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### Policy

The U.S. Navy Medical News Letter is basically an official Medical Department publication inviting the attention of officers of the Medical Department of the Regular Navy and Naval Reserve to timely up-to-date items of official and professional interest relative to medicine, dentistry, and allied sciences. The amount of information used is only that necessary to inform adequately officers of the Medical Department of the existence and source of such information. The items used are neither intended to be nor susceptible to use by any officer as a substitute for any item or article in its original form. All readers of the News Letter are urged to obtain the original of those items of particular interest to the individual.

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### Penicillin Reactions

The advent of penicillin in 1943, was hailed not only because of its remarkable therapeutic powers, but also because of the infrequent and trifling reactions that followed its use. Today, it heads the list of medicinal agents in the frequency, diversity, and severity of the sensitivities which it induces. In current experience, it has replaced foreign sera as the most common cause of fatal anaphylactic shock. It is responsible for a growing number of deaths due to irreversible vascular allergy, periarteritis nodosa. Yet, in many instances, sensitivity has unnecessarily been incurred. Moreover, the most severe sensitivities can be recognized by skin tests (a rarity in the field of drug allergy). It is, therefore, the authors' purpose to stress the growing need for prevention of unnecessary sensitization, to describe the ways in which sensitivity manifests itself, and to discuss the management of reactions and the avoidance of the serious and fatal types.

Fifteen reported anaphylactic deaths in a year and a half emphasize the potential seriousness of penicillin sensitivity. In addition to deaths in anaphylactic shock, more protracted types of penicillin sensitivity have, at times, also proved fatal. Exfoliative dermatitis due to penicillin, chronic irreversible vascular lesions, including periarteritis nodosa, contribute additional deaths. Syphilitic patients have at times died after penicillin-induced Jarisch-Herxheimer reactions, in some of which a sensitization factor could have been involved. To obtain a complete estimate of the lethal seriousness of penicillin reactions, one would need to ascertain not only the number of anaphylactic deaths not reported, but also the number of the more protracted severe reactions, such as periarteritis nodosa and exfoliative dermatitis, in which the role of penicillin was not suspected.

A striking fact with regard to penicillin reactions is the multiplicity of forms in which they may occur. The authors, therefore, list those which have been reported, not necessarily in the order of their frequency, but

rather according to the type of manifestation: 1. Dermatitis medicamentosa. 2. Urticaria. 3. Lesions like those of erythema nodosum and erythema multiforme are increasing in frequency. 4. Contact dermatitis. 5. Exfoliative dermatitis. 6. Bullous dermatitis. 7. "Serum sickness" reaction. 8. Purpuric reactions. 9. Agranulocytosis. 10. Photosensitivity. 11. Lupus erythematosus disseminatus. 12. Periarteritis nodosa. 13. Anaphylaxis. 14. Miscellaneous.

Factors favoring penicillin sensitization are: 1. Sensitizing exposure. 2. Allergic constitution. 3. Penicillin preparation and route of administration. 4. Cross reactions with other fungi.

The management of anaphylactic shock is increasingly more difficult. The greater the sensitivity of the patient, the sooner the reaction begins after the dose of penicillin. In the records of the 17 fatal anaphylactic cases, when symptoms began within a minute or two and death came in 10 to 15 minutes, it was noted in 5 cases that death occurred before any treatment could be given, and probably for the same reason, no mention of treatment was made in 5 others. In the rest, no significant effects were achieved by the following measures: subcutaneous, intramuscular, and even intracardiac epinephrine; parenteral nikethamide, ephedrine, and Coramine; intravenous calcium gluconate and aminophylline; and administration of oxygen, by mask or positive pressure.

The authors believe that this record can be improved. (a) The first requisite, as Hoagland has emphasized, is preparedness to meet the emergency. This includes the availability of a tourniquet, sterile syringes, and epinephrine, Benadryl, or Pyribenzamine for parenteral use, other indicated drugs, and oxygen. (b) When penicillin is given parenterally, it should be injected into the arm at a low enough level to make a tourniquet effective. At the first sign of a severe reaction, the tourniquet should be applied and kept in place, except at long intervals, to delay absorption (one might even be justified in making a crucial incision at the injection site and applying suction as recommended in snakebite). (c) The airway should be kept open and oxygen administered by mouth. (d) Sympathomimetic drugs, preferably epinephrine, should be given by intravenous drip. (e) Antihistaminics may be given intravenously. Burleson reported improvement within 10 minutes after intravenous Benadryl. (f) To prolong and hold the effect initiated by the preceding measures, ACTH may be given in intravenous drip or cortisone by mouth.

In cases of lesser reactions: (a) Stop the penicillin. (b) Medication to be used depends upon the severity of the reaction. (c) For milder reactions, full doses of antihistaminics and ephedrine are indicated. (d) For exfoliative dermatitis, cortisone should be given beginning with 300 mg. in divided doses over the first 24 hours, 200 mg. the second day, 100 mg. daily for a week, and then 75, 50, and 25 mg. respectively on 3 subsequent days. (e) In case of periarteritis nodosa, cortisone in full dosage and over a protracted period is required.

The management of chronic urticaria, and of severe "serum sickness" reactions deserves special comment. The penicillin should be stopped and antihistaminic drugs given in full dosage. The diet should be restricted to cooked foods only, and in addition, the patient should eat no fish or sea food, no nuts, and no chocolate. If symptoms are completely relieved, the antihistaminic drugs should be gradually tapered off; and if symptoms do not recur, the diet may be gradually relaxed. If symptoms are not relieved by antihistaminics, and the diet mentioned, then food sensitivities should be tested and the diet arranged accordingly. If no positive food reactions are found, then a course of cortisone, as mentioned under exfoliative dermatitis, should be given.

Much penicillin sensitivity is unnecessary, and preventable by not giving penicillin in minor ailments, avoiding local applications of the drug, avoiding preparations of depot penicillin unless they are decidedly necessary, giving preference to the oral route of administration, and avoiding combined parenteral injections with other possible antigens. Penicillin reactions may be largely avoided by careful attention to an allergic history in the patient's background, by questioning with regard to previous penicillin therapy, especially previous penicillin reactions, and by proper precautions in the management of such patients. (Am. J. M. Sc., Oct. 1953, R. A. Kern, M.D. and Maj. N. A. Wimberley, Jr., MC, USA; Department of Medicine, Temple University School of Medicine and Hospital, Philadelphia, Pa.)

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#### Treatment of Blastomycosis

Three concepts regarding blastomycosis are widely prevalent in medical circles. The first of these is that this disease is such a rarity that it need not be seriously considered in differential diagnosis. However, in a 10-year period, 16 patients with North American blastomycosis were observed at the John Gaston Hospital and the University of Tennessee College of Medicine; of perhaps even greater significance is the fact that 7 additional cases were subsequently observed in the relatively brief period of 15 months. Four of the latter patients came to necropsy with a clinical diagnosis of tuberculosis or bronchogenic carcinoma. Frequently, microscopic and bacteriologic examinations are necessary at autopsy to differentiate these diseases. It is probable that many cases of blastomycosis are misdiagnosed. This disease should be considered in all cases of chronic pulmonary disease simulating tuberculosis in which tubercle bacilli cannot be readily demonstrated. Numerous reports of blastomycosis have appeared in the recent literature and it is becoming more and more apparent that it is not as rare as many believe.

A second widely held view is that the diagnosis of blastomycosis is extremely difficult--that it requires prolonged and expensive laboratory procedures. The authors' experience indicates that the most important factor in

the diagnosis of this disease is an awareness of its existence. Laboratory procedures involved, such as the microscopic examination of sputum and purulent exudates utilizing 10% sodium or potassium hydroxide, the culture of body secretions, exudates, and tissues as well as tissue biopsy, are not unusually difficult or expensive.

A third concept held by a large number of physicians is that the diagnosis of systemic North American blastomycosis is largely academic as no treatment is available and the death of the patient is usually inevitable. Until recently treatment has been limited to iodides and supportive therapy--adequate diet, vitamins, bedrest, and general hygienic measures. While some have believed that potassium iodide is of value, others have denied this. It has been demonstrated that aureomycin is capable of controlling this condition but apparently a sufficient concentration cannot be obtained to eradicate the causative organism in the tissues, as is possible in actinomycosis. The effect of cortisone in 1 patient suggests that it is contraindicated in blastomycosis. The work of Schoenbach and his associates with stilbamidine led to the investigation of the possible use of the less toxic 2-hydroxystilbamidine in blastomycosis.

Even though treatment of these patients with 2-hydroxystilbamidine was extensive and prolonged, no significant toxic effects were observed. It should be recalled that originally the customary dosage of stilbamidine administered to patients with leishmaniasis totaled about 2 gm.; even this quantity caused such severe trigeminal neuropathy that the use of this drug was discontinued. The authors' experience obtained during the treatment of multiple myeloma with comparable doses of stilbamidine also emphasized the toxicity of this compound. In contradistinction, the 4 patients with blastomycosis reported here received 19.6, 4.3 (in a 4-year-old patient), 8.1, and 4.5 (in an 84-year-old patient) gm. of 2-hydroxystilbamidine, respectively. No trigeminal neuropathy developed and careful and extensive clinical studies did not reveal any other toxic sequelae, confirming previous observations. The same favorable result was recently described during the treatment of a case of South American mucocutaneous leishmaniasis with 6.1 gm. of 2-hydroxystilbamidine. Because such large doses of 2-hydroxystilbamidine can be given with impunity, diseases which until now have proved resistant to stilbamidine may be favorably influenced by larger doses of the 2-hydroxy derivative. (Am. J. Med., Nov. 1953, I. Snapper, M. D., Mount Sinai Hospital, New York, N. Y., and L. V. McVay, Jr., M. D., John Gaston Hospital, Memphis, Tenn.) (See Medical News Letter, Vol. 22, No. 3, page 14)

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The printing of this publication has been approved by the Director of the Bureau of the Budget, June 23, 1952.

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### Gamma Globulin in the Treatment of Measles Encephalitis

Forty-one cases of measles encephalitis and encephalomyelitis with follow-up studies are presented in detail; 15 patients received 20 cc. or more of gamma globulin early in the acute phase (a total dosage of from 0.43 to 1.1 cc. of gamma globulin per pound of body weight); 12 patients received from 4 to 16 cc. of gamma globulin early in the acute phase (a total dosage of from 0.07 to 0.30 cc. of gamma globulin per pound of body weight); and 14 patients were not treated with gamma globulin in the acute phase.

The results in the group given 20 cc. or more (a total dosage of 0.43 cc. or more per pound of body weight) were better in every respect than those of the other 2 groups. This group had a greater apparent complete recovery rate, a reduced incidence in the severity of sequelae, a normal temperature by the third day (mean of 14 out of 15 cases), a shorter hospital residence, no fatalities, and no secondary complicating pneumonia. The patients made remarkable recoveries in view of signs and symptoms which indicated extensive nervous system involvement. Four patients received gamma globulin alone (no antibiotics or sulfonamides) in the acute phase and made the same rapid recovery as those given antibiotics or sulfonamides in combination with the gamma globulin injections.

There were no local or systemic reactions to therapeutic doses of gamma globulin.

The recommended dose is a total dosage of 1 cc. per pound of body weight, given intramuscularly in divided doses, over a 36- to 48-hour period, as soon as the signs and symptoms of central nervous system involvement are manifest. Suggested dosage schedules are given.

Gamma globulin therapy can be expected to shorten the acute stage of measles encephalitis and encephalomyelitis and as a result (1) reduce the incidence of sequelae, (2) reduce the severity of sequelae, and (3) reduce the mortality rate. It may not be possible to see every patient recover without sequelae inasmuch as neurological signs indicative of central nervous system tissue destruction subsequent to viral invasion are already present when treatment with gamma globulin is begun.

Adjunctive therapy is mandatory to assure the fullest recovery. The therapeutic regime in measles encephalitis and encephalomyelitis includes in addition to gamma globulin, adequate fluid and electrolyte intake, oxygen, antipyretic therapy, suction, balanced nutritional feedings, sedatives (barbiturates) in small doses as needed, magnesium sulfate in small doses, antibiotics, and sulfonamides. (J. Pediat., Nov. 1953, L. Odessky, M.D., A. V. Bedo, M.D., K. G. Jennings, M.D., I. J. Sands, M.D., P. Rosenblatt, M.D., H. Weisler, M.D., and B. Newman, M.D.; Communicable Disease and Pathology Services, Kingston Avenue Hospital, Brooklyn, N. Y.)

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### Coarctation of the Aorta

Coarctation of the aorta is a congenital malformation in which a segment of the aorta is constricted. Classically, the narrowing occurs between the origin of the left subclavian artery and just distal to the site of insertion of the ductus or ligamentum arteriosum, involving only a relatively short segment of the aorta. While there may be any degree of narrowing of the aortic lumen at the site of the coarctation, there is usually a marked stenosis, or less frequently an atresia, in the clinically significant cases. Rarely, coarctation occurs in other areas, either proximally in the aortic arch or in the distal thoracic or abdominal aorta, and in some instances the involved segment may be of considerable length.

Coarctation in individual cases carries a variable prognosis, but it has been clearly established that the over-all life expectancy of a group of patients with coarctation is much shorter than that of the population at large. Frequently, coarctation occurs in association with other serious cardiovascular malformations, and in such cases the life expectancy is generally quite short.

Prior to 1945, coarctation was a clinical curiosity of academic interest only. In that year, Crafoord and Nylin and Gross independently reported successful resections of coarctations with re-establishment of the continuity of the aortic lumen. Since that time surgery has been performed on many cases of coarctation and the practicality and effectiveness of this method of treatment have been clearly demonstrated. The result is that in medical centers where vascular surgery of this type is being performed, coarctation is no longer either rare or of only academic interest. Along with the general increase in clinical interest in the anomaly, there has been an awakened interest in its radiological aspects.

Once the possibility of coarctation is considered, by either the radiologist or the local physician, its presence can be easily confirmed by a combination of routine physical and radiologic studies in the great majority of instances. The only group of cases offering any real diagnostic problem occurs in young children. Here the coarctation may be complicated by additional anomalies and, in general, routine radiologic studies in this group have little to offer in terms of the diagnosis of coarctation. Both diagnostic and therapeutic aspects of symptomatic coarctation in infants vary considerably from those of the older age groups.

When the diagnosis has been established, unless there are obvious contraindications to surgery, the patient should if possible be referred to one of the centers specializing in the treatment of coarctation. There his condition will be re-evaluated and part of this process will center around the radiologic aspects of the case. The problem immediately arises as to the role of contrast vascular studies in such an evaluation. The authors believe that these procedures should be utilized only in selected cases. They have been impressed by the finding that in the great majority of clinically significant coarctations the anomaly is located at a specific

anatomical site and that its nature is such that a skillful and experienced surgeon can successfully resect the stenotic area and restore the aortic continuity by an end-to-end anastomosis. In other words, if surgeons routinely performed a left thoracotomy through the bed of the fifth rib in patients with a clinical diagnosis of uncomplicated coarctation, they would in approximately 90% of the cases find a lesion of this typical type. If aortic grafts were available, the operability would rise to about 95%. The only real difficulty would occur in those relatively rare instances where the coarctation is not located at the usual site, and in these cases a clue as to the abnormal location may be obtained on routine physical examination. For example, if the coarctation involves or is proximal to the origin of the left subclavian artery, there will usually be significant differences in the blood pressures of the upper extremities. Or, if the coarctation is located in the abdominal aorta, the murmurs and collateral circulation pathways may show distinct variations from the usual findings.

For these reasons it is believed that in the great majority of cases careful physical examination and routine radiologic studies will adequately indicate the site of coarctation. It should be emphasized that by routine radiologic study a single standard chest film is not implied. In addition, there must be included fluoroscopy, barium-swallow films in the routine projections, and adequate attempts to demonstrate the figure "3" sign. It is believed that contrast vascular studies should be limited to those instances where there is some reason to suspect that the coarctation is atypical, or where routine radiologic studies give no clear indication of the site of the stenosis.

If, under these conditions, contrast studies are deemed necessary, aortography will, in general, provide a more adequate visualization of the coarctation, although it apparently carries a greater risk than does angiocardiology. Regardless of the type of contrast study used, consistently satisfactory results will not be obtained unless the equipment permits the obtaining of serial films. (Radiology, Nov. 1953, R. D. Sloan, M. D. and R. N. Cooley, M. D., Department of Radiology, The Johns Hopkins Hospital and University, Baltimore, Md.)

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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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### Stomach Cancer Diagnosis

A method of achieving early diagnosis of stomach cancer has long been sought. Roentgen-ray examination, long considered the most reliable method of diagnosis, may fall short of detecting cancer at a stage where successful treatment is possible. The gastroscope is of limited value for the investigation of special cases. Examination of gastric washings and gastric aspiration for cellular material have been attempted during recent years with certain promise yet decided limitations in accuracy. The Panico balloon, one of the most recent techniques, has demonstrated improved accuracy, but the procedure, which takes about 1 hour per case, demands meticulous care in the handling and washing of cellular material, and this renders it a rather complicated procedure requiring the services of a specialist.

The low calcium content of malignant cells is apparently responsible for the tendency of malignant epithelial cells to separate more readily than normal epithelial cells. A gastric brush devised by the senior author exploits this principle of tumor friability, for even light contact of the rotating brush against the tumor removes great numbers of the cancer cells, while contact with healthy tissues yields lesser numbers of benign cells.

A rotating brush in a sleeve, which may be passed with ease into the empty stomach of any individual during a 5- to 10-minute period, places a simple and practical instrument at the disposal of the medical profession for the collection of gastric cells for study.

It is possible that the presence of esophageal varices might constitute a contraindication of the use of the brush. If in the presence of gastric retention, the stomach is found to be full of mucus, it is desirable to remove the mucus by suction before using the stomach brush.

Occasionally, the brush has been tinged with blood on removal from the stomach, but no case of gastric hemorrhage and no harmful effects from its use have yet been encountered.

The first tests with the stomach brush were made on patients suspected of having gastric cancer. However, even in this early group of 8 patients there was still always the element of doubt, because roentgen-ray findings coupled with clinical investigations were suggestive of cancer but the question of a gastric ulcer could not be ruled out. In those cases highly suggestive of gastric cancer, the conclusive cytological findings provided confirmatory evidence.

An early doubt in the authors' minds was the question of whether the brush would reach neoplasms developing in the larger portion of the stomach. It was gratifying to note that in 3 such carcinomas, the cell-brush specimens provided conclusive (Class V) cytological findings in 2 cases, and positive (Class IV) in a third.

There were 14 positive cases diagnosed (Classes IV and V), and 10 labeled as "suspicious" (Class III). To date there have been 6 absolute confirmations (surgery or post-mortem examination) and 5 relative confirmations

based upon fairly conclusive roentgen-ray and clinical findings. Three positive cases have not yet been confirmed.

It is believed that a conservative attitude should be adopted during the early trials with any new instrument, and surgical intervention would not seem justified on the basis of positive cytological findings alone.

Positive cytology, on the other hand, is a clear-cut indication for thorough diagnostic investigation utilizing to the full clinical and radiological procedures as well as the gastroscope in an effort to procure an accurate diagnosis prior to instituting therapy. (Cancer, Nov. 1953, J.E. Ayre, M.D., and B.G. Oren, M.D.; Section of Gastro-Enterology, Jackson Memorial Hospital, Miami, Fla.)

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### Diagnosis of Laryngeal Carcinoma

This report is the direct outgrowth of efforts to photograph various types of laryngeal pathologic changes for teaching purposes. In the course of accumulating and reviewing pictures the authors were impressed by the problem of leukoplakia in its varied forms and associated incidence of carcinoma of the vocal cord. The relative lack of symptoms in extracordal or extrinsic cancer and the amazing extent to which such lesions had often progressed before recognition were consistently disturbing observations. The authors became interested in correlating mirror and direct laryngeal views with operative specimens from the same patient. The striking similarity between the gross appearance of some forms of tuberculosis of the larynx and carcinomas of the larynx was evident on numerous occasions. Inasmuch as the choice of therapy often involved problems in diagnosis, some consideration of treatment has been included. For a more definitive analysis of these particular topics than was afforded by photography, the authors gathered from their records such statistics and clinical data as seemed pertinent.

The study is based on a series of 116 patients with carcinoma of the larynx observed in the past 5 years.

The terms "cordal," "endolaryngeal," "subglottic," and "extracordal" are used to designate the four principal types of laryngeal carcinoma.

Hoarseness was the only symptom of cordal carcinoma and was present in each of the 31 patients in this category. The average duration of this symptom before diagnosis was 7 months. The widespread use of antibiotics may be a factor in delayed diagnosis of early laryngeal cancer.

Leukoplakia was evident in 19 of 31 patients (61%) with carcinoma of the vocal cord. Inasmuch as leukoplakia figures prominently as a precursor of cordal carcinoma and is observed most often in heavy smokers, excessive smoking may be regarded as a predisposing factor in cancer of the vocal cord.

Hoarseness was uniformly present in 18 patients with endolaryngeal carcinoma. Throat discomfort of varying degree was also experienced by 6 patients in this group.

The diagnosis of subglottic carcinoma was often obscure until invasion of the vocal cord or narrowing of the airway occurred. The average duration of symptoms before diagnosis in cases of subglottic carcinoma was 13.4 months, an interval appreciably greater than in other forms of laryngeal carcinoma.

Extracordal (extrinsic) carcinoma developed silently or with minimal symptoms. The most common symptom was some form of throat discomfort, present in 69% of the patients. In the entire group of 58 patients with extracordal carcinoma, 20 (34.5%) were found to have cervical metastasis on admission.

Multiple primary carcinomas were found in 7 of the 116 patients in this study.

Tuberculosis of the larynx and carcinoma of the larynx often presented comparable gross appearances. Biopsy in a case of laryngeal tuberculosis is warranted when cancer is suspected. (Arch. Otolaryng., S. A. Friedberg, M. D. and L. J. Wallner, M. D.; University of Illinois College of Medicine, Department of Otolaryngology, Chicago, Ill.)

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#### Progress in the Study of Hodgkin's Disease

The greatest progress in Hodgkin's disease has been in the field of therapy. The chemotherapeutic agents represent a remarkable advance, particularly the mustards and mustard-acting drugs (TEM).

In selected cases both drugs have dramatic specific action. Cortisone and ACTH have limited use because only very few patients are benefited. The value of adenylic acid is also limited to a highly selected group, difficult to differentiate from the larger group who will not be benefited.

One drug the author recommends on the basis of work extending over a period of the past 15 months and which as yet is unpublished, is Butazolidin. With this drug control of pain, fever, and, to some extent, pruritus is obtained. It also produces in selected cases, a feeling of well-being, improves the appetite, and dissipates the feeling of fatigue--common symptoms in Hodgkin's disease. The author has also seen nodes regress during its administration.

In the early, or preliminary, phase of the disease the node enlargement is observed to be due to hyperplasia of the small lymphocytes. Scattered through the node, inconspicuous and sometimes difficult to find, are enlarged reticulum cells, with swollen nuclei containing a prominent nucleolus. Eosinophils and Sternberg-Reed cells may or may not be present.

As time goes on the numbers of lymphocytes begin to diminish and the reticulum cell forms increase until they dominate the picture.

Later, even these begin to undergo atrophy so that eventually the lymph node persists as an enlarged fibrous structure, the ultimate result being complete destruction of the lymphoid system, exhaustion of the lymphoid elements, and inability to regenerate the lymphocyte beyond a minimum degree.

In a small group of cases, the direction of change is quite different from that just described. Instead of the reticular elements undergoing atrophy, they proliferate and form true infiltrating neoplastic growths.

There is one further point in the dynamics of the Hodgkin's process--namely the histology of a new node which appears for the first time late in the disease. Early in the author's studies a node was obtained from a patient at such a period, only a few days after it had appeared. Instead of the histology of early Hodgkin's which the author expected to see, there were many fibroblasts, fibrous tissue, and normal-appearing reticulum cells with a few abnormal forms and Sternberg-Reed cells. In other words, though it had enlarged only recently, the node reflected the advanced status of the disease. It did not go through a phase of lymphoid hyperplasia, reticulum dedifferentiation and degeneration and then fibrosis. This observation has been duplicated several times in patients upon whom biopsies have been done periodically over the years and indicated to the author profound physiologic alteration of the lymphoid system. This alteration may be the reason for the irreversibility and inevitably fatal outcome of Hodgkin's lymphogranuloma.

When the pathologic process is viewed thus as a dynamic process and its consequences pondered over, certain questions arise: (1) How long does it take for the process to develop and run its course? (2) What factors control it? (3) What is its significance?

In the first place the tempo of the various anatomical steps varies from individual to individual. One patient the author followed had a paragranuloma type of node at the initial biopsy. A year later, at autopsy, every node was fibrosed, and the gastrointestinal tract and spleen were devoid of lymphoid cells. Parker and Jackson cite 1 patient with a biopsied node showing paragranuloma in whom, 35 years later, a second biopsy revealed the same. Why such extreme differences in behavior? The answer is not known. It can be postulated that it must be linked in some way to the immunologic processes of the individual, and that it depends upon the potency of the specific toxic causative factor.

The clinical significance of this pathologic process which ultimately destroys the lymphoid system is evident to those having wide experience with Hodgkin's disease. The rapidity with which the end stage is reached is reflected in the acuteness or chronicity of the clinical course. Further, there is a correlation between response to therapy and the anatomical composition of the node. It is well known that response to therapy is best when nodes are predominantly lymphocytic and poor when the fibrotic phase is reached.

It appears, therefore, that the integrity of the lymphoid system is important to the body economy. Just as the ultimate course of rheumatic fever depends upon the degree of anatomic damage to the heart and the extent to which cardiac physiology is altered, so the ultimate course of Hodgkin's disease may depend upon the extent the lymphoid system is destroyed and the tempo at which it is done. (Ohio State M. J., Oct. 1953, A. Rottino, M. D. St. Vincent's Hospital, New York, N. Y.)

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Selected Research Report  
Intra-arterial and Intravenous Transfusions

A study of the relative effectiveness of intravenous and intra-arterial transfusion in the treatment of hemorrhagic shock has been carried out in a series of 64 dogs. Transfusions were administered by the 2 routes under comparable and rigidly controlled conditions. The experiments were so designed as to evaluate objectively the rationale which has been proposed to explain the favorable clinical results reported with the use of intra-arterial transfusion. The following observations were made: (1) The hydraulic effect of intra-arterial transfusion in elevating arterial pressure is insignificant at rates of transfusion which are employed clinically. (2) The recovery of arterial pressure is a function, not of the route, but of the rate of transfusion. (3) Intra-arterial and intravenous transfusion are equally effective in restoring the low cardiac output characteristic of hemorrhagic shock. (4) The rapidity with which intra-arterially and intravenously transfused blood mixed with the general circulation was determined by a method in which the plasma fraction of the transfused blood was tagged. Compared to a standard technique, no evidence of pooling of the infused blood was found with either intra-arterial or intravenous transfusion. (5) Central venous pressure was found to fall during hemorrhage and to rise to normal or slightly above during reinfusion of previously shed blood. Changes in venous pressure and the occurrence of heart failure were unrelated to the route of transfusion employed. (6) Simultaneous, paired, survival experiments in 26 animals failed to show a significant difference in survival rate between intra-arterial and intravenous transfusion. (7) Direct perfusion of the coronary arteries by arterially infused blood was demonstrated by radiographic technique to occur only when the output of the left ventricle has become negligible or nonexistent. Direct perfusion of the cerebral vessels with unsaturated blood given intra-arterially was demonstrated by directional oximetry to reduce both cerebral arterial and cerebral venous oxygen saturation. (8) In resuscitation from asystole, intra-arterial transfusion has some theoretical advantages over intravenous transfusion. In the present experiments, both methods of transfusion were found to be effective in restoring cardiac contraction. The relative effectiveness of the two methods was not determined. Intra-arterial

infusion was assumed to initiate heart beat by perfusion of the coronary arteries. However, suggestive evidence was obtained to indicate that it may, under some circumstances, act via the venous system.

In addition to the recognized risks of blood transfusion, the infusion of blood intra-arterially under pressure is accompanied by additional hazards. These are: (1) Delay. The inevitable result of the time needed to cannulate an artery and to prepare a pressure transfusion. (2) Interruption of the flow of blood to the extremity employed, with gangrene or other complications of ischemia. In addition to the cases reported, several others have come to the authors' attention. (3) Air embolism. There have been no cases reported of this accident. However, this is an important consideration. (4) Severe (post-transfusion) extremity pain. This is usually attributed to arterial spasm.

The rapid intravenous transfusion of blood has been demonstrated in these studies to be an effective treatment for experimental hemorrhagic shock. No evidence could be found that rapid intra-arterial transfusion is any more or less effective. (Research Report NM 006 014.07.01, Dec. 1952, Naval Medical Field Research Laboratory, Camp Lejeune, N. C., LT J. V. Maloney, Jr., (MC) USNR, et al). (See Medical News Letter, Vol. 21, No. 9, page 9)

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#### Nongonococcal Urethritis

As a result of the paucity of factual information concerning the etiology, epidemiology, and therapy of nongonococcal urethritis, the Bureau of Medicine and Surgery, U.S. Navy, initiated a joint study at the Naval Medical Field Research Laboratory and U. S. Naval Hospital, Camp Lejeune, N. C.

In the phase of the study reported, the authors' primary objective was to establish by detailed historical, clinical, epidemiologic, and microbiologic methods the variations from normal of subjects with nongonococcal urethritis.

From the men appearing at the Venereal Disease Unit of the Camp Dispensary with a urethral discharge in which the gonococcus could not be found by smear or culture, 45 subjects were admitted to the U. S. Naval Hospital for this investigation. They were thoroughly investigated, treated, and returned to active duty. An attempt was made to limit the first 25 cases to those of short duration without a history of prior urethral discharge or therapy. The rationale was to study the syndrome in the simplest possible form. The longest period of observation following initiation of therapy was 160 days, and the shortest was 14 days. The average follow-up period was 62.5 days.

For each patient admitted to the hospital, a hospital corpsman with a history negative for recent febrile illness or any genitourinary tract disease was selected for study as a paired control.

With admission to the hospital, each patient was started on a planned course of investigation which consisted of a period of observation while therapy was administered and weekly observations after release to active duty.

A number of impressions have been gained: (1) Nongonococcal urethritis is a disease of sexually active people, but it has not been proved to be venereal in origin and should not be so classified. (2) The clinical picture is one of a mild inflammatory disease of the lower genitourinary system and is not confined to the anterior urethra. (3) "Abacterial" urethral exudates do not exist. (4) A specific etiologic agent has not been found and further investigation must include that of the existing flora of the urethra and its accessory apparatus. (5) Known forms of the gonococcus play no etiologic role in this disease. (6) A small coccobacillary organism appearing only in the patient group warrants further study. (7) The associated prostatic inflammation is probably the most important component of the syndrome. (8) Oxytetracycline (Terramycin) is the most effective form of therapy available. (Am. J. Syph., Gonorr. & Ven. Dis., Nov. 1953, LT S.S. Ambrose, Jr. (MC) USNR and LCDR W. W. Taylor (MSC) USN, U.S. Naval Hospital, Camp Lejeune, N. C.)

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#### Intramuscular Veriloid

A previous report on the treatment of acute hypertensive emergencies discussed the intravenous use of a biologically standardized and reproducible mixture of ester alkaloids from *Veratrum viride*, generically designated Alkavervir. Because the hypotensive effect of the veratrum alkaloids is dependent on an action within the cephalic region, these agents possess certain advantages over adrenergic and ganglionic blocking agents. They are just as effective in the supine position as in the upright position and postural reflexes are not impaired. Therefore, an extract such as Alkavervir (Veriloid) is particularly useful for the treatment of hypertensive emergencies in the unconscious or bedfast patient. No serious unfavorable renal, cardiac, or cerebral effects have been reported following their use.

There seems to be no question concerning the efficacy of intravenous infusion of Alkavervir (Veriloid) as a method for reducing the blood pressure. It has been used effectively in the treatment of hypertensive crisis and encephalopathy. The administration of Veriloid by continuous infusion is fairly simple if competent and constant nursing supervision is available. The inconvenience of prolonged therapy of this nature makes an effective intramuscular preparation highly desirable if the blood pressure response is reproducible with a given dose and if this dose can be arrived at by a simple titration procedure; that is, progressively increasing the dose on each injection until the proper one is ascertained. Such a preparation can

be given as indicated by the return of blood pressure toward its pre-treatment levels, and requires much less supervision than when the drug is given by continuous intravenous infusion. Because intramuscular Veriloid seemed to have the theoretical advantages mentioned, it seemed important to determine its dosage range and if possible a means of predicting accurately the dose required for any given patient. It was also hoped that the concomitant use of oral and intramuscular Veriloid would result in a lengthening of the interval between intramuscular doses, and thus further simplify the treatment of hypertensive emergencies.

Veriloid was administered by repeated intramuscular injections to 35 patients with hypertension. The patients were divided into 2 groups. There were 23 patients in Group 1. These patients received only the intramuscular Veriloid. There were 12 patients in Group 2, who received intramuscular Veriloid after they had received the oral form of the drug for several days to 2 weeks.

Intramuscular Veriloid (aqueous solution) reduces the blood pressure in patients with hypertensive disease. This route of administration simplifies the maintenance of the veratrum-induced hypotension for the treatment of hypertensive emergencies. Combined oral and intramuscular administration did not offer any advantages over intramuscular therapy alone.

It appears that the best approach to establishing the proper dose is to start with a small dose; namely, about 0.6 mg. in the usual case. If this does not produce a satisfactory hypotensive response, succeeding doses should be gradually increased, 0.2 mg. at a time, until a definite response is noted. Further increases of 0.1 mg. may be necessary to achieve the desired degree of hypotensive response. The established intramuscular dose may then be administered at approximately 6-hour intervals (more or less as indicated). In an occasional patient, intervals as long as 12 hours may be necessary between doses. The response of the individual patient must at all times be the guide to the size and frequency of dosage.

The use of a continuous intravenous infusion to establish the dose of intramuscular drug that would be necessary to adequately reduce the blood pressure was of little value because the relationship was too variable and the necessary dose of the intramuscular drug was too critical (narrow therapeutic index). (Am. J. M. Sc., Nov. 1953, J.H. Moyer, M.D. and I. Johnson, M.D.; Cardiac Clinic, Jefferson Davis Hospital, Houston, Tex.)

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#### Diabetes Mellitus in the Aged

It is generally believed that there is a basic difference between diabetes mellitus in the older age groups and that in younger persons. According to Joslin, patients who develop the disease after age 60 exhibit it in a mild form much like that of the fat diabetic patient between the ages of 40 and 60 although in many instances the patient manifests the more severe type of youth.



It is stated that the older diabetic patient's condition is likely to remain stationary or he may even require less and less insulin as time goes on. In other words, they do not appear to demand as close supervision as do younger persons. Also, in Joslin's older patients the condition develops more insidiously so that the exact time of onset is not as readily ascertainable as in younger diabetic patients.

It is agreed that a considerable proportion of older diabetic patients require no insulin and become aglycosuric on diet alone. Further, it is assumed that those who require insulin are the so-called stable type of diabetic patient who would do well on any kind of insulin and that the majority are on small or moderate doses (under 40 units). Certainly, everyone admits that the older diabetic patient should be treated with extreme caution to avoid vascular accidents.

In order to ascertain whether diabetes in the aged is actually distinctive and, if so, to define these characteristics more clearly, 59 consecutive case records of diabetic patients in whom diabetes was first discovered after the age of 60 were reviewed. Thirty-three cases were from the private service, 14 from chronic disease hospitals, and 12 from a local Veterans Administration Hospital. There were 36 male patients and 23 females. In the private series, which was a much more random selection, there were 17 men and 16 women.

Diets were prescribed on the basis of the patient's ideal weight. The authors employed the maximum longevity tables developed by the Metropolitan Life Insurance Company to determine the weight of the patient. These ideal weight charts are based upon the very important conclusions drawn from their studies that an adult individual who does not exceed the weight which he attains at age 25 is most likely to attain maximum longevity. In other words, a weight gain with increasing age is not conducive to longevity. The tables take into account the body build of the individual, being subdivided into small, medium, and large frames.

Most of the patients were overweight and the reduction diet was prescribed most frequently. The authors employed a 1,200 calorie diet for overweight patients, 2,200 calories for maintenance, and 2,600 calories for the underweight diabetic patient. These diet values are taken from the standard diets prepared by the American Dietetic Association and the American Diabetes Association.

Barach found that only 15% of 317 diabetic patients over 60 years of age require insulin as compared with 60% of his young and middle-aged diabetic patients. It should be pointed out that this author was careful not to seek normal blood-sugar levels. Insulin is not to be used in the obese diabetic patient or in other older diabetic patients until an appropriate diet has been tried first. The use of insulin frequently becomes an easy substitute for diet. When this procedure is followed, obesity and hyperglycemia, which usually can be eliminated completely by diet, may actually necessitate an increased insulin dosage.

The cautious administration of insulin in older diabetic patients is advisable, not only to prevent shocks, but also to prevent excessive appetite which leads to obesity and further strain on the cardiovascular system and to avoid the possibility of coronary insufficiency secondary to insulin reactions.

Most of Barach's patients who took insulin used either protamine zinc insulin or PZI combined with crystalline insulin. In a recent study the authors found the "protamine insulins" (PZI, mixtures, and NPH-50) to be the greatest offenders in causing insulin reactions, both as to frequency and severity, by comparison with regular insulin and globin. Consequently, the authors hesitate to employ the protamine insulins in patients over 40 years of age and especially in those over 50 years of age.

In this study approximately one-half of the patients needed no insulin or at the most 5 or 10 units. Only 6 patients required 40 to 50 units per day. The remaining patients required moderate doses, from 15 to 30 units. The amount of the original glycosuria gave no indication of the ultimate insulin requirement. Thus, a patient with seeming "mild" diabetes may require insulin to eliminate glycosuria. Conversely, 1 patient, who spilled 124 grams of glucose in 24 hours, became aglycosuric without insulin on a reduction diet and weight loss. (Ohio State M. J., Nov. 1953, J. I. Goodman, M. D. and L. B. Goldberg, M. D., The Mount Sinai Hospital, New York, N. Y.)

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#### Intra-articular Hydrocortisone for Arthritis

A total of 8,693 intrasynovial injections of hydrocortisone have now been given to 852 patients with a variety of rheumatic diseases. At least partial amelioration of local symptoms and signs, often persisting for weeks or months, has resulted in most instances. Adverse effects have been rare and nearly always mild and self-limited. Although the period of observation has extended over more than 2 years, the treatment must still stand the further test of time before complete acceptance as a therapeutic agent in the local management of rheumatic diseases.

It cannot be overemphasized that this form of therapy is strictly for local palliation and is not a substitute for systemic therapy for any generalized rheumatic process. Likewise, supportive therapy should not be neglected when this adjunct is employed. Intra-articular hydrocortisone has proved a useful adjunct to general measures in the management of rheumatoid arthritis, osteoarthritis, and gout, particularly when one or only a few joints are actively involved. For localized conditions such as bursitis, traumatic arthritis, tennis elbow, and tenosynovitis such as "trigger finger," hydrocortisone injections have been successfully employed alone.

Because local hydrocortisone injections into one or two joints at a time practically obviates the danger of systemic hormonal effects, it can be used in patients in whom contraindications of systemic cortisone therapy exist. This local method has also proved valuable as an adjunct in orthopedic surgery and in rehabilitation.

The only contraindications to the employment of intra-articular hydrocortisone are the presence of infection in or near the joint, or disease so widespread that local therapy is impractical. Arthritis of spinal joints is not amenable to this form of therapy for anatomic reasons.

There has been a tendency for internists to avoid therapy by intra-articular injection, thinking this falls more into the province of the surgeon. Because this procedure appears potentially much less hazardous than thoracentesis, abdominal paracentesis, pericardial paracentesis, or lumbar puncture, the author does not subscribe to such a view, and regards intra-articular injection as a procedure no more formidable than intravenous infusion, or even venipuncture. As with the latter procedures, however, skill must be developed by training and practice. Detailed instructions in technic are now available to the physician. (Ann. Int. Med., Oct. 1953, 4200 Pine St., Philadelphia 4, Pa., J. L. Hollander, M. D.)

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### Bone Marrow Plasmocytosis

Increased numbers of bone marrow plasma cells have been reported in a wide variety of clinical disorders. Plasma cell proliferation has also been correlated with protein synthesis. This study reviews the relationship between marrow plasmocytosis, level of plasma globulins, and the clinical conditions with which they are associated, employing a different and more reliable method of evaluating the number and distribution of plasma cells in the marrow. Cytologic studies were done using bone marrow sections rather than the conventional smear.

Plasma cell data are presented with particular emphasis on the following topics: (1) the characteristic distribution of plasma cells in human bone marrow; (2) the pathologic conditions with which bone marrow plasmocytosis is associated; and (3) the relationship between plasma cell proliferation and hyperglobulinemia.

When bone marrow containing increased numbers of plasma cells is examined, utilizing the section technic, the plasma cells are most frequently seen sheathing the arterial capillaries, although clumping, random scattering, or complete marrow replacement may occur. The peculiar property of the plasma cell to sheath small blood vessels of human bone marrow had been previously reported by Block. Plasma cell perivascular sheathing is seen as commonly in marrows with slight plasmocytosis as in marrows with very marked plasma cell proliferation.

Sternal marrow sections of 60 patients with bone marrow plasmocytosis were reviewed as unknowns with a control series of slides. The degree of plasma cell proliferation was correlated with the clinical diagnosis and plasma globulin level.

The diseases most frequently associated with marrow plasmocytosis in the authors' series were multiple myeloma, rheumatoid arthritis, hepatic cirrhosis, Hodgkin's disease, and granulomatous and collagen diseases.

Significant elevation of the plasma globulin occurred in 80% of the cases with increased plasma cells.

Plasma cells are characteristically seen sheathing the arterial capillaries, but may also be found in clumps, spread diffusely throughout the section, or solidly packed in the marrow. (Blood, Nov. 1953, H. Klein, M. D. and M. Block, Ph. D., M. D.; Department of Medicine, University of Chicago, Chicago, Ill.)

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#### Acute Idiopathic Pericarditis

Acute idiopathic pericarditis has been recognized with increasing frequency during recent years. Because this benign disorder is so frequently confused with acute myocardial infarction, the author has been prompted to review experience with this form of pericarditis at Fitzsimons Army Hospital. During the past 3-1/2 years the author has seen 28 cases that he considered to be of the idiopathic or benign variety. A case was considered of idiopathic etiology only if all known causes, such as rheumatic fever, tuberculosis, myocardial infarction, uremia, tumor, trauma, specific infections, et cetera, could be eliminated. All but 6 of these cases were initially diagnosed as myocardial infarctions. The differential diagnosis can be made with reasonable accuracy if the main clinical features are appreciated and kept in mind.

Acute idiopathic pericarditis is a disease which occurs predominantly in males in a ratio of 2 or 3 to 1. The most usual age period is in the third and fourth decades, but cases in the so-called coronary age period are not infrequent.

A history of a preceding respiratory infection is common, and was elicited in 17 of the 28 cases; no pertinent information was obtained in 6. A history of unusual physical or emotional exertion or exposure to cold is not unusual and occurred in 6 cases. Some cases follow surgical procedures.

The onset was abrupt in 19, less acute in 8, and insidious in 1. The presenting complaint in all patients was pain. The pain was localized in the midchest and substernal region in 17 patients at the onset, in the left anterior chest or precordial region in 6, in the chest and back in 2, in the left shoulder in 2, and in the left arm in 1. The pain is usually severe, and closely mimics that of myocardial infarction in character and location. It

is usually intermittent but may be persistent, and may be described as sharp or dull, stabbing or aching, pressing, gripping, constricting, or oppressive. The pain is usually intensified by respiration, and this feature occurred in all but 3 cases. It is commonly aggravated by the prone position or torsion of the body, as was seen in 11, and may be increased by swallowing and coughing. One patient complained of sharp exacerbation of his pain every time his heart beat. Exercise is usually without effect. Radiation of the pain is common, and the sites most frequently involved, in order of decreasing frequency, were the left shoulder, right shoulder, precordium, neck, and back. Radiation down the left arm may be noted, but is not usual. The 3 patients whose pain began in the left shoulder and arm all subsequently had localization in the substernal region. The associated symptoms most commonly encountered were malaise, fever, cough, dyspnea, and nausea.

The prognosis is excellent, with complete recovery. The course is quite variable. The duration of the author's cases was from a few days to 4 months, the average being 3 to 4 weeks. Recurrences are common and are seen in about 30%. Recurrences tend to be of briefer duration and of a milder nature than the original attack.

The differential diagnosis is very important, and includes other conditions causing chest pain and a friction rub. Of greatest importance is the differentiation of this syndrome from that of acute myocardial infarction. One implies a good prognosis with complete recovery, while the other implies a serious disease with high mortality and morbidity rates, economic loss, and, too frequently, a life of total or semi-invalidism. Another reason for establishing an accurate diagnosis is that today myocardial infarction is commonly treated with anticoagulants, which should not be used in the treatment of acute pericarditis. Pain aggravated by respiration is uncommon in myocardial infarction but is almost always present in pericarditis. Although shock and circulatory collapse are frequently noted in myocardial infarction, they are infrequent in pericarditis. Drop in blood pressure and the presence of a gallop rhythm are commonly seen in myocardial infarction, but are rarely if ever encountered in acute pericarditis. The early appearance of a pericardial friction rub, especially within the first 24 hours, and its persistence for several days or weeks, are strong evidence of pericarditis. In myocardial infarction the friction rub appears late (usually the second or third day), rarely ever lasts for more than a few days, and rarely recurs once it has disappeared. If the rub is detected before there are electrocardiographic changes, the odds favor pericarditis over infarction by 100 to 1. The demonstration of pleural involvement and the early appearance of fever and leukocytosis aid in the recognition of pericarditis. Fever and leukocytosis usually attain their maximum on the second to the fourth day in myocardial infarction, whereas they are commonly maximal at the onset in acute pericarditis. Early and adequate electrocardiography is of the greatest help.

Acute rheumatic pericarditis may appear before other clinical signs of rheumatic fever, but endocarditis ultimately appears, making the diagnosis obvious. A tuberculous etiology can be identified by the more severe systemic reaction, the prolonged course, the signs of tuberculosis elsewhere, and the positive Mantoux skin test.

Other causes of acute chest pain, such as dissecting aneurysm, angina, hiatus hernia, spontaneous pneumothorax, mediastinal emphysema, acute pleurisy, pulmonary infarction, et cetera, seldom cause difficulty after complete physical and laboratory examination.

Treatment is symptomatic. The author's experience has failed to show that any drug appreciably alters the usual course. It must be appreciated that it is extremely difficult to evaluate any therapeutic agent in any disease which pursues such a benign, self-limited course as this one.

There is no indication for the use of anticoagulants. In fact, fatalities have been reported with their use for benign pericarditis. (Ann. Int. Med., Nov. 1953, Col. E. M. Goyette, MC, USA, Fitzsimons Army Hospital, Denver, Colo.)

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#### Infectious Gastrointestinal Diseases

In the Navy as in civilian life any time spent off the job for sickness means a decrease in the over-all efficiency of the unit, diminished production, and increased expenses. Throughout the naval establishment endemic infectious diarrheal diseases still contribute greatly to the over-all noneffective rate.

The author believes that generally there is a definite relationship between the prevalence of these diarrheal diseases among naval groups and the interest of medical departments in the preparation of hygienic food and potable water. Usually, the prevalence is greatest where the interest is least.

The Medical Department of the Navy has recently undertaken an extremely ambitious program designed to provide for the sanitary education of all food handlers. Such an undertaking is of great importance and deserves the cooperation of all medical personnel. This phase of health education has previously failed to keep pace with the many recent advances in the field of water and food sanitation. The barriers which modern public health methods are erecting against the transmission of food- and water-borne diseases are of little value if the personnel involved in their preparation have had no exposure to the principals of sanitation.

The average medical officer spends only a small proportion of his time in the study and treatment of infectious gastrointestinal diseases. Cases seen at sick call are usually treated routinely by symptomatic therapy until the symptoms are relieved. As a rule, the man is not on a duty status during

the period of this treatment. Usually, not until empiric therapy has failed are laboratory examinations done in an effort to establish the etiological agent. Epidemiologic investigations are rarely done in an attempt to determine the sources of infection unless very large numbers of cases are involved.

There seem to be 2 principal approaches by which the prevalence of infectious diarrheal diseases can be further reduced. First, more time should be devoted to establishing the etiology and the focus of infection of individual cases, if possible, and thereby provide for accurate specific therapy and control. Second, SecNav Instruction 4063. 1, Food Sanitation Training Program, dated 11 Aug 1953 should be implemented by the medical departments in every possible way. (LT W.H. Cope (MC) USN, OinC, PMU #2, Naval Base, Norfolk, Va.)

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#### Treatment of Arterial Injury

This presentation of the management of arterial injury is designed to acquaint the military physician, regardless of his particular interests, with the emergency treatment of major vascular injuries and with the various definitive operative procedures which the vascular surgeon in the field is now able to perform. Salient points of operative technique and postoperative care are stressed, and the procurement of vascular grafts and the relative merits of the various methods of graft preservation are discussed briefly.

Injury of a major vessel is a surgical emergency, and delay in diagnosis or treatment may have serious consequences. Such injury should be suspected when arterial pulsations are absent distal to a wound, regardless of how trivial the wound may appear. Brisk hemorrhage from a wound which cannot be controlled with local pressure is presumably arterial, and the fact that bleeding does not resume following the release of a tourniquet does not rule out the possibility of major vascular damage. The finding of a pulsating hematoma or of a white or mottled, cold extremity, even in the absence of external blood loss indicates probable arterial injury. In deep shock which responds only to massive transfusions major vascular damage should be suspected.

Hemorrhage must be controlled as soon as possible, and most bleeding can be stopped by simple pressure over the bleeding site. When this is not effective, a tourniquet should be applied without delay. If this is not possible, bleeding may often be stopped by pressure applied by hand over the course of the artery proximal to the wound at any of the so-called pressure points, where the vessel may be compressed against an unyielding structure.

If a tourniquet is used, it should be only tight enough to control the bleeding. Once applied it should not be loosened until the patient is ready for definitive treatment, unless such treatment be delayed more than 2 or 3 hours--a situation which is unlikely to arise with the surgical availability and the rapid evacuation of casualties which the Armed Forces now employ. If a small artery or vein can be clearly seen bleeding in a wound, a clamp may be applied, care being taken to grasp only the bleeding vessel. Under no circumstances should a clamp be applied blindly in a deep wound in an effort to control hemorrhage. Such efforts are rarely successful, and frequently nerves and other vessels are traumatized or the bleeding vessel may be even further damaged.

As soon as the patient's condition will permit, every effort should be made to repair a damaged major artery. The vessel is usually approached proximal to its injury, and a piece of umbilical tape is placed around the artery after it has been dissected free. In this manner, bleeding can be controlled without compression of the collateral vessels, which would be the case if a tourniquet were used. Similar control of back bleeding is achieved by placing a second tape or a rubber-shod bulldog clamp on the vessel distal to the wound. Any branches between these points must also be temporarily compressed. The vessel is freed from its sheath and the adventitia around the injury site is carefully trimmed away.

A clean laceration in an otherwise undamaged vessel may be sutured. However, if as much as half the vessel has been transected or if there is evidence that the vessel has been crushed, it is usually wiser to divide the vessel, remove all damaged tissue and re-establish continuity by end-to-end suture or by insertion of a suitable graft. Back bleeding from a severed vessel is not a reliable sign that the vessel can be safely ligated. There is often a collateral flow sufficient to produce back bleeding but inadequate to supply all the tissue distal to the injury. On the other hand, absence of back bleeding is a strong indication for repair of the vessel.

End-to-end suture is preferable to grafting if it can be accomplished without undue tension. Too much tension will obviously cause the sutures to cut out, but excess tension, even if insufficient to result in disruption, will cause spasm which may in turn cause ischemia of the limb. If the injury occurs near a joint, flexion at this joint will enable the cut ends of the vessel to be more readily approximated, but an anastomosis that is accomplished with the aid of such maneuvers may well be torn or narrowed when the limb is extended during convalescence if special care is not taken to avoid sudden extension.

The ends to be approximated must be cleanly cut, and this is best done with a sharp razor blade which will not crush the wall of the vessel as will scissors. The adventitia must be carefully and completely removed beyond the point where sutures are to be placed to prevent its being dragged into the wall or lumen of the vessel by the suture.



The vessel is occluded and its ends approximated by Potts clamps. The ends must be sutured together with an everting suture so that intima is in contact with intima.

When the defect resulting after all damaged artery is excised is too great to permit end-to-end suture, a graft must be used. The technique of inserting the graft is similar to that of suturing the vessel end on, except that two anastomoses instead of one must be performed. The graft should be of the same diameter and caliber as the recipient vessel and its length should approximate that of the defect. If the anastomosis forms a constriction, or if the graft distends when filled, or if there is kinking because too long a segment was inserted, eddy currents will be created which may result in thrombosis. Every effort should be made in closing the wound to surround and support the graft with soft tissue.

The most satisfactory graft material is an arterial homograft, which may be fresh or preserved. If no artery is available, a segment of the greater saphenous vein may be utilized. The vein should be slightly smaller in diameter than the recipient artery because it will distend when filled with arterial blood. The vein graft should be reversed so that blood flow will not be impeded by valves which may be in the segment.

Every effort must be made to restore the continuity of the iliac, femoral, and popliteal arteries because of the high incidence of gangrene which is known to follow ligation of these vessels. The trauma which injures these vessels often also destroys their collaterals so that gangrene will result even more frequently than following simple ligation. A divided or contused subclavian or axillary artery should be repaired, but extensive exploration of an upper arm which has not been contused and in which there is reason to believe the collaterals are intact is probably not justified. Certainly absent radial or ulnar pulsations alone are not sufficient indication for exploration and arterial grafting.

After the artery has been repaired, if the distal pulse is feeble or absent or the extremity remains cold or mottled, a unilateral sympathectomy should be considered, and it is best done while the patient is still on the table. If these changes are noted at a later period, after the anesthesia has worn off, a paravertebral sympathetic block will often improve circulation in the involved extremity. Papaverine hydrochloride is a potent vasodilator, and it may be given intramuscularly or in an intravenous drip in doses of 1/2 grain at 2-hour intervals. Intravenous alcohol is less effective as a vasodilator, but it has other useful effects which make it of value in postoperative management.

Anticoagulants should be employed only when there is definite indication and when absolutely reliable laboratory control is available. Occasionally a diffuse thrombosis will occur in the small terminal arterial radicals in the interval between injury and restoration of blood flow, and progression of this thrombosis must be prevented. When there has been marked

contusion of a limb, the intima distal to an arterial injury may have been damaged sufficiently to cause an intraluminal thrombosis which may not be apparent for several hours. When such situations exist or when there is reason to suspect the development of thrombi, anticoagulants should be used.

Unfortunately, the use of these drugs requires careful laboratory control, and the necessary laboratory procedures cannot be done feasibly in the forward areas where most of the arterial injuries must be repaired. In these situations where anticoagulants are indicated, the patient should be evacuated to the rear as soon as he is able to be transported safely. To delay anticoagulant therapy for these patients is to invite ischemia, gangrene, and amputation.

If the anastomosis has been accomplished without tension, and if the wound is not complicated by fracture, gentle active and passive motion may be started in 24 to 48 hours. If a major vein has been ligated or if the limb has been greatly contused, the extremity should be elevated and should be wrapped snugly with an elastic bandage. If a cast is required, it should be bivalved so that the extremity may be inspected and to permit rapid access to the wound in case of hemorrhage. Care must be exercised in the positioning of the patient to avoid unnecessary pressure of the operative area against the bed or cast.

Unless the patient requires anticoagulants or presents an unmanageable problem in electrolyte balance or for some other reason must be evacuated to a larger rear activity, he should be kept under the supervision of the surgeon who operated until his convalescence is complete or at least until the danger of leakage, perforation, or thrombosis is past. It is obvious that if such complication should occur, the physicians who performed the surgery and who have followed the patient through his immediate post-operative course are in a better position than anyone to evaluate this complication and to undertake its treatment.

It must be emphasized that delay in repairing damaged vessels decreases greatly the chances of satisfactory results. For this reason, definitive vascular surgery must be carried out in the forward areas. Each medical company should have a vascular team of 2 physicians and 2 or more corpsmen who work together as a unit and who are well drilled in the technical aspects of the usual procedures they may be called on to perform. Each medical company should have in readiness at all times a basic set of instruments and supplies which are needed to perform vascular anastomoses.

Within the past 5 or 6 years a variety of substances have been experimentally used to bridge an arterial defect, including segments of autogenous artery and vein, formalin-fixed homologous and heterologous arteries, plastic tubes, tubes made from various fibrous tissue, and cold-preserved, deep-frozen and freeze-dried arterial homografts. By far the most satisfactory results have been obtained with the preserved arterial homografts.

Of particular interest to the military surgeon is the development of freeze-dry preservation or lyophilization, by which the vessels are immersed in liquid nitrogen at minus 196° C. and then dehydrated by sublimation under a high vacuum (50-20 microns of mercury) while the tissue is still frozen. The vessels are then allowed to warm to room temperature while being maintained under vacuum. This requires about 72 hours, at the end of which time, they are sealed in glass ampules under an air pressure of 200-100 microns of mercury. There is accumulating evidence that this procedure and the subsequent storage of these vessels in a vacuum at room temperature is less harmful to the vessel than is prolonged storage in the frozen state.

The indefinite periods for which these latter grafts may be preserved without special care plus their ease of storage and transportability are obvious advantages over other methods of preservation. When ready for use, the vessel is removed from its sealed glass container and immersed in saline for 15 to 20 minutes. After this simple reconstitution, the vessel grossly resembles a fresh graft except for being somewhat paler, and it handles in every way like a fresh vessel. (LT N. E. Adamson, Jr. (MC) USNR)

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#### Training Aids Used in the Casualty Treatment Training Program

During the course of postgraduate instruction at the U. S. Naval Dental School, NNMC, Bethesda, Md., several training aids were developed to aid in teaching the administration of advanced first aid. Among these were the facsimile arm, neck, abdomen, and chest, and a mannikin.

The facsimile arm is used for teaching needle insertion techniques including: (1) intramuscular insertions, (2) subcutaneous insertions, and (3) intravenous insertions. Of these, the most important are intravenous insertions for the administration of medicaments, anesthetics, plasma, and for the withdrawal of blood.

The facsimile neck is a training aid used for instruction in emergency methods of opening an obstructed airway. A cricothyroidotomy or an elective tracheotomy can be demonstrated. To imitate a living patient accurately and realistically, the facsimile neck was designed and constructed complete with simulated skin, muscles, cartilage, trachea, and blood vessels.

The facsimile abdomen is used to teach procedures in clamping blood vessels, tying blood vessels, suturing, and bandaging. These procedures had previously been demonstrated and practiced on a piece of felt secured to a board. The facsimile abdomen is lifelike, complete with simulated skin, adipose tissue, blood vessels, and blood. Arterial and venous flow is mechanically achieved.

The facsimile chest is a vinyl resin training aid which may be secured to an assistant. It is operated mechanically with a series of rubber tubes and facsimile blood, to simulate a sucking chest wound.

The mannikin is a facsimile of a 6'1", 185-pound male, used to demonstrate numerous first-aid problems. A few of the representative problems that can be demonstrated and treated are: (1) Choking and mouth bleeding caused by a depressed fracture of the anterior portion of the mandible. (2) Choking caused by a foreign body in the throat; and procedure for an emergency cricothyroidotomy. (3) A penetrating chest wound. (4) An abdominal wound. (5) An arm wound. (6) A leg wound.

Additional training aids are being fabricated to aid in the teaching program at the Naval Dental School. (U. S. Naval Dental School, NNMC, Bethesda, Md., CDR J. V. Niiranen (DC) USN)

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#### New Dental Officer Procurement Brochure

The Bureau of Medicine and Surgery has recently released a procurement brochure entitled "A Career Plan for You in the U. S. Naval Dental Corps" (NavMed P-5032). This pamphlet contains information on which civilian dentists can evaluate the advantages of entering the Dental Corps of the Navy or Naval Reserve. An initial distribution of the publication is being made to Offices of Naval Officer Procurement, Continental District Dental Officers, and activities which give the Basic Indoctrination Course for Dental Officers. Copies of the brochure may be obtained from District Printing and Publications Offices. (DentDiv, BuMed)

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#### From the Note Book

1. Rear Admiral Lamont Pugh (MC) USN, Surgeon General of the Navy, spoke at a luncheon honoring Dr. Maurice J. Lewi, President of the Long Island University College of Podiatry, who was celebrating his ninety-sixth birthday. During the period 9-12 Dec, the Surgeon General made an informal inspection of Navy Medical Department facilities in New Orleans, La., and Orange, Tex. While in New Orleans, Admiral Pugh attended, as an honored guest, the Fifty-first Annual Meeting of the Navy League of the United States. (TIO, BuMed)

2. Rear Admiral Clarence J. Brown (MC) USN, Deputy and Assistant Chief of the Bureau, attended the Annual Clinical Meeting of the American Medical Association held 1-4 Dec, in St. Louis, Mo. Admiral Brown is the Navy

Member of the House of Delegates of the American Medical Association. At the Annual Meeting of the Society of Medical Consultants of the Armed Forces, held at the Walter Reed Medical Center, Washington, D.C., Admiral Brown presented a paper entitled, "The Navy and Consultant Programs." (TIO, BuMed)

3. The Bureau displayed two of its scientific exhibits during the month of December. "Body Armor" was displayed at the National Convention of the Navy League of the United States, at New Orleans, La., 10-12 Dec 1953. The second exhibit, "U.S. Navy Dental Corps Casualty Treatment Training Program," was shown during the mid-winter Clinical Meeting of the American Medical Association, 1-4 Dec, at St. Louis, Mo. (TIO, BuMed)

4. A class of 40 Navy Dental Technicians and 5 Coast Guard Dental Technicians was graduated on 20 Nov 1953, from the Naval Dental Technicians School, Naval Training Center, Bainbridge, Md. Captain Edward C. Raffetto (DC) USN gave the graduation address. (TIO, BuMed)

5. The Dental Department of the Naval Station, Treasure Island, Calif., was host to a combined meeting of the members of the California Academy of Periodontology and Naval Reserve Dental Companies 12-1 and 12-2 at the Naval Station, 12 Nov 1953. LCDR C. L. Foss (DC) USNR, spoke on "The Correlation Between Clinical and Microscopic Findings in Normal and Pathologic Oral Mucous Membrane," and LT P. C. Conglis (DC) USN, discussed the "Procedures in Taking and Fixing Biopsy Specimens." (TIO, BuMed)

6. Captain William M. Silliphant (MC) USN, Deputy Director of the Armed Forces Institute of Pathology, represented the Bureau of Medicine and Surgery and participated in the meeting of the New England Pathological Society held on 19 Nov at the U.S. Naval Hospital at Chelsea, Mass. Captain Silliphant on invitation of the Society gave a lecture on the pathology of epidemic hemorrhagic fever. (TIO, AFIP)

7. To study the effects of mechanical vibration on man, the Navy has designed and constructed a research instrument termed a large displacement-amplitude vibration machine. The Naval Research Laboratory, cooperating with the Naval Medical Research Institute, Bethesda, Md., has completed the first phase of the project by the construction, calibration, and testing of the instrument. Over 5 years in building, the instrument has now been assembled and installed at the Naval Medical Research Institute where research studies are being undertaken by LCDR D. E. Goldman (MSC) USN, a biophysicist. (TIO, BuMed)

8. Commander Philip A. Canal (DC) USN, received the Bronze Star Medal with Combat "V" for his outstanding performance of duty while serving with the First Marine Division in Korea from December 1952 to August 1953. The award was made by the Commanding General of the First Marine Division, and forwarded last month to Commander Canal at the Naval Dental Clinic, Brooklyn, N. Y., where he is now on duty. (TIO, BuMed)
9. X-ray findings in hemorrhagic fever consist of central and focal pulmonary congestion. The central type of congestion is demonstrated by widening of the pulmonary vascular markings at the hili with increased linear densities forming outward into the lungs. Associated with this there may be numerous patchy areas of congestion which may be confluent. Focal areas of congestion in the periphery of the lung may be present without evidence of hilar vascular congestion. (Radiology, 1953, Maj. D. W. S. Stiff, MC, USA and Col. G. M. Powell, MC, USA, Osaka Army Hospital, Osaka, Japan)
10. The clinical syndrome of gout appears to comprise several distinct anomalies of purine metabolism. The usual form of the disease reflects an inborn error of purine metabolism and may be regarded as primary gout. Secondary gout may develop in the course of diseases involving the hematopoietic system and in related disorders. (Ann. Int. Med., Nov. 1953, A. B. Gutman, Mount Sinai Hospital, New York, N. Y.)
11. A new and satisfactory method of reducing and fixing intracapsular fractures in elderly persons is presented in Geriatrics, Oct 1953, H. E. Hipps, Waco, Tex.
12. Eight hundred and fifty-four sporadic cases of acute aseptic meningitis occurring among military and veteran personnel and their dependents are reviewed in Annals of Internal Medicine, Oct. 1953, Capt. C. V. Adair, MC, USA, R. L. Gould, and J. E. Smadel, Walter Reed Army Medical Center, Washington, D. C.
13. The following naval medical officers have recently been certified in their specialties by American Boards: LT W. R. True (MC) USN, American Board of Ophthalmology; LT J. J. Driscoll (MC) USNR, American Board of Obstetrics and Gynecology; CDR W. H. Druckemiller (MC) USN, American Board of Neurological Surgery; and CAPT A. W. Loy (MC) USN, as a member of the Founders Group in Aviation Medicine of the American Board of Preventive Medicine.
14. Although medical social work is a relatively young profession, there are approximately 3,825 persons actively engaged in this work in the United States today, according to a publication "Health Manpower Sourcebook, Section III: Medical Social Workers." There are, however, three times as many positions open in this field as there are persons to fill them, and it is estimated that 800 to 1,000 graduates a year will be needed to fill the vacancies. (Dept. H. E. W., PHS)

15. What plant superintendents and plant maintenance engineers ought to know about the methods currently used for cleansing air of dust, smoke, fumes, fog, and mist is presented in the 90-page "Handbook on Air Cleaning" just issued by the Atomic Energy Commission. (Office of Technical Services, Technical Reports News Letter, Nov. 1953, Department of Commerce)

16. A new publication "Safe Handling of Cadavers Containing Radioactive Isotopes," is available from the Government Printing Office, Washington 25, D.C. This handbook provides pertinent information for the guidance of mortuary and medical personnel involved in the handling and autopsy of cadavers containing radioactive materials. (National Bureau of Standards)

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"I'm Just A Steering Wheel"

I'm just a wheel--a steering wheel--and you're my captain.

Behind me, you're the lord and master of a miracle. You can make me take the kids to school. You can turn me down the sunny road to town. With me you can guide your goods to the market . . . you can rush the injured to be healed . . . you can go, in minutes, to places that once were hours away. You can do magic.

Yet, in the blink of an eye, in the tick of your watch, I can turn deadly killer. I can snuff out the life of a kid still full of life--maybe your kid. I can twist a smile into tears. I can wreck and cripple and destroy. I can deal out death like the plague.

And I'm no respecter of persons . . . a child, a grandmother, even you my friend . . . It's all the same to me.

I'm sensitive. I respond instantly to the hands you give me. Give me calm hands, steady hands, careful hands . . . and I'm your friend. But give me unsteady hands, fuzzy-minded hands, reckless hands . . . then, I'm your enemy, a menace to the life, the happiness, the future of every person, every youngster riding, walking, playing. I was made for pleasure and usefulness. Keep me that way. I'm in your hands. I'm just a steering wheel. And you're my captain. Behind me you're the lord and master of a miracle . . . or a tragedy. It's up to you. (Safety Review, Office of Industrial Relations, Navy Department, Washington, D. C. ; reprinted in "Sky-Lines" newspaper of the U. S. Naval Hospital, Philadelphia, Pa.)

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Hospital Commended by Navy Secretary

The U. S. Naval Hospital, Philadelphia, Pa. received the Secretary of the Navy's Award for achievement in Industrial Safety for the year 1952.

BUMED INSTRUCTION 6150.15

7 Dec 1953

From: Chief, Bureau of Medicine and Surgery  
To: All Naval Hospitals and Stations Equipped With Infirmaries or Dispensaries

Subj: Medical records, clinical records, and X-rays in custody of the Veterans Administration in the cases of former members of the Naval Service and Reserve components thereof; procedure for procurement and return of

This instruction sets forth the procedure for procuring and returning subject records.

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AVIATION MEDICINE DIVISION



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Duties of the Naval Flight Surgeon in Air Evacuation

To the wounded, transportation has usually meant an interruption of treatment and an ordeal--sometimes one from which he did not recover. Air evacuation almost eliminates all this through the speed of planes and remarkable teamwork of all concerned. The implications are far-reaching, and are causing fundamental changes in military medicine.

The Department of Defense has established a general policy of using planes wherever practicable in the evacuation of casualties. Throughout the Korean campaign, evacuation across the Pacific was accomplished almost 100% in the planes of the Military Air Transport Service (MATS), an organization under Air Force control but consisting partly of Navy personnel and units. The Navy has an additional role in air evacuation involving responsibility for air evacuation of combat and noncombat areas which are not covered by the MATS system and are of interest primarily to the Navy.

The tremendous medical advantage of air evacuation, experiences in World War II and in the Korean campaign has highlighted an equal strategic advantage, reduction in the number and size of medical installations needed in the combat zone, and reduction in the ambulance traffic which hampers the flow of combat transport to the fronts. The elimination of evacuation



runs for hospital ships allows their specialized staffs to remain at work near the source of casualties.

On only a few days' notice, a system can now be set up anywhere in the world, capable of evacuating all casualties in any action to which supplies are delivered by air (except by parachute drop). During sudden peak loads, the air evacuation squadron of the Pacific Division of MATS was able to get large numbers of additional trained personnel within about 10 days. The credit goes to the Air Force School of Air Evacuation, who had foreseen the need and had trained a large surplus of air evacuation nurses (both Air Force and Navy) and air evacuation technicians. When the emergency arose, these nurses and technicians were released from their current assignments and flown immediately to air evacuation duty in the Pacific.

The Navy flight surgeon's job in air evacuation presents unlimited opportunity for initiative. From the very nature of the mission, there will often be acute situations which call for improvisation. Evacuation of all casualties by air is still a new policy, and some of the basic principles are yet to be developed. The flight surgeon should compare notes with those working in other fields of air evacuation, and must become familiar with the problems of line personnel on whose cooperation he will rely. The present air evacuation methods were developed in the field under combat conditions for the most part, by men who had foreseen the problems. It is to be expected that improvements will be developed in the same way. The results will involve the lives of thousands of men.

The Korean conflict has proved that transoceanic evacuation is best accomplished entirely by air. It is by no means certain that such a policy can be applied in forward areas. Here and there it has been employed with spectacular success. It is obvious that it can be exploited further, but to what extent or by what means is not known. In forward areas as well as in "mainline" air evacuation, it is the nonmedical factors--rapid transport and flexibility of route and of organization--that are paramount. The selection and preflight preparation of patients will be less important whenever the tactical situation makes it dangerous to delay evacuation. Inflight care, on the other hand, will often be critical. It will command more attention in Navy plans and training.

An air evacuation system must be flexible enough to meet peak loads on short notice. Using the planes which will carry patients, air evacuation units in forward areas can be expanded and new units set up within hours. This requires a reserve of trained personnel, assigned by the air evacuation unit to nearby medical facilities for short periods of appropriate on-the-job training. These personnel will provide the close liaison which is so essential between the air evacuation unit and its associated medical activities. The author is convinced that if the full value of air evacuation is to be realized, a variable proportion of the complement of every medical installation must be trained and experienced in air evacuation.

The Department of Defense has assigned to the Military Air Transport Service the primary role of evacuation of casualties by air. MATS' job is to provide "mainline" air transportation, but it "does not include responsibility for the tactical air transportation of airborne troops and their equipment, the initial supply and resupply of units in forward areas, or that required by the Department of the Navy for internal administration, or required for the fulfillment of the mission of the Navy, or air transport over routes of sole interest to naval forces where the requirements cannot be met by the facilities of MATS. Nothing in this paragraph shall preclude the Navy or the Air Force from using their equipment as a secondary function for the evacuation of sick and wounded when circumstances arise."

In preparation for its air evacuation mission, MATS made a thorough study of the experiences and records of the Air Transport Command (ATC) and the Navy Air Transport Service (NATS) and especially of the South Pacific Combat Air Transport (SCAT). This material was reorganized and applied in the patient air lift from Korea, including the trans-Pacific phase and the delivery of patients to hospitals all over continental U.S. From all this practical experience, certain firm principles are beginning to emerge, not all of which apply to air evacuation in general.

Perhaps the most important factor in air evacuation is its speed and flexibility. Patients can be evacuated in large numbers, on short notice, from any part of the world. MATS found that in "mainline" evacuation the second most important factor is the selection, classification, and preflight preparation of patients. MATS rarely has to transport critical cases, and the risk to the patient is almost nil. For this reason, the third most important factor, inflight care, is essentially a nursing problem. MATS rarely sends a doctor on these flights, and may not even assign a medical officer to its Medical Air Evacuation Squadrons.

The job of a Navy flight surgeon in MATS would, therefore, be administrative, or more often (and more important) supportive, as a medical officer in a hospital or dispensary associated with the MATS air evacuation system. The patients are in the care of excellent teams of flight nurses and technicians, to whom the flight surgeon bears a relationship analogous to that of a consultant specialist to the nursing staff on a hospital ward.

The factors which limit air evacuation in land fronts held by Marines are heavy ground fire, enemy fighter aircraft, and weather. It seems reasonable to set a goal of 100% evacuation by air whenever these three factors are not prohibitive, although terrain may occasionally be unsuitable even for winch pick-up by helicopter, particularly in arctic, jungle, or mountain terrain. There should be two echelons: forward and rearward, from the first usable air field. The former should depend largely on helicopters, and the latter on cargo planes.

The tactical situation will often force evacuation of patients in critical condition, and air evacuation personnel should be well trained in the care of such patients in appropriate types of aircraft. They will have to know how

to work under fire. It is in these areas that a flight surgeon will most often be needed as a team member. He will also have to work in close coordination with operations and hospital personnel in order to respond efficiently to the immediate situation. First echelon planes often carry no medical personnel. Marine fighter squadrons have developed a technique for the rescue of pilots who have been shot down behind the enemy lines. Wingmen locate the victim and then provide escort for the helicopter to and from the scene. Just before and during the pick-up, they strafe thoroughly on all four sides of the stranded victim to discourage snipers, who often use him as a decoy. The pick-up is usually made by winch to avoid presenting a stationary target. As in all front-line evacuation, the effect on morale is often of tactical significance.

During the withdrawal from the Chosin reservoir area, last-minute evacuation was supplied to many a cargo plane-load of casualties from airfields about to be overrun by the enemy.

In amphibious landings, in the first echelon, the three limiting factors again are heavy ground fire, enemy fighter aircraft, and weather. We rely largely on helicopters for air evacuation to hospital ships and to a rendezvous with second echelon planes.

In the second echelon, patients may be transferred to cargo planes at a nearby airfield. Seaplanes have been used for long flights from coastal waters, and may pick up their patients in all sorts of unfavorable locations, including the open ocean.

During World War II, a friend of the author volunteered to fly some critically needed medical supplies to the Salerno beachhead. Knowing that the coastal approaches were still covered by enemy artillery in the hills, he landed his PBY shortly after dark about a mile off shore. He and his crew ferried the supplies ashore and returned to the plane with a load of critical patients and a nurse. By vigorous effort, they were able to get them aboard and to take off by dawn.

As it grew lighter, they looked around uneasily for Nazi fighters. Nor were they disappointed. A ME109 made a sudden pass from portside, though without firing. At the same time, the crew chief spotted another to starboard. The PBY was unarmed, and the only course was to fly low over the water and take evasive action. The Messerschmidts circled closer but did not attack. They were in no hurry and seemed frankly curious. Finally they swung in close aboard, grinned, saluted, and left.

The crew chief told the reason. One of the patients had noticed the approaching fighters and had told the nurse. The resourceful lady had opened the hatch. Her streaming blonde hair and the bandages of her patients proclaimed that this was no combat mission.

Air evacuation from task forces at sea presents many challenging problems. Casualties are usually light except when ships receive major damage. Only carrier-based planes, helicopters, and sometimes, sea-

planes are capable of landing and taking off among the ships. For security reasons, flights to and from the task force should be held to a reasonable minimum, and are often forbidden. The task force, however, is a fighting element, and its casualties should be evacuated promptly, for morale as well as for medical reasons.

None of the present types of carrier-based planes can be modified to carry more than a very few patients, although some types of cargo planes could, no doubt, be adapted and stressed for landing on large carriers. Most of the helicopters now in use are strictly limited as to patient load, particularly in the lighter summer air. They have relatively tiny operating ranges. For short hauls, however, they are invaluable, and helicopters of much larger load capacity and range may reasonably be expected in the near future.

The task force will undoubtedly need facilities--perhaps on a carrier--for treating and holding patients over a period of days or weeks if need be. The flight surgeon should be able to do his part in setting up an air evacuation system to fit the occasion.

Training is needed by two categories of personnel: those assigned to air evacuation units, and those having duty in hospitals or other activities associated with air evacuation units. Some of these personnel might well be rotated from one to the other.

Navy air evacuation nurses are given 234 hours of specialized training at the Air Force School of Air Evacuation in Gunter, Ala. Navy flight surgeons and aviation medical technicians each get 10 hours incidental to their training at the Naval School of Aviation Medicine at Pensacola, Fla. Other Navy corpsmen get none. (This is exclusive of on-the-job training.)

Air evacuation training for those concerned indirectly is far more important than it would appear at first. It is the hospital that is primarily responsible for selecting and preparing patients for air evacuation, for classifying them according to the type of handling they will need, and for prescribing the treatment they will be given en route. This presupposes a thorough knowledge of the capabilities of the air evacuation unit as well as of the patient's condition. Neither MATS nor Navy air evacuation units will accept a patient (except in emergency) until he has been examined by a doctor (a flight surgeon, if available) and declared fit to travel by air. This is usually done at the hospital.

Experience in ward nursing is invaluable to the air evacuation corpsman as well as to the air evacuation nurse: the long-range air evacuation plane is essentially a very crowded flying ward, and the smaller short-range plane used in forward areas is essentially a flying ambulance. Yet corps school training and hospital experience omit some very essential items: adaptation of medical and nursing techniques to the equipment and conditions found in the planes; techniques and principles of loading; ditching procedures; handling of patients in and on the water; survival in combat,

arctic, jungle, and other areas; organization, records, and responsibilities in air evacuation units; flight safety and disciplines; and aviation physiology.

It seems unreasonable to expect the flight surgeon to indoctrinate his corpsmen in all this unless they have been through a formal course in air evacuation. Such a course should have as prerequisites: (1) corps school, (2) an appropriate flight physical examination, (3) the ability to swim 200 yards or more, (4) minimum of 12 months' duty in a naval hospital, with at least 2 months on each of the following wards: neuropsychiatric, orthopedic, surgical, and medical, and 1 month in the diet kitchen. Preference should be given to corpsmen with experience in handling paraplegic and quadriplegic patients. The course itself should consist of lectures and practical exercises in air evacuation. It should be followed by an apprenticeship of 50 hours of treating actual patients in flight under the supervision of an experienced air evacuation corpsman or nurse.

All air evacuation personnel need on-the-job training in air evacuation units and in associated medical installations. (CDR K. R. Whitney (MC) USN)

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#### Visual Acuity Determination of Candidates for Aviation Training

Numerous candidates who have been found qualified on original examination are found to have defective visual acuity when they first report to the Training Command. In some of these cases several months elapsed between date of original examination and date of entry to preflight training. Deterioration of visual acuity during that waiting period is one possibility. Another possibility is that the findings reported on the original Form 88 were inaccurate. The object of these comments is to clarify the existing standards and techniques used in the determination of visual acuity of candidates for flight training.

Present standards require a visual acuity of not less than 20/20 for each eye uncorrected. This means that a candidate for flight training must be able to read letters subtending a visual angle of not more than 5 minutes of arc at the nodal point of the eye. He must, in addition, read these letters within a reasonable length of time. Two seconds per letter or 20 seconds for a 10-letter line is considered adequate. Instructions concerning the procedure of checking visual acuity are outlined in detail in Chapter XV, Section VIII, Manual of the Medical Department, and all examiners should be thoroughly familiar with them.

It is of particular importance to watch the subject while he is reading to prevent squinting or head tilt. The visual acuity is considered satisfactory if the candidate reads all the letters correctly on the 20/20 line of the standard vision chart in 20 seconds. If the candidate fails to read some of the letters on the 20/20 line the chances are that he has a minor refractive error and a cycloplegic refraction should be performed before he is considered disqualified.

A cycloplegic refraction is required on all candidates for flight training. To be of value it must be properly performed. At least 4 applications of 4% homatropine hydrobromide at 5-minute intervals are necessary to insure adequate cycloplegia. A single pellet of paredrine or homatropine under each lid is not satisfactory. One hour after the first instillation of homatropine the subject is ready for refraction. Under cycloplegia a candidate must have no evidence of myopia and not more than plus 2.5D in any meridian, with not more than 0.75 D of astigmatism. The candidates requiring careful consideration are the borderline myopes, those who can just read the 20/20 line but not the 20/15 line. Under cycloplegia, such a candidate must be able to read 20/20 without minus correction in any meridian.

Frequently, several months elapse between the date of original examination and the date the candidate reports to the Training Command. If he falters when asked to read the 20/20 line he is given a complete re-examination including a refraction under homatropine. Occasionally, the candidate who was found to have 20/20 with plano on the original examination is found on re-examination to have 0.5 D of myopia. Furthermore, he can no longer read 20/20 without minus correction under cycloplegia. The question then comes up as to whether the myopia developed between examinations or was present in a smaller degree at the original examination.

A certain percentage of candidates will develop myopia while under training. There is little that can be done about that. But it can be ascertained that on the original examination these men were able to read a good 20/20. That means reading all letters on the 20/20 line in not more than 20 seconds. If there is any doubt about it, a different chart should be used. Furthermore, with the candidate able to read 20/20 under cycloplegia, it should be determined if the addition of a minus lens improves his vision.

Attention is also invited to the exact specification of the examining rooms as to size, color, illumination, et cetera, as described in Section VIII, Chapter XV, Manual of the Medical Department.

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Defects Noted on SF-88's Submitted to BuMed:  
October and November 1953

Omissions .....	155
Excess copies .....	32
Lack of copies .....	69
Carbon copies not legible .....	178
Carelessness in recording results .....	72
No designator after rank .....	57
Flight time omitted .....	37
Not fully explaining dental defects of NavCad applicants .....	6
Not recording C. E. R. and improperly placing pulse in spaces .....	70
Refractions not properly recorded .....	8
Not leaving right side in column 73 for BuMed endorsement .....	67
Failure to state aviator's service group in recommendation .....	46
No reason given for hospitalization .....	7
Not clarifying or going into enough detail regarding medical defects ...	13
Failure to mention disqualifying defects on SF-89 .....	5
Failure to submit SF-89 .....	1
Facsimiles used in place of original signatures .....	5
Failure to record audiometer findings on NavCads .....	3

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Course of Instruction in Aviation Medicine

The Aviation Medicine Division announces the convening of a course of instruction in Aviation Medicine leading to the designation of successful candidates as U. S. Naval Flight Surgeons. This new class will begin instructions on 5 April 1954 at the U. S. Naval School of Aviation Medicine, Naval Air Station, Pensacola, Fla., and will continue for approximately 6 months.

The class will be limited to 32 medical officers of the Regular Navy and Reserves of the rank of Lieutenant Commander and below. There is an urgent need for Flight Surgeons in the air arm of the United States Navy, and all eligible medical officers are requested to consider this new and growing field of medicine as a specialty for their naval career.

Aviation Medicine offers to the medical officer diversified opportunities for naval medical experience. Duties with aviation units afford general medical practice in addition to special opportunities for practice in otolaryngology, ophthalmology, physiology, psychiatry, as well as research and other specialty fields.

Those medical officers desiring to enroll for this course of instruction should apply by official correspondence to the Chief of the Bureau of Medicine and Surgery, Aviation Medicine Division, and include in the request the following agreement of obligation: "I agree to remain on active duty for one year following completion of the course or for six months beyond my obligated service, whichever is longer."

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Aero-Medical Association Annual Meeting

The Aero-Medical Association will hold its twenty-fifth Annual Convention on 29-31 March 1954, at the Hotel Statler in Washington, D. C.

All flight surgeons and those interested in aviation medicine are urged to attend this Silver Anniversary Meeting of the Aero-Medical Association. This is your organization, so give it your support. Make this year's meeting the best by attending and joining the discussions.

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Permit No. 1048

OFFICIAL BUSINESS

WASHINGTON 25, D. C.

DEPARTMENT OF THE NAVY  
BUREAU OF MEDICINE AND SURGERY

PENALTY FOR PRIVATE USE TO AVOID  
PAYMENT OF POSTAGE, \$300