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Recent Knowledge on Treatment of Chemical Warfare Casualties

Responsibility for civil defense against chemical warfare rests upon individuals, civil defense units and government agencies.

Three responsibilities which civil defense units must assume as beyond the capabilities of the average individual citizen are: 1. Detection and identification of the chemical agent, monitoring for which would require automatic devices, almost immediate analysis and decisive report to the public by either the direct sounding of an alarm or by a central control agency which has been furnished reports. 2. Decontamination of individuals and their clothing, equipment, water and food; and of whole areas, including building and plant facilities. Previously trained personnel in units, transport, and means for decontamination must be provided for this. 3. Treatment for chemical warfare casualties, including decontamination where necessary, for which essential means must be provided to previously trained personnel.

Governments (federal, state and local) also have three great fields of responsibility. 1. They must provide information for the training of individuals and units to (a) protect citizens in attacks; (b) combat rumor and panic and other adverse psychological effects; (c) inspire confidence in and acceptance of leadership. 2. They must provide personnel and material means and management. 3. They must provide organized activities directed against chemical attack and towards the treatment of casualties from chemical attacks. These aspects are suggested, rather than fully discussed.

In this paper chemical warfare agents are discussed as an all-inclusive entity. However, students planning future civil defense against chemical warfare should plan to learn, in a methodical manner, everything possible concerning individual agents, utilizing a standard operating procedure (S.O.P.) check list as a guide, similar to the following 10 points:

1. Nature of agent.
2. Munitions for chemical agents.
3. Methods of dispersion.
4. Effects upon people.
5. Effects upon food and water.
6. Means of protection where human contact is unavoidable, by dispersion or other method. For example, individual protection by gas masks, protective clothing, seeking shelter inside house or shelter; collective protection by detection devices, alarm systems, gas proof shelters, in addition to protection of supplies and equipment, food and water, clothing and shelters.
7. Special protection of materiel, e.g., food, water, etc., by protective packaging.
8. Methods of decontamination in which the agents are actively removed, destroyed, fixed or sealed, or passively allowed to disperse or vanish with climatic or other natural action, etc. Active decontamination is possible for individuals, equipment and areas. Various decontaminating agents are used in different ways against the different agents.

9. Methods of treatment: first aid, definitive, sorting, treating.
10. Relationship between chemical warfare agents, their effects and their handling.

It is apparent that no such rapid review as just presented is adequate. Maximum understanding of at least 2 groups of current chemical warfare agents must be attained. First, the matter of incendiaries is one which should have continuing attention. Their great potential proved by World War II attacks upon Tokyo, Hamburg and other cities have continued to the present time. The incendiaries as a group are sufficiently understood to permit going on to the consideration of nerve gases, details of which have recently been publicized. (See Medical News Letters, Vol. 16, No. 9; Vol. 17, Nos. 5 and 10.) More toxic than formerly known chemical warfare agents, they gain entrance to the body by inhalation of the vapor or by absorption of the liquid agent through the skin, the eyes or the gastrointestinal tract. Detailed consideration of this newer agent would serve also to illustrate many of the points mentioned in the standard operating procedure check list.

In summary, the necessity for civil defense preparedness for chemical warfare has been reaffirmed; a general discussion of the subject in the broadest terms has been presented; limited types of agents (the incendiaries and nerve gases) have been stressed. Chemical warfare against the United States is a practical possibility under certain circumstances. (J. Missouri M. A., May 1952, COL. W. L. Wilson (MC) USA)

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Penetrating Wounds of the Heart

This report of 81 cases creates a perspective by which the problem of penetrating wounds of the heart emerges as an understandable unity with well defined pathological and clinical facets. The core of the problem is acute pericardial tamponade, which, by its development, contains hemorrhage, prevents a voluminous blood loss, and thereby saves life in the early phase. But tamponade is a two-edged sword, and if the build-up of intrapericardial pressure continues unabatedly, death will ensue from cardiac compression. The evidence indicates that lethal tamponade may occur relatively rapidly; also that tamponade may be prolonged for as much as 10 hours or more without fatality. The latter indicates that the build-up of lethal pressure was delayed, stopped or controlled in one of two ways, or in both. (1) By the reduction or cessation of hemorrhage from the cardiac wound - by blood clot or wound closure itself. To quote Ballance, "wounds of the heart under some circumstances do not allow the continued escape of blood. They close and heal as do some wounds of the great arteries." (2) By decompression through the constant or intermittent ejection of blood from the pericardial wound.

The evidence of long duration of tamponade suggests not only that aspiration has a logical basis for use as definitive therapeutic procedure, but also that, in the isolated case, the tamponade may become stabilized and go on to resolution with healing of the cardiac wound and recovery of the patient. A few such cases have been reported, which were verified by autopsy findings. Even in the period

before operative interference on the heart according to Georg Fischer's statistics, 85 % died and 15 % recovered.

Aspiration as definitive therapy is opposed, except when the surgical set-up, including personnel, is inadequate for the task of pericardiotomy and cardiorrhaphy. Aspiration seems to be impracticable, as shown by the authors' findings that the major content of the sac is unfailingly clotted blood. But more important is the consideration of the late results that seem likely with blood clot remaining and with fibrin deposition on the serous sac over heart and the large vessels at the base. Adhesions seem to be inevitable as in a clotted hemothorax, and certainly there would be some incidence of adhesive pericarditis as a sequel. Even in the present series, with clots removed, there has been evidence that adhesions do form, since 5 cases of adhesive pericarditis were noted, 2 of which had increased venous pressures, and indications of the constrictive syndrome. In a recent report, Dr. Maguire of Louisville, operated upon a patient for constrictive pericarditis 6 months after the aspiration treatment. It is likely that as time goes on, a greater number of cases of constrictive pericarditis, sequel to the aspiration treatment will be reported.

From 1938 to 1951, each successive year has given a lowered incidence of infection i.e., sepsis, septic pericarditis, empyema and wound infection due in great part to the effectiveness of chemotherapy and the antibiotics. Careful preoperative preparation and meticulous surgical procedure likewise played a significant role in this record.

Of the authors' 80 patients, 20 died before surgery could be instituted, and 61 were operated on with a recovery rate of 57.3 %.

All patients with myocardial wounds who reached the operating table, with the exception of 2 who died on the table, had a significant pericardial tamponade.

Practically all heart wounds were inflicted transpleurally so that two problems were simultaneously posed; viz., the penetrating wound of the heart, and the penetrating wound of the chest with lung laceration, hemothorax, pneumothorax or hemopneumothorax. A transpleural surgical approach was therefore in order for an overall assessment of the thoracic injuries and for appropriate therapy.

The authors are convinced that surgical management is preferable to conservative management by aspiration. Pericardiotomy and primary cardiorrhaphy is a sound effective procedure, which is capable of effecting a high recovery rate and less likely to result in adhesive pericarditis with the ominous danger, in some cases, of development of the constrictive syndrome. Their findings suggest, however, that aspiration may on occasion be thoroughly effective as definitive therapy. There is no question of its value preliminary to surgery. (Surg., Gynec. & Obstet., May 1952, A. De L. Maynard, J. W. V. Cordice, Jr. & E. A. Naclerio)

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Management of Hand Injuries

In the management of injuries to the hand, it is the prime purpose of the surgeon to obtain a properly functioning hand as an end result; all efforts should

be directed toward this eventual goal.

First, one must stress the first-aid management which consists in the application of a sterile protective dressing, a firm compression bandage, and immobilization by splinting in the position of function which is the position of grasp. This is obtained when the wrist is hyperextended in a cockup position; the fingers are in mid-flexion and separated and the thumb is abducted and in mid-flexion with the tip pointing toward the little finger. This type of first aid should be instituted at the place of injury and can be applied by a nurse, physician, or even by instructed fellow workers. It is important that the wounds not be explored with fingers or instruments, painted or douched with antiseptic solutions, or dusted with sulfa powder or other drugs. After the first-aid treatment, the patient should be sent immediately to the hospital where definitive treatment may be given.

At the hospital, after the necessary thorough examination, and x-rays have been taken, and gross evaluation of tendon, nerve, blood vessel and bone injury has been made, the patient is prepared for the operating room where definitive and properly administered care can be carried out.

Under general anesthesia and in a bloodless field, the hand is well cleansed, care being taken not to use chemicals of any kind on the wound itself. After adequate surgical preparation of the hand, a complete and sensible debridement of the wound with complete removal of all devitalized tissue and foreign material is carried out. Because of the multiple delicate structures of the hand, in case of doubt as to whether tissues are devitalized or viable, it is better to err in favor of the latter.

Following this, the injured structures are repaired with the idea in mind that the aim is early restoration and good function of the hand.

Lacerated Wounds. These may include damage to the skin, fat, muscles, tendons, tendon sheaths, blood vessels, nerves, and bones and joints with various combinations. In all these injuries, treatment has 4 objectives: (1) protection from infection, (2) restoration of structures, (3) avoidance of deformity and (4) early restoration of function. After the skin edges have been excised and the wound blocked, then definite surgery is undertaken. All divided blood vessels are secured and ligated with very fine plain catgut. The author advises primary suturing of nerves and tendons, as having an advantage over secondary or later suturing. Hence all severed nerves, including digital nerves, should be repaired. Fine arterial silk should be used, accurately approximating the nerve ends by means of small interrupted sutures placed around the periphery and including only the perineurium and avoiding the nerve bundles. It is important to avoid axial rotation, particularly in nerves having both sensory and motor function. Nerves should be handled gently, never crushed, rubbed or allowed to become dry. Care should be taken to distinguish nerves from tendons so that suturing of a nerve to a tendon is not carried out.

Tendons. All tendons should be repaired, including the tendon of the intrinsic muscles. An important exception to this rule concerns the flexor tendon severed within the flexor sheath or in the digital flexor canal. In the prepared, fairly clean wounds, these may be safely sutured with interrupted sutures of fine silk, approximating the cut ends after they have been freshened and squared with

a sharp knife or, best, a safety razor blade. Where tendons have retracted and additional incisions are necessary to locate the retracted tendon ends, these incisions should be curved or transverse, never longitudinal and never in the palmar or dorsal mid-line aspects of a finger. Tendons, like nerves, should never be crushed, rubbed or allowed to dry or be handled roughly. Splinting is required following tendon repair with the tension being removed from the suture line, i.e., allowing the hand to assume the position of function.

Muscles. Severed muscles should be lightly approximated with interrupted mattress sutures of absorbable material tied to avoid tension and contraction.

Fascia. Severed fascia or ligamentous tissue should be approximated with interrupted mattress sutures of absorbable material, again avoiding tension.

Subcutaneous Tissues. It may or may not be necessary to approximate the layer, but when it is felt that suturing is indicated, a very fine absorbable material is again used.

Bones. In bony injuries one is interested in obtaining restoration of normal relation of bony structures, in maintaining the corrected relation of bones to permit healing, in preventing stiffening of the joints in a position of non-function and in early restoration of function. Preoperative x-ray films are sent to the operating room with the patient as a guide toward restoration of normal position of the bony structures at the earliest possible time. This may be accomplished by manipulation, manual traction, pressure and molding, all of which should be gentle and deliberate so as to avoid further soft part injury. In closed fractures, when attempts at manipulative reduction are not promptly successful, open replacement of the fractures is the treatment of choice. In combination injuries, when open fractures are encountered, reduction is carried out at the time of the original definitive treatment in the operating room and care of the bone should precede any tendon or nerve repairs.

Skeletal traction applied by means of Kirschner wires is a very satisfactory method of treatment and may be combined with the use of plaster splints to maintain reduction. Flat splinting is to be condemned, and all joints whose motion will not jeopardize healing and position should not only be left free but should be actively moved during the entire period of immobilization.

Immobilization may be obtained by the use of the Mason universal splint or molded plaster splints; internal fixation with the use of Kirschner wires or a portion of a Hagedorn needle used as an intramedullary or transfixation pin. The length of time of fixation varies, depending on the structures involved. Ligamentous injuries following dislocation need about 2 weeks of immobilization for healing; long bones of the hand, about 3 weeks; carpal bones, 12 to 16 weeks. During this period of healing it should again be stressed that all joints not necessarily immobilized should be freely moved so as to activate their controlling muscles, and frequent, even almost constant, use by the patient should be encouraged.

Skin. Where sufficient skin is available for primary closure, this is accomplished by means of interrupted sutures of firm, non-absorbable material. In those cases where there is loss of skin, immediate skin grafting is indicated. This varies with the particular case. Pinch, split thickness or full thickness or pedicle grafts may be required. One of the fundamental principles in the

management of traumatic wounds is "convert all open to closed wounds as soon as possible."

Partial Amputation of Tips of Fingers. Immediate pinch or split thickness grafts placed over the debrided tip gives excellent results in those cases in which the bone is not protruding. Where bone is protruding, revision of the stump with definitive amputation is the treatment of choice. When primary skin closures cannot be obtained because of loss of skin, immediate Thiersch grafts are placed over the denuded area to obtain a closed wound.

Mention should be made of possible uses of pedicle grafts from the abdomen or thigh in cases in which partial amputation with extensive soft tissue damage has occurred involving the thumb. As the thumb is the most important digit of the hand, no bone should be sacrificed. By this plastic procedure done at the first operation, a useful member can readily be obtained. This should be done at the time of original definitive care and not as a late reconstruction procedure.

After-care. This involves the proper application of a dressing, bandages and splints as the case may demand. Gauze is placed between all the digits with the nails and finger tips exposed for examination purposes, unless the tips of the fingers are involved. Sheet cotton is then applied, followed by a compression bandage with the hand being immobilized in the position of function as previously described. Adequate splints are then applied, and where tendons have been involved, one must remember to take the tension off the suture line. The patient is then placed in bed with the extremity elevated and the dressing is not removed for 5 or 7 days unless infection is suspected, in which case the dressing is removed and the hand observed. Antitetanic serum and gas gangrene serum are given immediately upon admission to the hospital, but antibiotics as a prophylactic measure are not used routinely. Active motion is started daily in the uninjured parts and splints are removed as soon as it is felt safe to do so, even though the bone healing has not been complete. A well-functioning deformed hand is believed better than a cosmetically perfect hand with no function.

Stellate ganglion blocks are used almost routinely on the author's serious cases in severed hand injuries. In this way the patient is made more comfortable, the vasospasm is eliminated, the circulation is improved, edema is diminished and healing is hastened. One is given in the operating room after the dressing is applied and others are given during the postoperative period as often as indicated. (Pennsylvania M. J., April 1952, J. H. Wagner)

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Burns of the Mouth

Burns of the mouth are identical to burns elsewhere on the body except, obviously, a sunburn. There are slight variations, however, in their treatment.

Just as in the case of burns elsewhere, the etiologic factors may be thermal, chemical, radiation or electrical. Moreover, burns of the mouth may also be classified as of first, second and third degree.

Thermal burns may be caused by extremes of heat or cold. The extreme cold, latent in a piece of metal placed in the mouth or on the lips, can cause a

surface destruction of the mucous membranes which causes the individual to pull away from the surface. This, in turn, will strip the surface tissue away, leaving a raw and sometimes bleeding surface. Usually enough epithelial structure remains and healing takes place spontaneously. Deeper freezing causes a serious wound which may necessitate grafting to prevent scar formation.

Heat, caused by either friction or latent heat in an object can cause trauma ranging from a mild hyperemia to a marked destruction of tissue, necessitating later plastic repair.

Chemical burns resulting from acids or alkalies should be neutralized as soon as possible with an agent that will not be destructive to the normal tissue. Continuous lavage until one is certain that no more harm will come from the destructive agent should be carried out very cautiously and thoroughly.

Radiation burns from x-ray or radium are treated best with watchful expectancy and supportive treatment, allowing them to heal before attempting a plastic repair. The amount of destruction of surface tissue, vascular disturbance, resulting fibrosis and deformity determine the subsequent procedures.

Electrical burns of the mouth probably occur most frequently. As soon as babies are allowed to crawl this hazard becomes manifest. Babies tend to place everything in the mouth and chew on it. In the case of electric wiring, chewing continues until a direct short is established between the two wires which causes a flash burn from the arcing and also a surge of current to pass through the tissues, producing many changes. These range from a mild hyperemia to a black char, depending on the length of time the current is on, direction of the flow of current, amperage, voltage and the ground. These babies are thrown into shock and should be treated immediately.

An electrical safety code should reduce this danger by making the following obligatory: (1) All lamp cords should be made of a heavy solid rubber covering that will not break down on being chewed by a baby. (2) All wall and lamp plugs should be operated by a master switch on the wall so all cords and plugs are devoid of current when this switch is open. (3) All wall plugs should be about 3 feet from the floor and of a type that a baby or small child could not operate.

The treatment for burns of the mouth, in some respects, is a great deal more simple than that of intensive body burns.

The most important factors in the treatment of burns of the mouth are: (1) control of pain, (2) prevention of shock, (3) reduction of infection to a minimum, (4) active treatment of denuded area to promote growth of granulation tissue and (5) plastic repair of skin, muscle and mucous membrane at the proper time.

Pain produced by a burn is continuous unless treated. The pain factor alone will throw the patient into shock if not controlled. The dosage of any drug to control pain is directly proportional to the extent of the body burn. A nembutal suppository of 1/2 gr. in a baby may be adequate, or 1 aspirin tablet may be sufficient for a child with a mild burn, or 1/4 gr. morphine for an adult. This dosage will be entirely inadequate in a severe burn. To give 3 or 4 times this dosage in an extensive burn, considering the age and weight of the patient, will not be dangerous and may help substantially in preventing shock. Fortunately, burns of the mouth are not accompanied generally by profound shock.

Shock should be treated by the following methods, if indicated: (1) control of hemorrhage, (2) restoration of body heat, (3) restoration of fluid balance by plain water, physiologic salt solution, plasma or whole blood, (4) placement of the patient in head low, feet and body elevated position and (5) close watch over patient, particularly in fluid intake and output, respiration, pulse rate and temperature to guard against an ensuing infection.

The currently used antibiotic drugs in the form of penicillin, aureomycin, terramycin and others have lightened the burden of treatment and shortened the course of invalidism. These drugs reduce the infections to an absolute minimum and allow granulations to form quickly.

To promote early stimulation of healthy granulation tissue a complete debridement of the burned area as soon as possible is advisable. Frequent irrigations with physiologic saline are helpful also. Where skin, muscle and mucous membrane have been destroyed, particularly in the upper or lower lip, or both, it is recommended to allow these parts to heal before a plastic repair is attempted. Adhesive tape straps diligently and strategically placed with regard to future healing, muscle action, cosmetic result, relaxation of skin and minimum scar tissue formation will help reduce the convalescent period. Areas of destruction of the lower lip can be corrected often by the use of adhesive straps alone. These tissues are extremely friable and will not lend themselves to immediate suturing, while an adhesive strap will save tissue, give good approximation and a fair end result.

Burns which destroy the vestibule of the upper or lower jaw and cheek sometimes can be corrected immediately by placing a split skin graft over a stent of modeling compound or acrylic and joining it in place. This, however, can be done only in older and more cooperative patients. Babies must be allowed to heal and correction made subsequently.

Much can be done to effect a quicker postoperative recovery to the normal by the addition of massage of burned tissues. This stimulation brings about early relaxation, enhanced blood supply, normal draping of tissue, destruction of fibrous connective tissue and normal response on nerve impulse.

In conclusion, the nutrition factor should have some consideration in these patients. In most cases a bland, liquid or semi-soft diet will be in order. This can be taken by mouth, in some cases with a glass tube or straw. In the more severe cases a Levine tube or indwelling catheter passed through the nose should be resorted to. This type of feeding may help greatly in preventing many complications that might otherwise arise due to a fluid imbalance, infection or disturbance of grafts. (Am. J. Surg., May 1952, L. W. Schultz)

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Self-Induced 'Trilene' Analgesia in Plastic Surgery, With Special Reference to the Burned Patient

'Trilene' is the British registered trade mark for Trichlorethylene ($CCl_2:CHCl$). It is a colorless liquid with a pleasant, fruity odor; 132.5 molecular weight; 87° C boiling point. The English product is colored with waxoline blue

to distinguish it from chloroform. The preparation is pure and suitable for inhalation use in analgesia. It is non-inflammable and non-explosive.

In England, since the use of 'Trilene' as an inhalation agent was reported and recommended in 1941 by Hewer, its employment has spread widely and rapidly, until today it is conservatively estimated that 'Trilene' has been used more than a million times. It has been used 40,000 times by one anesthetist (Ostlere) without serious mishap.

In the United States its use had been reported initially in 1934 and 1935. The present report is based on its employment by members of the Department of Anesthesia of the Duke Hospital (Durham, N. C.) on more than 3,000 patients without serious complication.

'Trilene' can be administered by the patient himself, child or adult, or by an untrained assistant. A special hand mask inhaler is used which is small in size and cost. Induction is pleasant and rapid and is not accompanied by excitement. An analgesia may be complete, even without loss of consciousness. The authors have often been able to proceed after the patient has taken 10 breaths. If a light degree of narcosis does occur, recovery is rapid. Premedication is not necessary, since 'Trilene' does not stimulate the production of salivary secretions. Nausea and vomiting are rare. Many procedures may be performed on an ambulatory basis, and the patient can walk from the hospital 20 minutes later.

The advantages of 'Trilene' may be summarized as follows: (1) the agent and apparatus are inexpensive; (2) the inhaler is of small size and readily portable; (3) the cylinder is non-spillable and essentially indestructible; (4) it can be self-administered by the patient; (5) potency of vapor can be regulated; (6) analgesia is smooth and rapid; (7) there is no excitement stage during induction; (8) momentary loss of consciousness causes mask to fall from face; (9) maximum safety is assured; (10) non-inflammable and non-explosive; (11) premedication not necessary; (12) does not complicate or contradict use of any other agent; (13) does not affect existing pulmonary lesions; (14) vapor has no irritating effect on respiratory passages; (15) no excess saliva or secretion of mucous; (16) rarely causes nausea or vomiting; (17) can be used in emergency rooms, operating room, patient's room or home; (18) patients can leave hospital in 20 minutes if treated on ambulatory basis; (19) metabolism of liver and kidneys not affected; (20) no change in blood pressure; (21) does not depress respiration; (22) capillary oozing is noticeably less than with other agents.

The following is a partial list of procedures which can be performed under 'Trilene' analgesia: (1) primary cleansing and debridement of burns; (2) open or closed venisection; (3) debridement of burn slough; (4) manipulation of "frozen" joints; (5) removal of imbedded or inaccessible sutures; (6) painful dressings; (7) shaving exuberant burn granulations; (8) reduction of simple fractures; (9) removal of sequestra; (10) incision and drainage of abscesses; (11) suture of lacerations; (12) biopsies; (13) dental extractions and intra-oral procedures; (14) myringotomy; (15) obstetrical deliveries; (16) cystoscopies, testicular biopsies, etc. In short, 'Trilene' may be used for all cases not requiring profound relaxation, or almost all operations outside the peritoneal cavity. Procedures which are very painful, such as operations on the nail bed, or for infections of the pulp of fingers, tendon sheaths, palmar spaces, etc., are not suitable for 'Trilene' analgesia alone.

It is seldom possible to achieve full surgical relaxation with this substance, and no attempt should be made to "push" it in order to do so.

It is emphasized that only specially prepared trichlorethylene should be used for anesthesia. The agent used commercially in the dry cleaning industry contains impurities and degeneration products. Care should be exercised not to anesthetize patients with 'Trilene' which has been left exposed to air and sunlight for more than 3 or 4 days. The drug will oxidize in such situations, with the possible production of dichloracetyl chloride, carbon monoxide, hydrochloric acid and phosgene. It may be the dichloracetyl chloride which has been responsible for the nerve palsies in industry. Trichlorethylene must never be used in a closed system with soda lime; the 2 substances react chemically with each other to produce dichloracetylene, a compound which is toxic to the nervous system. Anesthetists agree that epinephrine should not be used with trichlorethylene.

It has been postulated that the ideal anesthetic and analgesic is one which is safe and complete, and from which the subject can recover quickly; it should be associated with a minimal amount of psychic trauma during and after induction, and be followed by the least possible number of complications. 'Trilene' analgesia apparently meets these qualifications. The plastic surgeon, the general surgeon and the orthopedist should find 'Trilene' a very useful agent and a valuable adjunct to his armamentarium. (Plast. & Reconstruct. Surg., April 1952, K. L. Pickrell, C. R. Stephen, T. R. Broadbent, F. W. Masters & N. G. Georgiade)

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Replacement of Gastric and Intestinal Fluid Losses in Surgery

The proper method for the replacement of gastrointestinal fluid losses in surgery has been the subject of considerable controversy. Volume-for-volume replacement with saline solution, and the use of glucose and saline mixtures as either equivalent or less than equivalent volume replacement, have both been unsuccessful.

It is the purpose of this paper to demonstrate that volume-for-volume replacement of gastrointestinal losses does not lead to disturbances in acid-base equilibrium if replacement solutions of appropriate composition are used.

The replacement of gastrointestinal losses is only a small part of complete parenteral fluid therapy in surgical patients. Recent advances in the knowledge of water and electrolyte metabolism have complicated practical fluid therapy.

The general principles of fluid therapy are: deficit therapy, maintenance therapy and concomitant replacement of abnormal losses.

The first phase is the replacement of any deficits of water and electrolyte that are present at the beginning of fluid therapy. The amount and kind of deficit are estimated as accurately as possible from the patient's history, physical findings and laboratory data and from balance data obtained from similar patients.

The second general principle of fluid therapy is the supply of water, electrolyte, protein, calories and vitamins at a rate that approximates the rate of turnover of these materials under ordinary circumstances - so called "maintenance

therapy." This turnover is a function not simply of weight or surface area but rather of total heat production - in other words, of energy expenditure. The requirements for maintenance therapy are calculated using a unit, namely, "100 calories metabolized"; therefore no corrections need be made for weight, age, fever, activity, basal metabolic rate and so forth after the total energy expenditure is estimated.

The third general principle of fluid therapy is the contemporary replacement of abnormal losses, as in burns, exudates, gastrointestinal suction, sweat, etc. This phase of fluid therapy consists of the volume-for-volume replacement of abnormal losses by solutions approximating in composition those lost from the body either externally or into unavailable body depots. The importance of the concomitant replacement of these abnormal losses in surgery cannot be overemphasized. If parenteral fluids similar in composition to those being lost are administered at the same time and at the same rate at which abnormal losses occur, deficits in body composition are avoided; and renal adjustments, which often further increase the over-all deficits of water and electrolyte, need not occur. It is with this third general principle of fluid therapy that this paper is concerned.

The most common abnormal fluid losses in surgery occur in the gastrointestinal tract and its derivatives, the biliary tract and the pancreas. Two solutions have been used to replace these losses. The first solution is called "Gastric Replacement Solution" and has been used, as the name indicates, to replace the losses incurred through gastric suction or vomiting. The second solution is called "Intestinal Replacement Solution" and has been used to replace losses incurred through intestinal suction as well as biliary or pancreatic drainage. The replacement solutions are similar in composition to gastrointestinal secretions.

These solutions have been administered to a number of patients. The present study consists of the review of the charts of 24 of these patients. Thirteen of these patients received replacement therapy for 24 to 48 hours only. These cases will not be reported, since no definite conclusions concerning them can be drawn because of the short duration of therapy.

Technic of Administration. In general these solutions were administered intravenously, through either a standard needle or a polyethylene catheter. However, they were designed to be isotonic with body fluids and occasionally were given subcutaneously without reaction. The gastric or intestinal replacement solutions were frequently mixed with other fluids used for maintenance therapy, and a 50 % solution of glucose was occasionally added when extra calories were indicated. At no time were they given at a rate in excess of 500 cc. per hour. The ideal procedure for determining the amount of replacement solution to be administered is as follows: A nurse carefully measures the volume of gastric or intestinal fluid obtained every 4 to 6 hours and, on instruction from the physician, adds to the infusion the equivalent volume of the appropriate solution. At the beginning of gastrointestinal suction more frequent measures of the rate of drainage are made so that a minimal debt is incurred. In actual practice, when a shortage of nursing personnel is likely, this ideal procedure is not feasible. Under the usual circumstances a prediction is made by the physician of the volume of gastrointestinal drainage for the next 12 hours based on the volume of drainage obtained during the first few hours of suction. The correct amount of replacement

solution is then added to the other fluids for the next 12 hours. At 12-hour intervals the drainage losses and fluid intake are calculated and appropriate corrections in the rate of replacement are made. The solution to be used (gastric or intestinal replacement) is determined by the physician on the basis of the location of the drainage tube and occasionally according to the type of drainage. The color and the pH of the drainage may be deceptive, in that gastric drainage may be green and yet be of low sodium and high chloride content.

Results. In all the cases studied, no evidence of toxicity could be obtained. Careful physical examination during the course of therapy revealed no evidence of central-nervous-system stimulation or depression, as might be seen from administration of an excess of ammonium ions. Edema was not detected clinically in any patient. The electrocardiogram was not affected, nor were urinary abnormalities detected during or after therapy. Many of the patients were losing large amounts of water and electrolyte, up to 4500 cc. a day; none displayed clinical evidence of dehydration, edema or changes in acid-base equilibrium. They all expressed a feeling of well-being and many were intermittently ambulatory.

All patients received water, electrolyte, protein, calories and vitamins according to the maintenance requirements, in addition to the replacement solutions. During therapy with gastric or intestinal replacement solutions there were no serious disturbances in water and electrolyte composition such as frequently occur when normal saline solution alone is employed for replacement. In several patients definite derangements were corrected; in all others the normal chemical structure of the extracellular fluids was maintained. (New England J. Med., 24 April 1952, R. E. Cooke & L. G. Crowley)

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Sympathetic Ophthalmia

Personal experience in a clear-cut clinical case of sympathetic ophthalmia following intracapsular cataract extraction, in which the histologic picture in the sympathizing eye was indicative of endophthalmitis, led to a review of the literature. The authors found 18 other cases, all in the British literature, in which a similar discrepancy existed. It was eventually concluded that clinical sympathetic ophthalmia is not always what it seems and that in some cases, at least, the disease which is present may be a bilateral form of endophthalmitis phacoanaphylactica.

The implications of this possible diagnostic error are explored. If the assumption is correct that apparent sympathetic ophthalmia is sometimes not that disease, but a bilateral form of endophthalmitis phacoanaphylactica, a re-examination of therapeutic practices is indicated. Enucleation may not be as imperative as some observers believe it to be. Instead, the proper procedure would seem to be removal of any lens material remaining in an eye operated upon, on the ground that it is the primary focus of the anaphylactic disease, or, if indications exist, removal of the lens in the other eye, on the ground that it may be the secondary focus.

The present status of corticotropin and cortisone is evaluated on the basis of 69 collected cases and 3 personally observed cases. These agents seem capable of controlling the inflammatory and exudative processes in some cases of the disease, especially if they are given early and if the disease is mild. Relapse may occur if therapy is withdrawn too soon or if too small a dose is used, though retreatment seems remarkably successful. The pattern of dosage and the best routes of administration are not yet established. It is impossible to determine from this series whether or not secondary glaucoma can be prevented by this type of hormonal therapy. Results in 6 operations, 3 of them performed personally, suggest that under cortisone protection surgical treatment can safely be undertaken in sympathetic ophthalmia, often quite promptly, with good results and without fear of the consequences which once would have followed such a course.

Results in a personal case, in which operation was carried out uneventfully and with good results under cortisone protection, suggest that it might be wise in any case in which an inflammatory focus (Redslob's "chancre of inoculation") exists after operation to remove it promptly, as a prophylactic measure, or, if sympathetic ophthalmia has already developed, as a therapeutic measure.

The availability of corticotropin and cortisone does not lessen the need for, or the usefulness of, mydriatic, antibiotic and foreign protein therapy as adjunct prophylactic or therapeutic measures. The recent discovery that foreign protein therapy is really an indirect form of corticotropin therapy clarifies the hitherto unexplained good results accomplished by this form of treatment. (A.M.A. Arch. Ophth., April 1952, G. M. Haik, R. L. Waugh, Jr. & W. Lyda)

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Umbo in Secretory Otitis Media

It is the purpose of this paper to direct attention to a frequently observed change seen at the umbo in cases of secretory otitis media. Many instances have been encountered in which annoying conductive type hearing losses have persisted for weeks after an apparent subsidence of the physical findings associated with a catarrhal otitis. The eustachian tube would inflate readily and clearly. The drumhead showed the usual varying degrees of retraction, but one departure from the normal was noted; the spatulated end, so-called, of the handle of the malleus seemed much larger, or the appearance of this area was that of a collection of fluid medial to the dermal layer. The size of this fluid collection varies from 2 to 5 mm. in diameter, the larger ones showing at times a visible fluid level.

That there should be some decrease in hearing acuity with these changes at the umbo is understandable. The better sound conduction of a concave surface as compared with a flat one was demonstrated by Helmholtz nearly a century ago. Whether changes at the umbo may interfere with the typical absence of a fundamental note peculiar to the membrane itself or whether the dampening effect of the malleous handle arising from the umbilication of the drumhead at the umbo is altered by the collection of fluid here is to be considered.

The finding has obtained in children as well as adults. The history is usually typical of catarrhal otitis media with exudation into the tympanum. Patients

with hydrops tympani have been treated in the more or less accepted manner with tubal inflations, attention to the nasopharynx and myringotomy combined with aspiration through needles or cannula, all of which was followed by the disappearance of the "niveau" and clearing of the tubal inflation tone only to have the patient fail to obtain complete relief from the "plugged" sensation in the ears and egophony. The drumhead would resume its normal luster, color and position, the only deviation from the normal being the localized area of pearly translucency at the umbo. The picture was frequently bilateral. In some cases as those where no fluid level was seen, the application of Bonain's solution (equal parts of cocaine menthol and phenol) to the end of the malleus handle brought relief almost immediately. It was concluded that this fixed the fluid as being subdermal-external to the substantia propria. By the simple process of osmosis the fluid was removed. In other cases a small incision was made radially from the end of the handle of the malleus with aspiration of the fluid. In these instances the exudate was believed to be more medial, probably submucosal. It is felt that these collections of exudate do not usually involve the substantia propria but lie either external or medial to this fibrous layer. It is accepted in due course of time the fluid is absorbed with possibly negligible increase in fibrous components at the umbo.

The umbo picture described must be seen frequently in every busy otolaryngological clinic. Many patients will respond to merely touching the umbo with an applicator wet with Bonain's solution. This minor procedure has afforded relief in many cases of troublesome recent catarrhal exudative otitis with residual deafness. (A.M.A. Arch.Otolaryng., April1952, CDR L. E. Wible (MC) USN)

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Comparison of the Effects of Veratrum Alkaloids and of Hexamethonium Bromide Upon the Blood Pressure in Arterial Hypertension

The authors compared the effects of veratrum alkaloids and hexamethonium bromide in patients with arterial hypertension, particularly in regard to blood pressure falls, toxic effects, and suitability for continued control of blood pressure levels. Their findings are summarized:

1. In 36 patients with arterial hypertension attempts were made to reduce the blood pressure by oral administration of mixed veratrum alkaloids (Anatensol, Vertavis), and in 27 of these continued treatment with hexamethonium bromide was also attempted.

2. Substantial blood pressure reduction without important toxic symptoms was possible in 10 of 36 patients with mixed veratrum alkaloids and in all of 27 patients with hexamethonium bromide injected subcutaneously. Treatment with the latter was maintained for periods of from 1 to 15 months.

3. Veratrum alkaloids and hexamethonium bromide resemble each other in that the therapeutic range of dosage is narrow. Graded responses can be obtained with less difficulty using hexamethonium bromide.

4. Continued administration leads to drug toleration with hexamethonium bromide, but little or no toleration develops with mixed veratrum alkaloids. The effective dose of hexamethonium bromide becomes stable after some months,

and toleration does not interfere with continued treatment.

5. After hexamethonium bromide, blood pressure falls are greatest in the standing, intermediate in the sitting and least in the lying posture. After veratrum alkaloids, postural hypotension is inconspicuous.

6. After hexamethonium bromide the pulse is ordinarily accelerated, but following continued treatment it may be unchanged. After veratrum alkaloids there is bradycardia.

7. The main toxic manifestation of hexamethonium bromide is faintness and lassitude associated with excessive fall of blood pressure; the symptoms are maximal when the blood pressure is at its lowest level. After veratrum alkaloids toxic effects occur while the blood pressure is still falling and may have disappeared before the blood pressure reaches it lowest level. (Am. Heart J., April 1952, F. H. Smirk & O. W. Chapman)

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Influenza-Virus Vaccination in Industry

An outbreak of respiratory infection resembling clinical influenza was observed in late February and March 1951, among workers at the Remington Arms Company, Inc., Bridgeport, Conn. Reports from other industries in Bridgeport indicated similar observations, and there was an exceptionally high incidence of absenteeism.

Of 1,952 unvaccinated employees, 183 (9.4 %) had clinical influenza, while only 15 of 847 (1.77 %) vaccinated employees had it. The average number of days lost was 8.0 in the vaccinated group and 8.2 days in the control group.

If it can be presumed, in the absence of a laboratory diagnosis designating the specific virus, that the outbreak was due to the A-prime influenza virus as was found in other communities during this period, the results obtained in this series of cases strongly indicate that the subcutaneous injection of 1 cc. of influenza virus vaccine containing 22.22 % FM-1 significantly reduced the incidence and exerted a protective effect against the disease. (A.M.A. Arch. Indust. Hygiene & Occup. Med., April 1952, C. F. Yeager)

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Daraprim in Treatment of Malaria

During 1949-50 a large series of substituted 2:4-diaminopyrimidines was synthesized by Falco and co-workers and tested against laboratory infections of Plasmodium gallinaceum in chicks, of P. berghei in mice and, in certain cases, of P. cynomolgi in monkeys. The most powerful schizonticide of the series proved to be 2:4-diamino-5-p-chlorophenyl-6-ethylpyrimidine (compound number 50-63), now known as "daraprim." Clinical trials in cases of quiescent human malaria were conducted in Lagos by Archibald (1951) on children aged 5 to 10 years; promising results were obtained and no toxic effects were observed. A supply of daraprim

having been made available in August, 1951, a clinical trial on subjects having overt attacks of malaria was undertaken at the Medical Research Council (Great Britain) Field Research Station, Fajara, Gambia, between August and November, 1951.

Daraprim is clearly a powerful schizonticide. A single dose of 0.5 mg. per Kg. of body weight causes the disappearance of asexual forms of P. falciparum and P. malariae from the blood in the great majority of cases, at a rate which is not dependent on the degree of immunity possessed by the host. While in a minority of cases there is some evidence of action upon ring trophozoites, the drug seems to exert its effect mainly at the stage of plasmodial development, when the chromatin is in active division. The evidence presented suggests that after a single dose the concentration of the drug in the blood remains high enough to be lethal to all the asexual forms, even if some do not reach the vulnerable phase of schizogony for 72 hours after treatment, as in the quartan cases.

In 2 cases asexual parasites persisted in the blood stream. It seems reasonable to attribute the first of these failures to underdosage, since a second treatment at a higher dosage (0.5 mg., instead of 0.25 mg. per Kg.) was rapidly effective. The cause of the second failure is more obscure. In this case the infant on admission had a severe generalized exfoliative dermatitis, and on examination the edge of a very hard liver was palpable a hand's breadth below the costal margin. A considerable degree of metabolic disorder, including impairment of liver function, may be inferred. Should the antimalarial activity of daraprim depend upon the disintegration of the drug into some metabolite, it may be that the impaired liver function interfered with this process and prevented the establishment of an adequate concentration of the active substance in the blood. However, the possibility that the failure was due to the presence of a naturally resistant strain or to the establishment of drug resistance by previous inadequate treatment - in this case at a dosage level of 0.25 mg. per Kg. - cannot be excluded.

The authors' experience is that daraprim promises to prove a valuable antimalarial drug. Its action seems to parallel closely that of proguanil ("paludrine"), while the rate at which it eliminates parasitemia seems to be intermediate between that of proguanil and chloroquine. Its small effective dosage and tasteless character may well make this the drug of choice in the treatment of malaria in infants and children. It certainly merits extended trials, both therapeutic and prophylactic, against the known strains of plasmodia infecting man. (Brit. M. J., 5 April 1952, I. A. McGregor & D. A. Smith)

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A Simple Method for Staining Trypanosomes and Plasmodia of Malaria in Tissue Sections

A simple, rapid and dependable method for staining trypanosomes and plasmodia in fixed tissues has been found more efficacious than other methods tried by the authors.

They have had considerable success in demonstrating malarial plasmodia in tissue sections using the Kingsley stain as originally described, but with a modification of technic they have found that the stain gave superior results in the

demonstration of trypanosomes in tissue sections. Tissues of rats infected with Trypanosoma equiperdum and tissues of canaries with Plasmodium cathemerium were employed. Small pieces of tissue were fixed in Helly's fluid for 10-12 hours and then washed for 24 hours in running water. The tissues were passed through graded concentrations of ethanol, terminating in absolute ethanol. In order to replace ethanol by butyl alcohol, tissues were passed through graded concentrations of butyl alcohol in ethanol, finally terminating in pure butyl alcohol. By this means, shrinkage of parasites in the tissue is avoided. From pure butyl alcohol the tissues were embedded in paraffin and 5 μ sections were cut.

To demonstrate trypanosomes the slides were stained with equal parts of Kingsley I and II for 5 minutes and quickly rinsed in 2 changes of distilled water. The sections were then dipped momentarily in acetone, acetone with eosin, butyl alcohol, followed by 3 changes of neutralized xylol; clarite was used for mounting. The Kingsley technic of development of a pink color by use of distilled water acidified with acetic acid could not be used because in the preparations described above the coloration of the parasites is totally lost. For this reason, eosin was added to the acetone to potentiate the red cytoplasmic stain of the tissues. Following this procedure the blue-staining trypanosomes were sharply and clearly demarcated.

In staining for malarial plasmodia in sections the same technic is used. After staining, however, the tissues are differentiated for a few seconds in a solution of 1 % acetic acid. The slides are then passed through acetone, to which a few drops of eosin solution has been added, followed by butyl alcohol and xylol, after which they are mounted.

The Kingsley stain is commercially available as Kingsley I and II or it can be made according to Kingsley's directions. Equal parts of each solution are mixed immediately before use. This stain is excellent for the differential staining of blood and bone marrow films, as well as for blood-borne parasites such as trypanosomes and malaria. It gives better results in tissue sections of bone marrow than any of the other stains tried by the authors. The Kingsley stain has certain definite advantages over most hematological stains and deserves a much wider use. (Science, 25 April 1952, R. W. Loehning & H. J. Van Baaren)

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Pseudocyesis

Pseudocyesis is a condition in which a woman firmly believes herself to be pregnant and develops many of the signs and symptoms of pregnancy. This article is an evaluation of clinical, gynecologic, endocrine and psychiatric surveys during, between and after episodes of pseudocyesis in 27 patients, 23 colored and 4 white, the largest group yet reported.

The 27 patients presented themselves as pregnant with the usual signs and symptoms. The initial and most common symptom was a menstrual disturbance; 19 were hypomenorrheic and 7 amenorrheic. Breast changes with secretion occurred in 22. A like number described fetal movements, although these appeared

as early as the first month. A softened cervix was present in 19, with the uterus enlarging up to about 6-week gestation size in 11. In no cases were the cervical and uterine changes entirely typical of any stage of pregnancy. Biologic pregnancy tests were initially positive in 4 cases (3 Friedman and 1 rat-ovary-hyperemia test) but proved negative upon repetition and in each case the pelvic examination was normal. Roentgenograms of several patients were initially reported as showing soft tissue masses the size of 3 month pregnancies but, on re-evaluation after normal pelvic examinations, were found to be within normal limits. Weight gains were greater than in normal pregnancies.

Considering these findings, it is easy to understand that every patient was thought to be pregnant by at least one physician and that even after examinations, 9 of the 27 were declared pregnant by 16 of the 40 examining physicians. This diagnosis has a tremendous psychic impact upon the woman and raises many socio-economic and insurance problems. It is therefore most important that this diagnosis be kept in mind as a not-too-rare condition (1:250 maternity clinic admissions in this study).

Hormonal studies of urinary gonadotropins by the mouse uterine-weight method revealed a diminished activity. Ovarian function, on the other hand, was elevated in 9 cases, normal in 11 and slightly diminished in 3. Luteotropic activity was found in the 5 cases assayed, which may explain the false-positive biologic tests, since rat-ovary-hyperemia responses have been obtained with luteotropic hormones. Progesterone effect was noted by study of endometrial tissue. Urinary 17-ketosteroids, liver function tests, basal metabolic rates, cholesterol levels and roentgenograms of the pituitary fossa were all normal.

A psychic factor was demonstrated and postulated to be the etiologic factor initiating body changes directly and also indirectly through the endocrine system. By acting upon the anterior pituitary through the hypothalamus, luteotropin is released. This, plus the presence of normal or increased estrogen levels, causes the persistence of luteinization of the ovaries. The resulting progesterone production, along with the estrogens, suppresses the production of follicle-stimulating hormone.

In this study therapy was considered effectual only after a full loss of the syndrome and absence of recurrence during a follow-up of 6 months or more. Twenty patients were observed for 6 months to 3 years after the termination of the episodes. Whenever possible, the therapies were used in the following order: informing the patient of the true diagnosis, psychiatric history taking, psychotherapy and endocrine therapy. Of the 27 patients, 13 lost their symptoms after "accepting" the true diagnosis, but a recurrence followed within a few months. Psychiatric history taking was likewise without effect.

Superficial psychotherapy was attempted in 13 cases. It proved curative in 6, effectual in 5 when combined with testosterone injections or curettage and indeterminate in 2 who failed to return. Testosterone injections and curettage alone had occasionally caused a temporary loss of the syndrome but it had always recurred; in those also having psychotherapy the syndrome disappeared without

reappearing. Testosterone, probably by depressing the estrogens, evoked a "full" menstruation, "proving" them not to be pregnant. Curettage may have provided a dramatic proof that their wombs were empty.

Symptomatic relief through superficial insight was all that was attempted, rather than thorough reconstruction of the basic personality. In those cases where the conflict was most conscious, the least therapy appeared necessary. More disturbed personalities required several cautious exploratory sessions with much support before they were able to trespass into long-forbidden areas. In most cases therapy was accelerated by the patient's great desire to rid herself of the symptoms. The dynamics, favorable response to superficial therapy and psychologic tests indicated pseudocyesis to be more closely related to hysteric phenomena than deeper psychosomatic disturbances. (Psychosomatic Med., March-April 1952, R. R. Schopbach, P. H. Fried & A. E. Rakoff)

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Panographic Radiography

Modern methods of diagnosis and treatment of diseases of the teeth and their surrounding structures require that the dentist have a complete series of dental radiographs for each patient. Conventional methods of intraoral radiography necessitate repetitious exposure and processing cycles of small and difficult to handle films. The use of a single strip of film to record the apices of an entire dental arch or a complete bite-wing survey would have obvious advantages over the present methods of dental radiography. These advantages would be most apparent in situations which require x-ray examinations of large numbers of persons such as in the military and public health services.

An apparatus has been developed at the University of Washington which will automatically expose a specially shaped film, producing on the single strip, a usable image of the entire dental arch. This method of radiography has been termed "panographic radiography." It is based upon similar methods described independently by Paatero and Smathers.

In this method, a narrow beam of x-radiation is directed through the tissues to a lead backed film which is aligned in the mouth by means of a tray type film holder. The full arch exposure is made by the coordinated motion of the object and the narrow beam of x-radiation which causes the film to be exposed somewhat in the same way as the film in a camera equipped with a focal plane shutter.

The most practical advantage of this method would be in its application to group surveys such as are required in military dentistry. A second application would be in caries control studies. The apparatus has been designed to permit easy dismantling.

It is believed that panographic radiography will ultimately have a usefulness much as the photofluoroscopic procedures used in the chest survey programs. In the evaluation of the panographic technic it is well to remember that it must be judged as an adjunct to conventional radiography and not as a substitute for it.

This innovation and method are by no means in their final form. At present it is questionable whether this system can be applied to all mouths. As there are in conventional radiographic technics, so also, there are intrinsic geometric limitations to this procedure when it is applied to the extremely square type arch and the very narrow V-shaped mouth.

A simple device for the alignment and stabilization of the patient must be developed along with the most usable assortment of film strip and film tray holders. Not the least problem of the future will be a determination of the total exposure of the patient to radiation under the conditions of this technic. (J. Dent. Res., April 1952, R. J. Nelsen & J. W. Kumpula)

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Surgery of the Horseshoe Kidney

The purpose of this paper is to call attention to the prevalence of horseshoe kidneys, to emphasize that such kidneys are more subject to secondary pathological changes than has been generally thought, and to suggest the type of treatment for various secondary lesions.

Because of its susceptibility to disease, as well as its relatively frequent occurrence, the fused kidney presents an important clinical problem. Almost every type of renal lesion has been encountered in horseshoe kidneys. With increased experience with this anomaly, the author has been impressed by the fact that a majority of the horseshoe kidneys seen clinically have hydronephrosis on one or both sides, with some degree of infection. Operation is often indicated, as in many cases cure cannot be obtained by the usual dilatation of the ureters and chemotherapy because of the anomaly itself. Once a horseshoe kidney becomes diseased, there is little hope of permanent relief except by surgical intervention. Heminephrectomy remains the most common operation, but all types of procedures have been performed, including pyelotomy, nephrostomy, pyeloplasties, ureterolysis, division of the isthmus, nephropexy and repair of trauma.

In this series, there have been 46 cases of horseshoe kidney in pyelograms on 13,080 patients (1:284).

Although horseshoe kidneys may exist without evidence of disease and without producing symptoms, they are much more subject to disease than are non-fused organs. This is mainly due to the abnormal insertion and course of the ureters, the regularly anomalous vascularization, and fixation of the fused kidney by its isthmus to the surrounding structures and vessels. A common condition affecting horseshoe kidneys is hydronephrosis with infection and, quite frequently, calculus. Much rarer are tuberculosis, polycystic disease, solitary cysts, pyonephrosis, nephritis, tumor and trauma.

Horseshoe kidneys, by their position, may cause pressure on the great vessels and other viscera, resulting in abdominal pain, with or without gastrointestinal disturbances. Removal of the appendix, gallbladder, or other organ has not infrequently been done, without relief of the pain until the kidney has been bisected and placed in its proper position by nephropexy.

Extensive destruction of the kidney and tumor require heminephrectomy. However, conservative surgery is indicated in many cases of hydronephrosis and infection, especially when bilateral. The operation utilized by the author consists of (1) division of the isthmus, (2) dilatation of the ureter with a splinting catheter and nephrostomy, or ureteropelvioplasty, as indicated, and (3) nephropexy. The catheter and nephrostomy tube are left in for 6 weeks.

Division of the isthmus, either for the purpose of removal of one-half of the horseshoe kidney or for relocating the separated organs, is easily accomplished, with perfect hemostasis, by using the fat-and-ribbon-gut method of repair of the severed isthmus. (J. Urol., May 1952, O. S. Lowsley)

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The Effect of Pneumoperitoneum Therapy in Pulmonary Tuberculosis on Liver Function

During the past decade there has been increasing use of pneumoperitoneum in the treatment of pulmonary tuberculosis, either as a definitive procedure alone or in combination with antimicrobial and surgical forms of therapy. The factors which encouraged the wider use of pneumoperitoneum as a therapeutic procedure were: the simplicity of induction, its reversibility, the minimum of complications incident to its use and the maintenance of the integrity of the intrapleural space.

Pneumoperitoneum has also been studied in the treatment of chronic pulmonary emphysema. Several workers have shown that the mechanical elevation of the diaphragm improved its function, resulted in a decrease in the residual air, increased vital capacity and improved blood oxygenation.

Pneumoperitoneum in the treatment of pulmonary tuberculosis is a procedure which requires prolonged use. Frequently it is necessary to maintain refills for several years to achieve proper control and stability of the pulmonary disease. A variable increase in intra-abdominal pressure is, therefore, persistently present for many months or years. The consequences of this increase in pressure can be best appreciated by reviewing x-rays of the abdomen of patients under treatment with pneumoperitoneum. There is considerable separation and displacement of the liver from the diaphragmatic leaves, lengthening of the esophagus, compression of the abdominal viscera and displacement of these towards the inferomedial plane.

The present study was done to determine the effect of continuous pneumoperitoneum therapy and its associated elevated intra-abdominal pressure upon liver function as determined by multiple liver function tests in 25 patients with pulmonary tuberculosis treated with pneumoperitoneum. All patients were in good physical and nutritional status and the pulmonary disease in each case was stable and inactive. The sputum and gastric contents were negative for tubercle bacilli for periods varying from 6 to 14 months at the time the liver function studies were conducted. All variables having the potentiality of causing liver function impairment were eliminated as far as possible.

The duration of the pneumoperitoneum varied from 6 to 21 months; the average intra-abdominal pressure was plus 12 cm. of water throughout the

maintenance of this therapy. The results of the present study indicate that long-continued pneumoperitoneum and prolonged increased intra-abdominal pressure did not produce impairment of liver function. (Am. Rev. Tuberc., May 1952, H. L. Katz, S. Sbar & M. G. Goldner)

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Deficiencies in Our Knowledge of BCG Vaccine

Until the necessary knowledge concerning BCG is obtained, it would seem advisable to continue its use on an experimental basis, limiting it to the inoculation of individuals where tuberculosis exposure is likely to occur, such as medical students, nurses, individuals from tuberculous homes, and also in selected population areas with high tuberculosis mortality rates. This position is based on the following factors:

1. No method has been developed for stabilizing the potency of BCG vaccine.
2. No method has been devised for preventing the rapid decline of viable organisms in the freshly prepared vaccine.
3. A marked variation in potency as well as in number of viable organisms exists in similar amounts of BCG from different laboratories.
4. The exact degree of immunity from BCG and the duration of this immunity are not as yet determined.
5. Adequate knowledge is lacking concerning possible differences in immunizing qualities of the vaccine in different racial groups.
6. The optimal method of BCG vaccination is still open to question.

BCG vaccination should not be offered as a substitute for other antituberculosis methods so successfully used in the United States. (Dis. Chest, May 1952, M. I. Levine)

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Change of Address

Please forward requests for change of address for the News Letter to: Commanding Officer, U. S. Navy Medical School, National Naval Medical Center, Bethesda 14, Maryland, giving full name, rank, corps and old and new addresses.

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From the Note Book

1. Dr. Melvin A. Casberg, Chairman of the Armed Forces Medical Policy Council, recently reported to the Secretary of Defense on the necessity for expediting the armed forces hospital construction program previously recommended by the Council. His report followed an inspection of representative sites of proposed and present armed forces medical facilities. (Armed Services Medical Policy Council, Office of SecDef, 13 May 1952)

2. The Surgeon General of the Army has requested manufacturers to start production for military use of a special self-fitting cotton bandage developed by the Department of Agriculture. The bandage has a high degree of crimp and kinkiness that gives it a self-fitting, self-tightening quality, readily adaptable to body contours. ("Washington News," J. A. M. A., 3 May 1952)

3. Two civilian scientists employed at the Naval Medical Research Institute, NNMC, Bethesda, Md., have been awarded fellowships to continue their work in medical research. A Guggenheim Fellowship, considered one of the outstanding awards in scientific circles in the United States, has been awarded Dr. T. L. Hill. Dr. Hill is a chemist and has been a staff member of the Institute since 1949. He will work with Prof. J. G. Kirkwood, Sterling Professor of Chemistry and Head of the Chemistry Department of Yale University, for one year. Dr. J. J. Blum, a physiologist, has been awarded a Merck-NRC Postdoctoral Fellowship and will work with Prof. Linus Pauling (Chemistry) at the California Institute of Technology for a year. Dr. Blum has been a staff member of the Institute since June, 1950. Upon completion of the work required by the fellowships, Drs. Hill and Blum will return to the staff of the Naval Medical Research Institute. (PIO, BuMed)

4. Twenty patients in the age group 45 and over were treated for 4 months with dihydrostreptomycin sulfate in a daily dosage of 1 Gm. Four to 12 months after completion of treatment it is stated that no symptoms of vestibular damage were noted at any time and there have been no audiometric changes of significance within the hearing range. There has been no clinical deafness. (Am. Rev. Tuberc., May 1952, S. T. Allison)

5. Radioactive cortisone for use in medical research will be manufactured with the aid of funds from the National Institute of Arthritis and Metabolic Diseases. (PIO, NIH, FSA, PHS, April 1952)

6. A plastic blood pack has been designed in which to collect, store and ship blood without danger of breakage, and also to save space and cost. The pack can be sterilized at 250° F. and comes complete with needles and tubes for donor and patient. (Science News Letter, 10 May 1952)

7. The May 1952 (Vol. 49, No. 5) issue of the Journal of the Missouri State Medical Association is devoted to considerations of medical defense in the civilian

defense program. Nine articles covering the major aspects are published.

8. The annual meeting of the Division of Medical Sciences of the National Research Council was held in Washington, D. C., 24 May 1952.

9. The applications of the electron microscope in the study of dental tissues are described in Oral Surgery, Oral Medicine and Oral Pathology, May 1952, by D. B. Scott.

10. The American Physiological Society has undertaken a study with the purpose of exploring physiology as a science, and of furthering its contribution to the welfare of the United States. A guiding committee has been formed by the American Physiological Society to direct the study in its broad definition of the physiological aspects of biological science and pertinent applications. (Bio Sciences Div., ONR)

11. One percent Lindane is the insecticide of choice in the Far East and is available from the Army Quartermaster Corps. (Preventive Med. Notes, May 1952)

12. A simplified method of management of the hypertensive toxemia of pregnancy using a purified extract of veratrum viride is discussed in the New England Journal of Medicine, 24 April 1952, by F. A. Finnerty, Jr.

13. The 54th annual convention of the American Hospital Association will be held in Philadelphia, 15 to 18 September 1952. Hotel reservations should be made early by those planning to attend the convention. (A. H. A., May 1952)

14. "It is possible to synthesize an organic phosphorous compound possessing specific toxicity to insects but being relatively innocuous to mammals." (J. Econ. Entomol., April 1952, G. A. Johnson, K. G. Nolan & J. T. Cassaday)

15. A statistical review of reports from selected American and European communities concerning the mortality and morbidity of tuberculosis appears in Diseases of the Chest, May 1952. (G. J. Drolet & A. M. Lowell)

16. Results of clinical trials substantiate the efficacy of the nitrite and thiosulfate therapy in cyanide poisoning. Successful treatment in 16 cases is reported in J. A. M. A., 10 May 1952, by K. K. Chen and C. L. Rose.

17. A discussion of intraocular rubber foreign bodies after surgery appears in the A. M. A. Archives of Ophthalmology, April 1952, (R. J. Brockhurst)

18. A symposium on facial paralysis, by several authors, appears in A.M.A. Archives of Otolaryngology, April 1952.

19. A collective review of protein nutrition in surgical patients is presented in S. G. & O., May 1952. (J. E. Rhoads)

20. Physiological and clinical studies reveal evidence that strict bed rest is injurious to the patient with congestive heart failure. The sitting position in a chair with the feet dependent obviates some of the harm of strict bed rest. (J.A.M.A., 19 April 1952, S. A. Levine & B. Lown)

21. Recent additions to the list of Navy Medical Corps officers certified by American Boards are CAPT E. C. Kenney (American Board of Internal Medicine) and LCDR J. M. Smith (American Board of Pathology). (PIO, BuMed)

22. The total enrollment in the U. S. Navy Correspondence Course Program is now 100,000. This is the highest total enrollment since the first correspondence course in navigation was issued in 1928. The Center is currently offering 120 enlisted courses and 63 officer courses, available to members of both the Regular Navy and the Naval Reserve. (U. S. Correspondence Course Center)

List of Recent Reports Issued by Naval Medical Research Activities

U. S. Naval Medical Research Unit # 3, Cairo, Egypt.

A Survey of Neutralizing Antibodies to Poliomyelitis in Cairo, Egypt, NM 007 082.13.03, 10 March 1952.

A Holder for Cover-Slip Blood Smears, NM 007 082.09.04, April 1952.

Notes on Egyptian Ticks (Ixodoidea). I. The Genus Argas (Argasidae) in the Cairo Area, NM 005 050.29.04, 5 April 1952.

U. S. Naval School of Aviation Medicine, U. S. Naval Air Station, Pensacola, Fla.

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BUMED CIRCULAR LETTER 52-43 12 May 1952

From: Chief, Bureau of Medicine and Surgery
To: Activities under the Management Control and Financial Responsibility of BUMED

Subj: Distribution of Federal Supply Schedules and Contractors' Catalogs (including price lists)

Ref: (a) ONM Ltr M30/EEO:alk of 25 March 1952

1. By reference (a) the Bureau of Medicine and Surgery has been informed that on or about 1 July 1952 the General Services Administration will activate a regional system for the distribution of Federal Supply Schedules and contractors' catalogs (including price lists) and will discontinue its present centralized distribution system. This letter sets forth the procedures by which Medical Department procuring activities may obtain such schedules and contracts.

2. Following activation by the General Services Administration of the planned regional distribution system, all Federal Supply Schedules and contractors' catalogs (except catalogs which, by special agreement, may be furnished directly by contractors) will be supplied to each Navy procuring activity through the General Services Administration regional office for the area in which the procuring activity is located. Each procuring activity desiring to receive these schedules and catalogs must complete GSA Form 457 (Application for Federal Supply Schedules and Contractors' Catalogs) and forward it to the appropriate regional office of the General Services Administration. Copies of GSA Form 457 may be obtained from the appropriate regional office of the General Services Administration.

3. General Services Administration regional offices and areas served are as follows:

GSA Region & Location	Area Served
1 - Boston, Mass.	Maine, New Hampshire, Vermont, Massachusetts, Connecticut, Rhode Island
2 - New York, N. Y.	New York, Pennsylvania, New Jersey, Delaware
3 - Washington, D. C.	Maryland, Virginia, West Virginia, District of Columbia, Puerto Rico, Virgin Islands
4 - Atlanta, Ga.	North Carolina, South Carolina, Tennessee, Mississippi, Alabama, Georgia, Florida
5 - Chicago, Ill.	Kentucky, Illinois, Wisconsin, Michigan, Indiana, Ohio
6 - Kansas City, Mo.	Missouri, Kansas, Iowa, Nebraska, North Dakota, South Dakota, Minnesota

GSA Region & Location	Area Served
7 - Dallas, Texas	Texas, Louisiana, Arkansas, Oklahoma
8 - Denver, Colo.	Colorado, Wyoming, Utah, New Mexico
9 - San Francisco, Calif.	California, Arizona, Nevada, Territory of Hawaii, Philippine Islands
10 - Seattle, Wash.	Washington, Oregon, Idaho, Montana, Territory of Alaska

4. Each Navy procuring activity now receiving Federal Supply Schedules and contractors' catalogs through General Services Administration must comply with the procedure set forth above in order to continue to receive such schedules and catalogs.

5. This circular letter shall be considered cancelled when necessary action has been taken by addressees.

H. L. Pugh

The above letter will not be printed in the Navy Department Bulletin.

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BUMED CIRCULAR LETTER 52-44 13 May 1952

From: Chief, Bureau of Medicine and Surgery
To: All Ships and Stations

Subj: Accounting data under appropriation Medical Care, Navy

Ref: (a) NavComp Manual Paragraph 022301-1
(b) NavComp Manual Paragraph 024406
(c) BuMed Cir Ltr 51-96 (as modified by BUMED Cir Ltr No. 51-138)

Encl: (1) Listing of Bureau Control Numbers under each Appropriation Subhead Number

1. The responsibility for the administration of the appropriation, Medical Care, Navy, is held by the Bureau of Medicine and Surgery. In order for this responsibility to be effective, it is essential that all activities which incur obligations and expenditures under the appropriation, Medical Care, Navy, assign to documents and vouchers proper accounting data.

2. Reference (a) sets forth the appropriation symbol and the appropriation subhead numbers under the appropriation Medical Care, Navy. In order that all activities may assign appropriation subhead numbers and bureau control numbers which are congruous with one another, enclosure (1) lists the first two digits of

(1)

Appropriation Subhead Numbers	Title	Bureau Control Numbers (first two digits only)
.10	Research and Development	50, 51, 52, 54, 56, 86, 88
.11	Maintenance and operation of medical treatment facilities	16, 17, 18, 19, 70, 72, 75, 77
.13	Industrial mobilization and procurement planning	61
.15	Departmental administration	43, 45, 47, 48, 49
.21	Education and Training	34, 36, 38, 40, 42, 44, 46, 82, 84
.28	Medical service, supplies and equipment at other facilities	12, 14, 20, 21, 22, 74, 76
.33	Nonrecurring procurement of medical supplies and equipment	13, 15
.35	Medical supply system	58, 60, 90
.39	Medical care in non-naval facilities	24, 26
.40	Care of the Dead	30, 31, 32, 78, 80
.90	Centralized procurement	62, 64

(2)

Bureau Control No.	Approp Subhead No.	Bureau Control No.	Approp Subhead No.	Bureau Control No.	Approp Subhead No.
12---	.28	36---	.21	60---	.35
13---	.33	38---	.21	61---	.13
14---	.28	40---	.21	62---	.90
15---	.33	42---	.21	64---	.90
16---	.11	43---	.15	70---	.11
17---	.11	44---	.21	72---	.11
18---	.11	45---	.15	74---	.28
19---	.11	46---	.21	75---	.11
20---	.28	47---	.15	76---	.28
21---	.28	48---	.15	77---	.11
22---	.28	49---	.15	78---	.40
24---	.39	50---	.10	80---	.40
26---	.39	51---	.10	82---	.21
30---	.40	52---	.10	84---	.21
31---	.40	54---	.10	86---	.10
32---	.40	56---	.10	88---	.10
34---	.21	58---	.35	90---	.35

Enclosure (1); Circular Letter 52-44

the bureau control numbers established by this Bureau under each appropriation subhead number. Upon assigning the appropriation Medical Care, Navy, to any document indicating a financial liability the bureau control number assigned to the activity shall be used under the appropriation subhead number indicated in reference (a) and enclosure (1). Examples of this assignment:

(a) Bureau Control Number 30 ---would be assigned with Appropriation Subhead Number .40.
(b) Bureau Control Number 20---would be assigned with Appropriation Subhead Number .28.

In no instance may an appropriation subhead number be assigned with other than the bureau control numbers as set forth in enclosure (1).

3. Reference (b) and reference (c) reflect expenditure account numbers and object classification symbols respectively, which are applicable to the appropriate Medical Care, Navy.

4. The assignment of appropriation data to contracts, documents, and vouchers in accordance with instructions contained in this letter will permit the Bureau of Medicine and Surgery to maintain proper fiscal control of funds under the appropriation Medical Care, Navy.

H. L. Pugh

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BUMED CIRCULAR LETTER 52-45 13 May 1952

From: Chief, Bureau of Medicine and Surgery
To: All Medical Department Activities and Facilities

Subj: The Armed Forces Medical Library

1. On 4 March 1952 the Secretary of Defense, by Department of Defense Directive 20.33-3, established the Armed Forces Medical Library.

2. For information in the field pertinent paragraphs of this directive are quoted:

I. INTRODUCTION

Pursuant to the authority vested in the Secretary of Defense by the National Security Act of 1947 (as amended), it is hereby directed that there be established an Armed Forces Medical Library (hereinafter called the "Library") with responsibilities, functions, authority and relationships as set forth herein. The Library shall be a joint agency of the three military departments, subject to the authority, direction and control of the Secretary of Defense, and under the management control of the Secretary of the Army. It shall consist of the present Army

Medical Library, which is hereby transferred thereto, and such other medical library items and collections as may from time to time be considered appropriate.

The Library shall serve as the central medical library of the Department of Defense and as a National Library for medicine and related sciences. In carrying out this objective, it will be dedicated to the advancement of medical sciences in the United States as a whole, as well as within the Department of Defense.

III. FUNCTIONS

1. Under policies established by the Armed Forces Medical Policy Council governing medical and allied activities of the Department of Defense, the Armed Forces Medical Library shall:

a. Serve as a central or national library for medical bibliographical research for the medical activities of the military departments, related research and development contractors, other governmental agencies, and the civilian medical and allied professions.

b. Publish guides to medical literature in the form of catalogs, indexes and bibliographical lists and distribute such publications to the medical activities of the military departments and, on a reimbursable basis, to other governmental and private organizations or individuals as required.

c. Provide technical consultation service to medical libraries at medical installations of the military departments.

d. Provide such central library services to field libraries as is appropriate.

V. RELATIONSHIPS

1. The Library shall coordinate its efforts with all Department of Defense agencies, other governmental agencies and private organizations which have a mutual interest or responsibility with respect to any of its functions.

2. The Director and the staff of the Library are authorized and expected to communicate directly and expeditiously with all Department of Defense agencies and appropriate subdivisions thereof, other governmental agencies and private organizations concerning technical matters within its jurisdiction and in which there exists a mutual interest or responsibility.

3. Services of the Library shall be available to all Department of Defense agencies and, when appropriate, other governmental, private organizations and individuals.

4. All agencies of the Department of Defense shall cooperate fully in assisting the Library in the performance of its mission.

H. L. Pugh

The above letter will not be published in the Navy Department Bulletin.

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NAVY DEPARTMENT
BUREAU OF MEDICINE AND SURGERY
WASHINGTON 25, D. C.

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