscera to become overdistended and strangulation instead of approximation in closing tissue layers. These surgical indiscretions give rise to shock, pain, distention, nausea, vomiting, ileus, thrombosis, embolus, urinary retention, etc. The

surgeon must be gentle while he executes his task with dispatch.

Trauma of an infectious origin may arise at the site of surgery from whence it may be dissipated elsewhere or it may be introduced into the surgical area and other sites from an external source. If infection is present, endeavor to limit its spread and microscopically identify by smear the causative organism. Frequently, smears from an apparently clean area may reveal organisms that bode harm unless promptly dealt with. In every case endeavor to combat a known causative organism not a group of unfavorable symptoms. Infection in the abdominal cavity when local calls for drainage; when not localized it probably defies drainage. It is necessary to mention the superior surgical results obtained at the Jackson Clinic by the local use of sulfanilamide and sulfathiazole. As much as 5 to 15 Gm. may be placed in grossly infected peritoneal spaces and frequently closed without drainage. It is also well to note the apparent catalytic effect of sulfathiazole and sulfadiazine when administered simultaneously. The sulfa drugs and penicillin are effective surgical handmaidens but they permit no surgical liberties.^{14,47}

Trauma of chemical origin manifests itself mainly by changes in acid-base, nitrogen, water and electrolytic balance. In the body sodium ions make up the chief base and chloride ions are the chief acid radicals. Vomiting can and often does produce alkalosis and is relieved by adequate salt and water. Starvation, diabetes mellitus and loss of intestinal secretions may produce acidosis which calls for glucose, salt, water and at times insulin. Blood chemistry determinations are helpful in regulating these postoperative metabolic disorders.

Trauma of psychic origin includes all the mental changes that surgery and its attended rigors produce. This may vary from fear to a true psychosis. Avoid when possible operating persons who feel they "will not get well." Do not forget that

many psychotic persons subject themselves willingly to surgery and, unless wary, the surgeon may unknowingly "fix" such a psychotic aberration. Cutler has aptly stated that one cannot treat the body well unless one also treats the mind.

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