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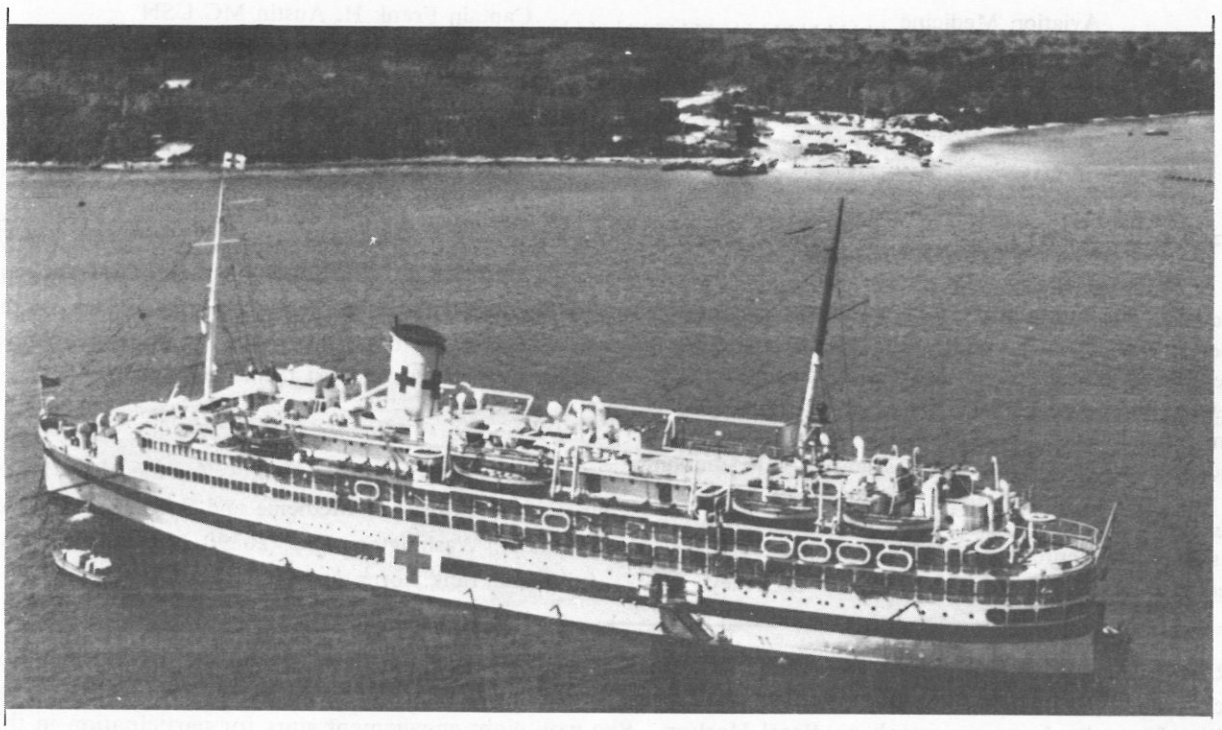

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Policy

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 are they, 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.

Change of Address

Please forward changes of address for the News Letter to Editor: Bureau of Medicine and Surgery, Navy Department, Washington, D.C. 20390 (Code 18), giving full name, rank, corps, and old and new addresses.

FRONT COVER: U.S.S. SOLACE (AH-5). Commissioned on 9 August 1941, the SOLACE joined the Fleet on 27 October and was the first hospital ship to be present in a naval battle when she cared for casualties from the Japanese attack on Pearl Harbor. She won eight engagement stars for participation in this and seven other military operations: Gilbert Islands, 24-26 November 1943; occupation of Kwajalein and Majuro Atolls, 3-4 February 1944; capture and occupation of Saipan, 18 June to 2 July 1944; capture of Guam 24 July to 15 August 1944; occupation of Southern Palau Islands, 6 September to 14 October 1944; capture of Iwo Jima 23 February to 10 March 1945; and the Okinawa Gunto operation, 24 March to 30 June 1945. The SOLACE was the first hospital ship to be refueled at sea while carrying a full load of patients, near the Gilbert Islands in November 1943, and the first to receive patients directly from the combat area (in the same campaign). As an illustration of her activity, during 1943 she traveled 37,069 miles, took part in 10 evacuations, six of them to transport patients from the New Hebrides area to Aukland and Wellington, New Zealand. Total admissions to the sick list that year amounted to 6,465, and she spent 5 months as a station hospital. During the Iwo Jima and Okinawa operations 1800 units of fresh whole-blood, 1,200 units of plasma, 136,000 sulfa tablets, and 2½ billion units of penicillin were administered. She admitted and treated about 25,000 patients altogether, 70 percent battle casualties, and steamed over 170,000 miles before VJ Day. Thereafter she engaged in transporting Pacific war veterans home, and was decommissioned 27 March 1946. The SOLACE had an overall length of 410 feet, displaced 8,650 tons, had a top speed of 18 knots and a cruising range of 7,000 miles.

The issuance of this publication approved by the Secretary of the Navy on 4 May 1964.

EFFECT ON SERUM CHOLESTEROL OF A CORN OIL AND SKIM MILK MIXTURE IN PEPTIC ULCER PATIENTS

By Benjamin M. Kaplan MD, Mitchell A. Spellberg MD, Margaret M. Norton MS, and Ruth Pick MD. From the Cardiovascular Institute and the Department of Medicine and Nutritional Sciences, Michael Reese Hospital and Medical Center, Chicago, Illinois. *Amer J Med Sciences 250(6):621-627, December 1965.*

Clinical and experimental evidence is mounting to indicate a clear relationship between the quantity and type of lipids in the diet and serum cholesterol levels in man. Likewise, there is work to support the premise that the height of the serum cholesterol is one of the major risk factors in the production of coronary heart disease.

Generally large quantities of milk and cream, which are high in saturated fatty acids, are consumed daily as part of the peptic ulcer therapeutic regimen. Since peptic ulcer is a chronic and recurrent ailment, individuals with this disorder consequently ingest a diet high in saturated fatty acids either constantly or intermittently for months or years. The incidence of coronary atherosclerosis appears to be increased in peptic ulcer patients. Briggs et al. have reported a statistically significant higher incidence of myocardial infarction in peptic ulcer patients treated with a Sippy diet than among peptic ulcer patients not so treated or nonulcer patients of similar ages. However, that the intake of large amounts of milk and cream over a prolonged period of time plays a major role in this increased atherogenesis has yet to be firmly established.

The purpose of this study was to quantitate the effect on serum cholesterol of substituting corn oil and skim milk for milk and cream in the peptic ulcer regimen. If by this simple method of increasing the ratio of polyunsaturated to saturated fatty acids, one could lower serum cholesterol significantly, the desirable high fat therapeutic regimen for peptic ulcer patients could be simply maintained without enhancing the potential for atherogenesis.

Methods

Eight ambulatory peptic ulcer patients (6 males and 2 females) were admitted to the Cardiovascular Clinical Research Unit for controlled study and therapy. Routine admission examination included a complete history and physical examination; an electrocardiogram; posteroanterior chest roentgenogram; complete blood count; urinalysis; blood V.D.R.L.; 3 stools for occult blood; fasting serum urea nitrogen, glucose, calcium, phosphorus, total protein, albumin-globulin ratio, protein-bound iodine; a diagnox blue test; and other pertinent laboratory procedures. An upper GI series had been done in each patient shortly prior to entrance to the hospital and these roentgenograms were repeated prior to discharge. Seven serum cholesterol determinations, utilizing the technique of Schoenheimer and Sperry were performed on hourly specimens (8:00 a.m. through 2:00 p.m.) at the beginning of the study and at the completion of each 2 week diet period. The average of the 7 determinations was used for tabulation. The results of the serum cholesterol determinations were unknown to the authors until after the discharge of the patients from the hospital.

Each patient ingested a GI No. 1 diet for the entire hospital stay, the components of which are seen in Table 1. During the initial 2 weeks, the GI No. 1 diet was supplemented by 9 hourly feedings of 90 ml of ½ milk and ½ cream (see Table 2). The GI No. 1 diet plus the milk and cream were designated as Diet B.

The second 2-week diet period consisted of an identical GI No. 1 diet with 9 hourly feedings of 90 ml of a palatable corn oil and skim milk mixture constituting diet B_1. The corn oil and skim milk mixture was prepared by one of us (M.M.N.) as detailed in Table 3.

Three patients were studied for a third 2-week diet period, at which time they again received Diet B.

The total calorie intake of the GI No. 1 diet when combined with either the milk and cream or with corn oil and skim milk varied between 2,000 and 2,600 calories, depending on the patients size and sex. Diets B and B_1 were similar for the individual patient as far as protein, carbohydrate and total fat content were concerned. Daily weights were recorded to make sure that the patient showed no appreciable weight gain or loss.

Table 1. Composition Of A Typical GI No. 1 Diet (Daily Amount)† Caloric Content 1194

	Protein (gm)	Carbohydrate (gm)	Total Fat (gm)	Saturated Fatty Acids (gm)	Mono-unsaturated Fatty Acids (gm)	Poly-unsaturated Fatty Acids (gm)	Cholesterol (mg)
Fruit	0	40	0	0	0	0	0
Bread	12	90	4.8	1.0	2.6	.8	6
Meat	42	0	19.5*	9.1*	9.8*	.6*	100*
Egg	7	0	5.5	1.7	2.1	1.7	234
Jelly	0	15	0	0	0	0	0
Butter	0	0	11.4	7.6	3.6	.6	40
Total	61	145	41.2	19.4	18.1	3.7	380

* Average
† Diet also contains vegetable A, which has negligible amounts of carbohydrate, protein and calories; vegetable B was not used.

Each person received 600 mg of calcium carbonate hourly during the day as an antacid and 30 ml of magnesium oxide as necessary for catharsis. Other drugs such as propantheline bromide, codeine, or dextropropoxyphene were administered infrequently for alleviation of epigastric pain.

Results

Ingestion of Diet B (the milk and cream with a GI No. 1 diet) for a 2-week period was associated with a rise in serum cholesterol in 4 patients, no change in 2, and a decrease in the other 2. It is possible that the 4 patients who failed to show an increase in serum cholesterol had been on a high lipid or cholesterol intake, or both, prior to entrance on the study, causing maximum elevation of serum cholesterol at the outset of the study. The average pretreatment serum cholesterol of the 8 patients was 226 mg per 100 ml and rose to 245 mg per 100 ml after the milk and cream regimen (Table 4). Previous experience with an additional 8 patients undergoing the same dietary program showed a similar rise in serum cholesterol in 7 patients, the average increase being 60 mg per 100 ml.

Following substitution of Diet B_1 (in which corn oil and skim milk replaced the milk and cream), the serum cholesterol levels dropped significantly in all 8 patients. The average decrease in serum cholesterol was 53 mg per 100 ml from the milk and cream regimen and 35 mg per 100 ml from the pretreatment levels (Table 5). The p value for the difference of the means was less than 0.001 when comparing the skim milk and corn oil regimen with the milk and cream regimen. When equating the skim milk and corn oil regimen with pretreatment values, the p value was less than 0.05.

Serum cholesterol rose appreciably in all 3 patients who returned to the milk and cream regimen after ingesting corn oil and skim milk (Table 4).

From a clinical standpoint, there was no evidence that the course of the peptic ulcer healing was altered by the substitution of skim milk and corn oil for milk and cream. Presumably the corn oil and skim milk mixture is as effective as milk and cream in inhibiting gastric secretion and slowing gastric emptying. It has been demonstrated that polyunsaturated fatty acids, such as cottonseed oil and soybean oil can effectively reduce gastric acidity.

Discussion

Serum cholesterol levels have been significantly lowered in man by increasing the dietary polyun-

Table 2. Composition of Milk and Cream (Daily Amount) Caloric Content 1154

	Protein (gm)	Carbohydrate (gm)	Total Fat (gm)	Saturated Fatty Acids (gm)	Mono-unsaturated Fatty Acids (gm)	Poly-unsaturated Fatty Acids (gm)	Cholesterol (mg)
Milk and Cream	24	45.9	97.2	61.3	30.7	5.2	324

Table 3. Composition of Corn Oil and Skim Milk Mixture (Daily Amount) Caloric Content 1149

	Protein (gm)	Carbohydrate (gm)	Total Fat (gm)	Saturated Fatty Acids (gm)	Mono-unsaturated Fatty Acids (gm)	Poly-unsaturated Fatty Acids (gm)	Cholesterol (mg)
Corn Oil	0	0	85	10.5	39.0	35.5	0
Corn Syrup	0	31.6	0	0	0	0	0
Egg White	4	.4	0	0	0	0	0
Skim Milk	24	36	0	0	0	0	0
Vanilla	0	0	0	0	0	0	0
Total	28	68.0	85	10.5	39.0	35.5	0

Ingredients	Amounts
Skim Milk	720 gm
Corn Syrup	40 gm
Vanilla	10 gm
Corn Oil	85 gm
Powdered Egg White	5 gm

Method of Preparation:
1. To ½ of the amount of skim milk add the entire quantity of corn syrup, vanilla, and powdered egg white. Mix in blender.
2. Agitate at "low" speed and pour corn oil slowly into the mixture.
3. Combine the remaining ½ of the skim milk with this mixture.
4. Refrigerate several hours. The mixture may congeal but will quickly dissolve on shaking.
5. Divide into 9 equal servings.

Additional vanilla or other flavors, such as commercial cherry juice or powdered coffee may be used to suit individual taste.

saturated: saturated fatty acid ratio by the administration of corn oil. Others besides ourselves have noted a reduction in serum cholesterol levels in peptic ulcer patients by increasing the ratio of unsaturated to saturated fatty acids. Thus Sandweiss et al. have reported reduction in serum cholesterol in 12 of 13 peptic ulcer patients by the use of an unsaturated fatty acid ulcer diet, in which the polyunsaturated: saturated fatty acid ratio ranged from 2.3:1 to 3.4:1. Similarly, McHardy, Judue and Cradie and Cayes and Ruffin have noted a decrease in serum cholesterol in peptic ulcer patients using a preparation containing soybean oil, in which the dietary polyunsaturated: saturated fatty acid ratio ranged from 2:1 to 3:1. The particular merit of our study was that we were able to provide a very simple alteration in peptic ulcer regimen, one which required no change in the usual GI No. 1 diet but depended entirely on the substitution of corn oil and skim milk for milk and cream. The polyunsaturated: saturated fatty acid ratio of Diet B_1 used in this study, in which the corn oil and skim milk mixture was added to GI No. 1 diet, was 1.33:1. With this diet a significant decrease in serum cholesterol was obtained.

Even though our studies and those of others show

Table 4. Serum Cholesterol Levels in 8 Patients on Different Diets

Patient	Pretreatment * (mg/100 ml)	Post Diet B (mg/100 ml)	Post Diet B_1 (mg/100 ml)	Post Diet B (mg/100 ml)
M.E.	278	330	232	—
R.J.	255	251	202	—
C.T.	192	258	223	—
C.M.	164	192	138	—
J.L.G.	246	282	216	284
H.K.	232	204	141	196
M.R.	134	135	111	—
F.C.	311	302	269	348
Average	226	245	192	276 ‡

Diet B = GI No. 1 diet with 9 feedings of ½ milk and ½ cream.
Diet B_1 = GI No. 1 diet with 9 feedings of corn oil and skim milk.
* Ad lib diet; some patients were on "peptic ulcer regimen."
‡ Of the 3 patients so studied.

Table 5. Changes in Serum Cholesterol Values in 8 Patients on Different Diets

Patient	Pretreatment to Diet B (mg/100 ml)	Diet B to Diet B_1 (mg/100 ml)	Diet B_1 to Diet B (mg/100 ml)	Pretreatment to Diet B_1 (mg/100 ml)
M.E.	+52	−98	—	−46
R.J.	− 4	−49	—	−53
C.T.	+66	−35	—	+31
C.M.	+28	−54	—	−26
J.L.G.	+36	−66	+68	−30
H.K.	−28	−63	+55	−91
M.R.	+ 1	−24	—	−23
F.C.	− 9	−33	+79	−42
Average	+18 ±11.5	−53 ±8.3	+67*	−35 ±12.1

Diet B = GI No. 1 diet and 9 feedings of ½ milk and ½ cream.
Diet B_1 = GI No. 1 diet and 9 feedings of corn oil and skim milk.
* Of the 3 patients so studied.

that serum cholesterol can be increased by ingestion of large quantities of milk and cream, only 43% of 145 patients with chronic peptic ulcers ingesting a modified "Sippy diet" intermittently for years had serum cholesterol levels of over 250 mg per 100 ml. One of us (M.A.S.) has noted a similar finding with a large number of peptic ulcer patients on chronic ulcer management. Although reports in the literature generally indicate a higher incidence of coronary atherosclerosis in persons with peptic ulcers, this correlation has been doubted by some. Why do these inconsistencies exist? Several possibilities exist to explain the discrepancies:

(1) Eating habits have been shown to play a significant role in the level of serum cholesterol as well as in the production and regression of atherosclerosis in the experimental animal. It is entirely feasible that serum cholesterol levels in peptic ulcer patients may be significantly influenced by the frequency of feedings. However, to date our preliminary short-term studies in peptic ulcer patients have failed to reveal a significant serum cholesterol variation dependent on whether the milk and cream or the GI No. 1 diet, or both, were ingested at frequent intervals in small quantities or at wide intervals in larger quantities.

(2) The quantity of polyunsaturated fatty acids in the "peptic ulcer diet" may vary considerably, with significant effects on serum cholesterol levels.

(3) Briggs et al. have indicated that while some patients with chronic peptic ulcers do follow a high saturated fatty acid and high cholesterol dietary regimen for many years, others do not. It is obvious that the dietary history is an important variable.

Our study and review of the literature lead us to recommend the following proposal for peptic ulcer patients as far as the high fat diet, considered essential in their dietary management, is concerned. From the serum cholesterol responses noted in these studies, it appears justified to suggest that corn oil (or some other palatable oil high in unsaturated fatty acids) and skim milk be tried instead of milk and cream as dietary supplement in the long-term therapy of peptic ulcer. As prepared by us, the corn oil and skim milk mixture is highly caloric and equal in calories to an equivalent amount of milk and cream. Since it is usually deemed important to avoid weight gain, the total number of calories ingested must be limited. This can be accomplished by reducing the caloric value of the other parts of the diet (Table 1).

Summary

(1) The administration of a GI No. 1 diet supplemented by 90 ml of ½ milk and ½ cream 9 times per day over a 2-week period to 8 peptic ulcer patients was associated with a rise in serum cholesterol in a number of instances.

(2) The substitution of skim milk and corn oil for milk and cream in the above regimen was accompanied by a statistically significant reduction in serum cholesterol far below pretreatment levels in all patients.

(3) The corn oil and skim milk mixtures were found to be palatable and effective in the peptic ulcer regimen.

(4) Corn oil and skim milk, rather than milk and cream, would appear to offer a safer approach in the long term dietary management of peptic ulcer with respect to serum cholesterol levels and presumably also to potential atherogenesis.

(The references may be seen in the original article.)

BACTERIAL ENDOCARDITIS—A CHANGING PATTERN*

Marwan M. Uwaydah MD†, and Arnold N. Weinberg MD‡, Boston, Mass. New Eng J Med 273(23): 1231-1235, December 2, 1965.

In recent years there have been changes in many of the factors which influence the development and outcome of bacterial endocarditis. These changes relate to both the susceptible host and the causative organism. Rheumatic fever, for example, appears to be declining in incidence and severity. More cases of bacterial endocarditis are being encountered in elderly persons with no history of valvular disease or murmurs. In addition, many more patients are being treated with corticosteroid hormones, immunosuppressive agents and extensive radiotherapy, all of which interfere with normal mechanisms of host resistance. The use of newly developed technics in cardiac surgery, such as prosthetic valve replacement, are creating more opportunities for microorganisms to gain access to the circulation and establish a foothold in the endocardium. Moreover, the wide use of multiple antibiotics has been associated with isolation of unusual and increasingly resistant organisms.

In an attempt to evaluate the magnitude and significance of recent changes in the clinical pattern of bacterial endocarditis and to assess the influence of both host and bacterial factors on this pattern, we have reviewed the experience with this disease at the Massachusetts General Hospital since July, 1958, using as a comparative series the cases presented from this hospital in a review covering the period 1944 to June, 1958.

Materials and Methods

Records of all the patients with bacterial endocarditis seen at the Massachusetts General Hospital between July, 1958, and June, 1964, were reviewed, including 26 cases diagnosed only at post-mortem examination. The main criteria used for diagnosis included repeatedly positive blood cultures in the absence of an obvious noncardiac septic focus, evidence of valvular heart disease, peripheral manifestations of endocarditis or pathological diagnosis whenever available, even in the absence of a typical clinical picture. Excluding cases only diagnosed at post-mortem examination, blood cultures were positive in 71 out of 74. The cases were divided into acute and subacute groups on the basis of a number of criteria. The acute group included patients with hectic fever, leukocytosis, extreme toxicity and rapid deterioration of cardiac function. The virulence of the causative organisms and the length of the clinical disease were also important factors in defining this group. In general, the patients with subacute endocarditis had less violent disease, prolonged in time, without marked toxicity or high fever, and rapid deterioration of cardiac function was not a major problem. Admittedly, this classification is arbitrary, but it was found to be helpful and applicable in 98 per cent of these cases.

Results

The cases of 100 patients were reviewed, many of whom had been seen sometime during their illness by one or more members of the Infectious Disease Unit. There were 56 males and 44 females, ranging in age from ten to eighty-nine years. As noted in Table 1, the average yearly number since 1944 was 15 cases, and there was little variation from year to year. The total hospital admissions increased very little during the period of study, so that the incidence of bacterial endocarditis did not change significantly during that interval. Excluding 2 cases that could not be classified as acute or subacute and were called "uncertain," the ratio of acute to subacute endocarditis increased progressively from 1:3.3 in the earlier series to 1:0.8 in the last two years of the current series.

Depending upon their cardiac status before the onset of their illness, patients were divided into three categories: those with no apparent abnormality (19 cases); those with congenital or rheumatic valvular disease (56 cases); and those with arteriosclerotic or calcific heart disease (25 cases).

Figure 1 presents the relation of the underlying heart disease and type of endocarditis to age. Although the highest incidence of both acute and subacute endocarditis was in the age group from thirty-one to sixty years, there were 38 patients over

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† Research fellow in medicine, Harvard Medical School; clinical and research fellow in medicine, Massachusetts General Hospital (Infectious Disease Unit).
‡ Associate in medicine, Harvard Medical School; assistant in medicine, Massachusetts General Hospital (Infectious Disease Unit).

Table 1. Bacterial Endocarditis at the Massachusetts General Hospital (1944 to June, 1964).

Period	Total Cases	Average Yr	Acute Cases	Subacute Cases	Uncertain Cases
1944*-June, 1958	228	15	53(23%)	175(77%)	
July, 1958-June, 1964	100	16	43(43%)	55(55%)	2
July, 1958, 1961	63	17	23(37%)	39(63%)	1
1962-June, 1964	37	14	20(55%)	16(45%)	1

*Study of Morgan & Bland.

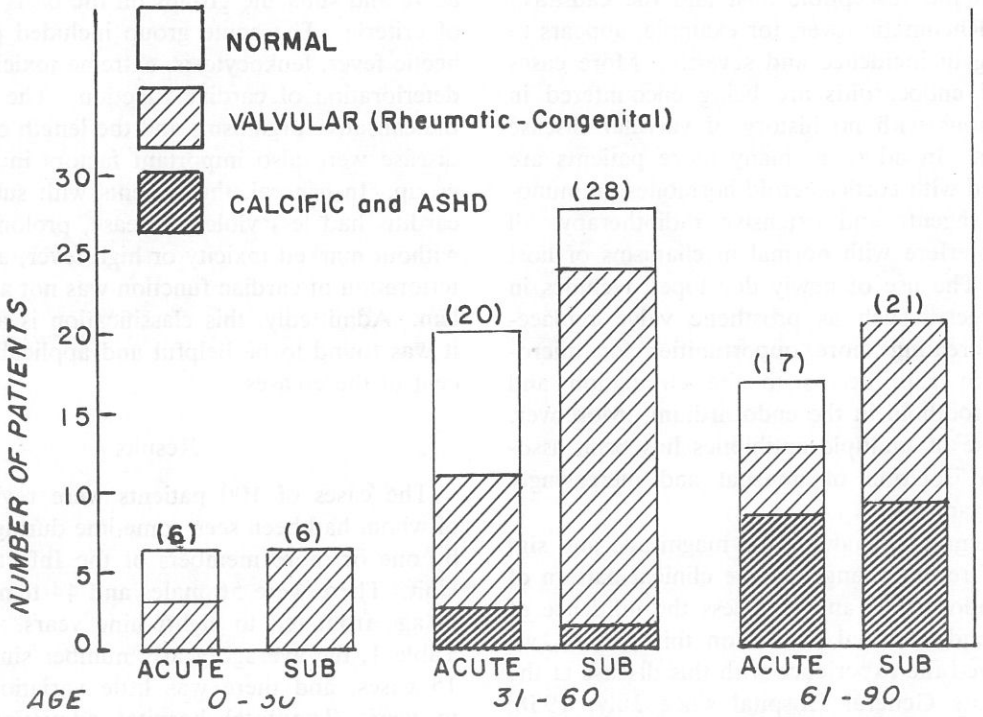

Figure 1. Relation of Underlying Heart Disease and Endocarditis to Age (1958-1964).

sixty. The main cardiac abnormalities in the young and middle-aged patients were rheumatic and congenital valvular disease whereas in the elderly patients, calcific and arteriosclerotic disease predominated. In 16 of the 43 patients (37 per cent) with acute endocarditis there was no evidence of overt predisposing heart disease, and only 3 of 55 patients (5 per cent) with subacute infection had clinically normal hearts.

Endocarditis involving the right side of the heart was encountered twice in this review. The 2 cases were analyzed without special reference to the valvular localization.

Table 2 compares the etiologic agents isolated from patients in the two series. Alpha-hemolytic streptococci remained the most commonly isolated organism. The overall incidence of *Staphylococcus aureus* increased from 14 to 23 per cent, but its relative frequency in acute cases remained unchanged, accounting for slightly more than 50 per cent of these cases. The prognosis was poor regardless of whether the staphylococcus was sensitive or resistant to penicillin. Other relevant observations were the increase in the number of infections due to Group A and Group D (enterococcal) streptococci and the surprisingly rare occurrence of gram-negative organisms. The 2 patients with endocarditis due to gram-negative bacilli were sixty-seven and seventy-seven years old. In neither was the diagnosis suspected during life.

Various other factors that may have affected the development of the disease are listed in Table 3.

Table 2. Isolates from Patients with Bacterial Endocarditis

Organism Isolated	1944-June, 1958 Acute Cases	1944-June, 1958 Subacute Cases	July, 1958, June, 1964 Acute Cases	July, 1958, June, 1964 Subacute Cases	July, 1958, June, 1964 Uncertain Cases
Alpha-hemolytic streptococci	1	116(66%)	1	38(69%)	1
Beta-hemolytic streptococci, Group A	1	2	4	1	0
Nonhemolytic streptococci	0	0	1	2	1
Streptococci, Group G	0	0	1	1	0
Enterococcus, Group D	0	5	3	3	0
Staph. aureus	31(58%)	3	23(53%)	0	0
Staph. albus	0	4	0	2	0
Pneumococci	9	0	2	0	0
Friedlander-like organisms	0	0	0	1	0
Proteus	1	0	1	0	0
Escherichia coli	2	2	0	0	0
Haemophilus influenzae	1	1	0	0	0
Brucella	1	0	0	0	0
Pseudomonas aeroginosa (bacillus pyocyaneus)	0	1	0	0	0
Unknown	6	41	7	7	0
Totals	53	175	43	55	2

Unfortunately, similar data are not available from the 1944-1958 series for comparison. Foci of infection, such as furuncles, pulmonary infections and pyelonephritis, were apparent in 65 per cent of the acute and 24 per cent of the subacute cases. Five infections followed cardiac surgery. Two were caused by penicillinase-producing *Staph. aureus,* and 1 patient survived. Another patient had an acute endocarditis due to Group D streptococcus, from which she recovered with antibiotic therapy. The fourth patient, from whom *Staph. albus* was isolated, had a subacute illness and responded well to treatment. In the fifth case no organisms were isolated from blood, and the patient deteriorated rapidly and died. The diagnosis was established at post-mortem examination.

Table 3. Conditions Associated with Bacterial Endocarditis, July, 1958, to June, 1964

Condition	Acute Cases (43 Cases)	Subacute Cases (55 Cases)
Dental problems	3 (7%)	15 (27%)
Diabetes mellitus	7 (16%)	3 (5%)
Liver cirrhosis	4 (9%)	4 (7%)
Focus of infection	28 (65%)	13 (24%)
Heart surgery	4 (9%)	1 (2%)
General surgery	4 (9%)	2 (4%)
Steroids	3 (7%)	0

The mortality rates for the two series are presented in Table 4 and include 15 cases of acute endocarditis and 11 subacute cases not diagnosed until post-mortem study. During the past twenty years there has been essentially no change in the overall survival rate in cases of subacute bacterial endocarditis.

Table 4. Gross Mortality Rates, 1944 to June, 1964

Year	No. of Acute Cases	Mortality %	No. of Subacute Cases	Mortality %
1944-June, 1958	53	85	175	32
July, 1958, June, 1964	43	75	55	30

Table 5 stresses the relation of "survival" to "recognition" and "age." "Recognition" refers to cases suspected strongly enough to initiate therapy, independent of the duration of therapy before death. The findings can be summarized as follows:

In the younger group almost all acute and subacute cases were recognized, but over the age of thirty, recognition became progressively poorer especially in the acute cases.

In the young group recognition was associated with good prognosis, in both acute and subacute cases, but in the elderly (sixty-one to ninety years of age), the mortality was consistently high even

when the diagnosis was made. In the middle-aged patients recognition led to a favorable prognosis in subacute bacterial endocarditis, but survival in acute bacterial endocarditis remained low.

The overall cure rate in recognized cases was 40 per cent for acute endocarditis and 87 per cent for subacute endocarditis.

Regarding epidemiology, the only significant observation was that all the hospital-associated cases were of the acute variety and frequently followed operative or other procedures (Table 6).

Table 5. Recognition and Survival in Relation to Age, July, 1958, to June, 1964

Age yr.	Acute Cases Total	Recog-nized	Survi-val	Subacute Cases Total	Recog-nized	Survi-val
0-30	6	5	4	6	6	6
31-60	20	14	4	28	23	22
61-90	17	9	3	21	15	10
Totals	43	28	11	55	44	38

Discussion

Despite the declining incidence of rheumatic fever and the more extensive use of antibiotics both prophylactically and therapeutically, the incidence of bacterial endocarditis at the Massachusetts General Hospital has not changed appreciably during the past twenty years. Although the average number of cases has remained at approximately 15 per year, the relative number of acute cases increased from 23 per cent in the earlier series to 55 per cent in the last two and a half years of this study. The

Table 6. Type of Endocarditis in Relation to Probable Environmental Source of Infection, July, 1958, to June, 1964

Type of Endocarditis	Community-Acquired Cases	Hospital-Associated Cases
Acute	30	13
Subacute	55	0
Uncertain	2	0
Totals	87	13

average age of the patients with acute cases remained fifty-five years, whereas that of patients with subacute endocarditis was fifty-four, as compared to forty-two in the Morgan-Bland series. The relation of mortality to age was striking in the latter group, being 16 per cent below sixty as compared to 50 per cent above that age. The increasing incidence of acute endocarditis observed at this hospital may reflect selection of only the sickest patients for admission, but the series does include 13 patients whose disease was acquired in the hospital.

A comparison of the underlying cardiac diagnoses between this series and the earlier cases reveals a declining frequency of rheumatic heart disease, from 71 to 46 per cent, and consistent with the older age of the patients, an increase in calcific and arteriosclerotic disease.

Various possible factors were of particular importance as sources of bacteremia in this series. Obstructive uropathy, prolonged urethral or intravenous catheterization, osteomyelitis and infected skin lesions may be cited as specific examples. Administration of steroids, diabetes mellitus, cirrhosis, cancer and other debilitating illness may have been responsible for altering host defense mechanisms in some patients and thereby predisposing to the development of endocarditis. These conditions complicated the clinical picture further by diverting attention from a consideration of the endocardial infection. Thus, in the elderly patient the possibility of endocarditis was frequently obscured by some extracardiac underlying disease, and the correct diagnosis was delayed or missed entirely. The presenting symptoms may be those of unexplained fever, hematuria, progressive uremia without obvious renal cause, anemia, mental aberrations, cerebrovascular accident or meningitis, alone or in various combinations. Heart murmurs may be absent or of such insignificant intensity as to fail to alert the clinician to the possibility of endocarditis. In this series no murmur was detected in 7 of 38 patients in the group from sixty-one to ninety years of age.

The differentiation of acute from subacute endocarditis depends upon the virulence of the etiologic agent and the severity and rate of progression of the disease. Organisms characteristically producing indolent disease on scarred valves occasionally cause fulminating infections, as noted in cases from this hospital and as mentioned in the literature. Contrary to some current opinion, we believe that distinguishing between the two forms is useful prognostically and because it emphasizes the necessity for rapid institution and prolongation of intensive therapy in acute cases. The reasons for the increase in the number of acute as compared to subacute cases in this series are not clear.

Although the overall percentage of endocarditis due to alpha-hemolytic streptococci dropped from 51 to 39 per cent during the two periods of study its

frequency in the subacute group remained unchanged. On the other hand, an increase of endocarditis due to other streptococcal species was noticeable during the present period. This is consistent with the reports of a rising frequency of infections with Group A streptococci and the increase in enterococcal infections, particularly in association with genitourinary disease. In our series we did not have any streptococci other than Group D that showed significant resistance to penicillin. However, as pointed out by other workers, a stepwise increase of resistance of streptococci not of Group D to penicillin may occur in the patient who has been receiving long-term penicillin prophylaxis.

A striking feature of the bacteriology of this series was the infrequent occurrence of gram-negative bacilli, in spite of the definite rise in the incidence of septicemias and bacteremias due to these organisms in recent years. This paradox cannot be easily explained. The different ways by which the host handles the gram-negative and gram-positive bacteria are possibly important determinants. The effectiveness of bactericidal serum factors in eradicating gram-negative bacteria may be instrumental in preventing attachment to and multiplication on the endocardium. Gram-positive organisms, which are usually disposed of by cellular phagocytic mechanisms, may establish an infection on the endocardial surface because of delayed cellular inflammatory reaction in this area.

In spite of all the advances in chemotherapy, the survival rate for bacterial endocarditis in our hospital improved only slightly, if at all, during the past twenty years. Further analysis of our data point to the fact that the poorest prognosis was in the elderly group, especially those with acute endocarditis. It is probable that lack of early recognition and therefore delayed treatment were important contributors to the high mortality rate in these patients. It is hoped that through better insight into the changing patterns of bacterial endocarditis, the disease can be recognized early enough for appropriate therapy to be effective.

Summary

At the Massachusetts General Hospital during the past twenty years the number of cases of bacterial endocarditis averaged 15 per year, with little variation from year to year.

The ratio of cases of acute to subacute endocarditis changed from 1:3.3 in the 1944-1958 series to 1:0.8 in the past several years.

Among the predisposing cardiac abnormalities, congenital or rheumatic heart disease was present in 56 per cent of the cases, but in the elderly patients calcific and arteriosclerotic heart disease predominated.

Factors such as increasing age, in association with medical and surgical illnesses, tended to obscure early diagnosis and led to increased mortality.

In this series, alpha-hemolytic streptococci and Staphylococcus aureus remained the most frequent causes of subacute and acute endocarditis, respectively. There was an increase in the number of cases due to Group A and Group D (enterococcal) streptococci, but there were only 2 cases due to gram-negative bacilli despite the rising incidence of gram-negative septicemia during the past decade. (The references to this article may be seen in the original article.)

SYSTEMIC "ALLERGIC" VASCULITIS

CLINICAL AND PATHOLOGICAL RELATIONSHIPS

Robert P. McCombs MD.*

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The clinical manifestations associated with systemic "allergic" vasculitis are so protean that they have been described and reviewed under the heading of a variety of syndromes (Table 1). In these the vasculitis is often of primary importance and changes related to the blood vessel disorder may account for nearly all of the clinical manifestations.

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It is not known why vasculitis produces different syndromes in different patients. It is obvious that tissues in the body can react to noxious stimuli only in a limited number of ways, and the various syndromes associated with vasculitis may well be expressions of several pathogenic mechanisms in which local factors play a role.

We have become aware, however, that there are many cases of systemic "allergic" vasculitis that can-

not readily be classified into one of the syndromes listed in Table 1, despite careful study and prolonged follow-up. We believe that attempts to classify rigidly such diffuse disorders as make up the syndrome of systemic vasculitis often leads to serious errors in diagnosis, treatment, and prognosis. In order to try to resolve some of these difficulties we undertook a study of our cases of vasculitis to determine if there were some common denominators of clinical value.

Methods

All of the clinical records and pathological material of patients admitted to the New England Medical Center Hospitals during the years 1946 to 1963 in which the diagnosis of vasculitis was confirmed histologically were reviewed. Follow-up data was obtained whenever possible by personal examination, otherwise by communication with the family physician or by consulting clinical records or autopsy reports from other hospitals concerning studies that followed the initial diagnosis of vasculitis. The various important manifestations were reviewed in relationship to time of onset, time of diagnosis, and response to therapy.

Results

A total of 72 histologically confirmed cases of vasculitis were included in this study. Of these there were 38 females and 34 males. Ages varied from 6 to 74 years. Three of the patients were less than 31 years of age, 33 were between the ages of 31 and 50, and 36 were more than 50 years of age.

Table 1. Clinical Syndromes Associated With Systemic "Allergic" Vasculitis

Periarteritis (polyarteritis) nodosa
Microscopic polyarteritis
Allergic granulomatosis
Wegener's granulomatosis
Serum sickness
Hypersensitivity angiitis
Drug hypersensitivity
Vascular (anaphylactoid) purpura
"Allergic" vasculitis (angiitis)
Arteriolitis "allergica" cutis
Nodular vasculitis

Etiology.—In 26 of our patients there were unmistakable drug reactions at the time of onset. The drugs associated with these reactions are listed in Table 2. Careful review of the evidence indicated that in 22 of our patients infection was probably present at or just prior to the onset, but of these, 12 also had reactions to drugs used to treat the infection.

Table 2. Drugs Responsible for Reactions Associated With Systemic "Allergic" Vasculitis

	No. of Cases
Penicillin	9
Sulfonamide	3
Chloramphenicol	2
Chlortetracycline	2
Phenylbutazone	2
Propylthiouracil	2
Busulfan (Myleran)	2
Pyrogen preparation (Pyromen)	1
Vaccine (possibly penicillin)	1
Iproniazid	1
Potassium iodide	1
TOTAL	26

Vasculitis is known to accompany some cases of rheumatoid arthritis, and corticosteroid therapy in this disease has been implicated as a possible causative or aggravating factor for vasculitis. Twelve of our patients had chronic inflammatory arthritis weeks or months prior to the occurrence of other manifestations that led to the establishment of the diagnosis of vasculitis. Only four of these patients had received corticosteroids prior to the diagnosis of vasculitis.

There was a history of allergic disease in 19 patients. Seven of these had had bronchial asthma; five, hay fever; two, urticaria; and five, previous drug reactions; four of the patients with histories of drug reactions had second reactions that led to the diagnosis of vasculitis and are included as drug-induced cases above.

It may be of significance that in four cases chronic leukemia was present, and in one case low-grade lymphoma was present, at the time the diagnosis of vasculitis was made. Two of these patients had drug reactions.

The various possible etiologic factors are summarized in Table 3.

Manifestations.—The variety of manifestations of systemic vasculitis suggest that they are dependent upon a number of variables. Certain tissues are more susceptible than others, and therefore these are the major "shock organs." In this series the

skin, joints, and muscles, kidneys, lungs, and peripheral nerves were affected much more commonly than other tissues. The extent of involvement of any organ was dependent upon the intensity of the reaction in vascular walls and in perivascular tissues. Local hemorrhage, edema, and inflammation were common, and when necrosis was present there often also was vascular thrombosis; infarcts of skin, kidney, heart, and brain have been encountered. In some instances, it was apparent that the vascular reaction may have been altered by therapy.

Table 3. Etiologic Considerations in 72 Cases of Systemic "Allergic" Vasculitis

	History of Allergy	No Allergy	Total
Infection	6(4)*	16(8)	22(12)
Rheumatoid arthritis	3(1)	9(3)	12(4)
Lymphoproliferative disease	0	5(2)	5(2)
No related disease	10(3)	23(5)	33(8)
TOTAL	19(8)	53(18)	72(26)

*Figures in parentheses indicate number of patients with drug reactions.

Important manifestations of systemic vasculitis in our cases are summarized in Table 4.

Systemic Signs.—Fever, when present, was usually of a low grade, except in fulminating cases. Weight loss, on the other hand, was often quite marked and occasionally was the presenting symptom.

Skin.—Purpura was the most frequent manifestation. In three of our cases purpura dominated the clinical picture and diagnoses of vascular purpura were entertained. In other cases, purpura was much less apparent, in some consisting of only a few scattered petechial spots, most often occurring over the lower third of the legs. Biopsy of purpuric lesions in most instances gave satisfactory evidence upon which to base the diagnosis of vasculitis.

Erythematous maculopapular rashes were encountered in slightly more than 20% of cases. Inflammatory nodules were not common, but when present, proved to be important clues to the diagnosis of vasculitis in that when biopsied they always gave evidence of acute necrotizing vasculitis.

Musculoskeletal Symptoms.—In the 12 patients with preexisting rheumatoid arthritis the symptoms

Table 4. Manifestations in 72 Cases of Systemic "Allergic" Vasculitis

		No. of Cases
Systemic Signs	Fever	22
	Weight loss	18
Skin	Purpura	35
	Erythematous rash	15
	Inflammatory nodules	9
	Urticaria	3
Musculoskeletal	Prior rheumatoid arthritis	12
	Arthralgias	31
	Muscular pain and tenderness	15
Pulmonary	Bronchial asthma	7
	Pneumonitis	22
Renal	Albuminuria, hematuria	24
	Renal failure	17
	Hypertension	2
Cardiovascular	Edema	14
	Ascites	10
	Myocarditis	5
	Phlebitis	5
	Peripheral vascular insufficiency	1
Neurological	Neuropathy	20
	Encephalopathy	7
Gastrointestinal	Bleeding	9
Hematological	Anemia	22
	Leukocytosis	20
	Eosinophilia	16
Other Laboratory Abnormalities	Elevation of blood sedimentation rate	46/62
	Reversal of albumin globulin ratio	23/57

of joint inflammation became more severe during the acute episode that led to the diagnosis of vasculitis. In 31 additional patients arthralgias accompanied other manifestations of vasculitis and, during remissions, joint symptoms disappeared; in these no deformities occurred and progressive rheumatoid arthritis did not occur, although definite rheumatoid arthritis appeared three and five years later in two patients.

Muscle pain, tenderness, and weakness were less frequent, but disabling when present. Proximal muscle groups were not primarily affected as in dermatomyositis. In the few instances in which muscle biopsies were obtained there were inflammatory changes in small arteries in the muscles with some secondary changes in the muscle.

Pulmonary Symptoms.—Bronchial asthma coincided with the approximate onset of other symptoms of vasculitis in only two patients and had been present in the recent past in only three others. In two additional patients there was a history of asthma.

Hemoptysis, cough, and dyspnea were evident in nearly one third (22) of our cases and in most of these pulmonary infiltrates were demonstrable by roentgenographic examination. Intrapulmonary hemorrhage, associated with renal bleeding (possibly Goodpasture's syndrome), was evident in two cases. Migrating pneumonitis (possibly Loeffler's syndrome) was apparent in three cases. Pleural effusions of moderate size accompanied the pneumonitis occasionally.

Renal Symptoms.—Microscopic hematuria, albuminuria of moderate degree, and the presence of granular and red blood cell casts were the most characteristic urinary abnormalities found, and these were present in 24 cases. When the disease was progressive and severe, gross hematuria and signs of renal failure became manifest. In most instances urinary findings were discovered, incidentally, during study for other manifestations of the disease. When performed at this stage, renal biopsies showed focal glomerulitis.

Cardiovascular Symptoms.—Edema was a common symptom. At times (eight cases) it was present in the absence of cardiac, renal, or hepatic disease and occasionally was the chief complaint. It is believed that edema may be a manifestation of capillary damage associated with vasculitis. Ascites was less common than edema and was rarely associated with it, being more commonly associated with hypoalbuminemia, but in five cases ascites apparently represented a primary manifestation of vasculitis.

Myocarditis, as evidenced by cardiac arrhythmias, diffuse electrocardiographic changes, and heart failure, was evident during acute stages of vasculitis in a few patients; two of these made a complete recovery with no signs of residual disease.

Phlebitis occurred during the active stages of vasculitis in five cases and seemed to be a manifestation of the disease. In one case peripheral vascular insufficiency was present that did not respond to sympathectomy but improved after corticosteroid therapy.

Neurological Symptoms.—Peripheral neuropathies were quite common and were mild except in fulminating cases. In some, at first there was only pain localized to the distribution of a peripheral nerve, being followed later by paresthesias and motor weakness involving more than one extremity. If corticosteroid therapy was given soon after onset, symptoms subsided rapidly, but if nerve damage was extensive, signs of peripheral neuropathy persisted for months. Neuropathies involving cranial nerves were noted rarely, but in one case the sudden occurrence of bilateral permanent deafness in association with other signs of active vasculitis suggested simultaneous involvement of both auditory nerves, presumably by affecting nutrient vessels.

Encephalopathies, not associated with uremia, were evident in a few of the more seriously ill patients. This manifestation was deemed to be present when there was mental confusion, delirium, diffuse alterations in the electroencephalogram, or spinal fluid abnormalities. In one case a cerebral thrombosis occurred during a febrile episode associated with arthralgia, hematuria, and albuminuria.

Gastrointestinal Symptoms.—Brisk gastrointestinal bleeding was the presenting symptom in three cases of systemic vasculitis and lesser amounts of intestinal bleeding were evident in six additional cases. In one case previously reported, abnormalities seen in x-rays of the jejunum permitted a roentgenographic diagnosis of vasculitis. The patient improved temporarily with corticosteroid therapy, but died later from exsanguination. Autopsy revealed active vasculitis at the site of bleeding as well as focal glomerulonephritis. It seems likely that bleeding was due to vascular damage, ulceration, and local mucosal necrosis.

Hematologic Abnormalities.—Anemia was present in nearly one third of the cases but in most of these it could be attributed to gastrointestinal bleeding or associated renal failure. Abnormal hemolysins were not demonstrated in any of the cases. Leukocytosis, when present, was usually of moderate

degree with white blood cell counts between 11,000 and 20,000 with occasional exceptions. Leukopenia of significant degree was not recorded. Eosinophilia of greater than 5% occurred in about one fifth of the cases, and as might be expected, was usually encountered in those patients with histories of bronchial asthma, allergic rhinitis, or drug hypersensitivity. In a few instances, however, moderate eosinophilia was the only suggestion of allergy present.

Other Laboratory Abnormalities.—Elevation of the blood sedimentation rate was by far the most common finding in systemic vasculitis. In several instances the rate (Westergren) was more than 100 mm/hr, and in several instances the observation of a high sedimentation rate stimulated continuing search for its cause including tissue biopsy, thus leading indirectly to the diagnosis of systemic vasculitis.

Abnormalities of the serum proteins also were common, with elevation of the globulins the most common fault. Decreases in serum albumin also occurred, possibly as a result of albuminuria or loss of albumin from the circulation to interstitial spaces. When search was made for lupus erythematosus (LE) cells, none was found. Fluorescent antinuclear antibody tests were negative in five of the seriously ill patients. Results from liver-function tests were abnormal in three of six patients tested.

Prognosis.—Twenty-five of the 72 patients were known to be dead at the completion of the study and follow-up information was inadequate in 4. Forty-three patients were known to be alive from 12 to 132 months after the diagnosis of vasculitis was established.

None of the deaths occurred in the 3 patients 30 years of age or less, nine occurred in the 33 patients between the ages of 31 and 50, and 16 of 36 patients more than 50 years of age died.

The mortality rate and clinical course were favorably influenced by corticosteroid therapy. The relationships of treatment and outcome are summarized in Table 5.

Table 5. Prognosis in 72 Cases of Systemic "Allergic" Vasculitis

Outcome	Untreated	Treated With Corticosteroids	Total
Death			
Due to vasculitis	9	9	18
Other cause	—	7	7
Incomplete follow-up	2	2	4
Complete recovery	2	15	17
Continuing symptoms	4	22	26
TOTAL	17	55	72

Autopsies were performed in 17 of the 25 fatal cases. All of the untreated patients showed active focal or diffuse glomerulonephritis with evidence of vasculitis in various organs other than the kidney. Focal or diffuse glomerulonephritis was also evident in five of the seven patients autopsied who had received corticosteroid drugs. Death was due to causes other than vasculitis or its therapy in seven of the treated patients; four had leukemia that had been present at the time of diagnosis of vasculitis, two had carçinomas that were diagnosed more than three years after the diagnosis of vasculitis; and one died of coronary thrombosis. Autopsies were performed in three of these patients and there was no evidence of vasculitis present in any, but all had recently received corticosteroids.

Of the 43 surviving patients, complete recovery was noted in 17 with no apparent residual and no need for maintenance corticosteroid therapy. Corticosteroids had been used in 15 of these patients. They were used for periods of 1 to 3 months in nine patients; from 3 to 12 months in three; and in three patients for 24 months, 36 months, and 96 months, respectively. Only 6 of 17 untreated patients survived more than one year after diagnosis, while 37 of 55 of the treated patients were alive 12 to 132 months after diagnosis of vasculitis.

Symptoms continued in 26 cases, but it was difficult in some to determine whether or not they were related to the vasculitis. For example, in seven of the surviving patients in whom rheumatoid arthritis antedated the vasculitis by several years, joint symptoms continued, but in six additional patients mild joint symptoms persisted for from one to five years after they first appeared coincident with other manifestations of vasculitis. Three patients continued to require intermittent corticosteroid treatment because of recurrent episodes of bronchial asthma. In four cases there were recurrent rashes. There were two cases of chronic leukemia, three cases of chronic renal disease, and one case of chronic debility following multiple surgical operations necessitated by vasculitis of the small bowel.

The clinical course in cases with renal involvement was quite variable. In two instances complete remission of renal disease occurred, apparently influenced favorably by rather intensive corticosteroid therapy. In nine others, hematuria, albuminuria, and cylindruria persisted for months or even years without progressive renal failure. Moderate degrees of hypertension appeared in only a few instances but, except

in fatal cases, was not a prominent feature of the disease.

We have considered that the term periarteritis nodosa should be reserved for those cases of vasculitis in which there is clinical or pathological evidence, or both, of nodular inflammation of muscular arteries or arterioles. In this series there were 17 cases that fit this category. Most of them had a rapidly progressive disease with renal involvement and 12 deaths occurred, but five patients were known to be living from 24 to 132 months after the diagnosis was established and complete recovery was apparent in two of these.

Thirteen of our patients with drug-induced vasculitis and 25 patients with "idiopathic" systemic vasculitis were living from 15 to 132 months after the diagnosis of vasculitis was established; complete recovery was evident in 15. The clinical manifestations in these groups were quite similar in several respects to those in our cases of periarteritis nodosa.

Comment

In "allergic" vasculitis it is believed that large molecular complexes are formed by the union of antigen and antibody and these somehow become attached to endothelial cells in small blood vessels where local inflammatory reactions are induced, presumably because of release of irritating substances from affected cells. This is the nature of the Arthus phenomenon in experimental hypersensitivity and is probably responsible for serum disease and drug hypersensitivity reactions in man. In erythema nodosum, in which vasculitis occurs, bacterial or drug hypersensitivity is often evident. Just what the antigenic stimuli are in idiopathic forms of systemic vasculitis can only be surmised. Some cases are associated with rheumatoid arthritis and chronic leukemia, in both of which associated immunologic disturbances are commonly present. One may speculate that systemic vasculitis is an autoimmune disorder. Certainly, there are many hypersensitivity phenomena in this group of cases.

The diagnosis of periarteritis nodosa has long been associated with an ominous prognosis. There have been sporadic reports of cases of periarteritis nodosa with intermittent prolonged courses or apparent recovery. For many years following its original description periarteritis nodosa was considered to be a fatal disease characterized by involvement of multiple systems in the body and necrotizing and aneurysmal arterial changes resulting in cerebral, coronary, mesenteric, renal, and other vascular infarctions.[7] Later, it was recognized that there were localized and microscopic forms of the disease. Since the diagnosis of periarteritis nodosa is often based only upon postmortem observations, descriptions of clinical abnormalities in this disease have undoubtedly been unfavorably colored by the serious nature of the cases reported. Zeek pointed out certain differences between periarteritis nodosa and angiitis due to drug hypersensitivity, namely, that the necrotizing nodular lesions of periarteritis nodosa classically were to be found in large muscular arterioles near bifurcations or at the hilar regions of viscera, although small arterioles were involved at times as well, but the pulmonary circulation and spleen were usually spared; in contrast, in hypersensitivity angiitis only small arteries, capillaries and venules were involved and the lungs and spleen were frequently affected. All of Zeek's patients who had hypersensitivity angiitis died within a few weeks of onset. Our cases of drug-induced vasculitis certainly fit into Zeek's category of hypersensitivity angiitis except that most of our patients recovered. We would agree that periarteritis nodosa deserves to be considered in a special category because of its poor prognosis. There are, however, many other cases in our series that fit neither of these groups, and these may be designated as cases of idiopathic systemic vasculitis or, because of the implications of allergy, we have chosen to use the term systemic "allergic" vasculitis.

There were many similarities in the clinical findings in our cases of systemic vasculitis and those noted in systemic lupus erythematosus, the exceptions being that a high percentage of our cases were males in contrast to the incidence of 80% of cases of systemic lupus erythematosus in females; also, in our cases of vasculitis the average age was more than 50 years while lupus occurs chiefly in young people; finally, none of our cases showed a lupus rash, LE cells, or positive antinuclear antibody tests. Perhaps there is some as yet undiscovered relationship other than vasculitis between these disorders.

The manifestations of vasculitis depend upon a number of variables: the location and distribution of the lesions, the type and intensity of the reaction in the vascular wall, the location of the vessel, the duration of the disease, the persistence of etiologic agents in the body, and the degree to which the reaction may have been modified by therapy with corticosteroids. The summation of these variables at any one time in any individual determines the clinical picture. Because the variables may be combined in many ways a large number of clinical syndromes have been described. It seems likely that basic

pathogenic mechanisms may be similar in all cases. The important fact to recognize is that vasculitis is present. Rather than to attempt to pigeonhole the diagnosis into this or that syndrome, it would seem wiser to recognize that the patient has systemic vasculitis with this or that manifestation, to eliminate the cause if it is apparent, and to initiate corticosteroid therapy in full doses at once. In this manner, prognosis is apt to be improved. When periarteritis nodosa and its variants—allergic granulomatosis and Wegener's granulomatosis—are suspected, therapeutic efforts should be doubled.

The fact that manifestations of systemic vasculitis often persists for months or years after a single initiating allergic event suggests that an inherent susceptibility exists which becomes clinically manifest only after a triggering event. A similar mechanism has been suggested in cases of systemic lupus erythematosus that have been induced by therapy with hydralazine hydrochloride, trimethadione (Tridione), aminosalicylic acid, and other drugs. (The references may be seen in the original article.)

CROSS-SPECIES TRANSFER OF LEARNING: EFFECT OF RIBONUCLEIC ACID FROM HAMSTERS ON RAT BEHAVIOR

By Frank R. Babich, Allan L. Jacobson, and Suzanne Bubash, Department of Psychology, University of Calif., Los Angeles. *Proc NAS 54(5):1299–1302, November 1965.*

In two previous reports, we showed that if ribonucleic acid (RNA) was extracted from the brains of trained rats and injected into untrained rats, the latter then evidenced a marked tendency to perform the originally trained response, even though no reward was provided for this behavior. The response involved was approach to the food cup in a Skinner box upon presentation of a distinctive stimulus. The first of these papers showed that the transfer effect was strong and consistent; the second showed that the approach response transferred was specific to the stimulus (click or blinking light) employed during training of the donor animals and was not attributable to differential handling or box adaptation of the donor animals.

Ribonucleic acid has been implicated in memory functions in organisms as disparate as man and planarian. If the mechanism of memory is indeed this parsimonious, one might be able to transfer learning from one species to another. The present experiment investigated this hypothesis. In the fashion used in our earlier papers, one group of animals was trained, another group injected and tested. In this study the donor animals were hamsters and the recipient animals rats.

Subjects were 16 adult male hamsters weighing approximately 100 gm and 16 adult male Sprague-Dawley rats weighing approximately 220 gm. The rats were fed Purina Lab Chow for 1 hr per day during the course of the experiment. Hamsters received one hundred 45-mg Noyes pellets per day plus an hour of wet mash every few days and occasionally lettuce and carrots.

Eight hamsters received magazine training in a standard Grason-Stadler Skinner box; that is, they were trained to approach the food cup upon hearing the distinct click produced by operation of the pellet dispenser. Magazine training of hamsters proved to be somewhat more difficult than is magazine training of rats; and accordingly, the Skinner box was modified slightly to facilitate the process. Instead of being released by the food magazine, pellets were dropped by hand down a polyethylene tube to which a funnel was attached. The food magazine itself was emptied, but the click it produced was employed as the discriminative stimulus for approach to the food cup. Thus, the two components of training, click delivery and pellet delivery, could be controlled independently. A final modification of the box consisted of placing an aluminum floor over the grid bars to enable the hamsters to locomote more easily.

Magazine training was accomplished as follows. On the first day, a given hamster, deprived of food for 48 hr, was placed in the Skinner box and allowed to eat two 45-mg Noyes pellets which had been placed in the cup. Then, while the hamster was investigating the cup, the food magazine was operated a number of times in succession, producing a distinct click each time, and immediately after each click a pellet was dropped into the food cup. As training progressed, the click was withheld until the hamster moved first a short and later a longer distance from the cup. During this time, the hamster was permitted a number of interspersed cup investigations which were not preceded by the click and were not rewarded with food. On a few occasions, the hamster did not approach the food cup promptly when the click was sounded; in this case, no food was delivered.

Each hamster was given 100 food-reinforced approaches to the food cup per day for 5 days. On the whole, hamsters are more sluggish than rats, and a slightly lower level of performance was achieved than is typically obtained with rats. Still, by the end of training, each hamster approached the food cup

from most parts of the box when the click was presented, and the approach behavior of the animals was clearly under the control of this discriminative stimulus.

A control hamster was matched to each experimental hamster and was run simultaneously in an adjacent identical Skinner box. This yoked control animal received the click whenever the experimental animal did, but was not fed in the box. Instead, each control animal was given 100 pellets in a glass dish immediately upon being returned to its home cage at the end of a session.

On the day of completion of magazine training, each of the 16 hamsters was sacrificed with ether and the brain was taken out as quickly as possible. A cut was made on a line joining the superior colliculus to the rostral end of the pons. The tissue posterior to this cut was discarded, as was the tissue of the olfactory bulbs. The average weight of the tissue retained was 0.8 gm. RNA was then extracted from this tissue by the following procedure. The tissue was placed in a cold mortar with 5 ml of phenol (90%) and 5 ml of isotonic saline, and was ground with purified sand for approximately 3 min. The mixture was then centrifuged at 18,000 rpm for 30 min at 0°C. The aqueous phase was carefully drawn off to avoid contamination with phenol or with the interphase. The aqueous phase was then brought up to a concentration of 0.1 M $MgCl_2$ and 2 vol of cold ethanol were added to precipitate the RNA. Precipitation time was 15 min. The suspension was centrifuged at 6000 rpm for 15 min, after which the supernatant liquid was poured off. The remaining ethanol was evaporated off, and the RNA was dissolved in 2.0 ml of isotonic saline. The amount of RNA was determined from the optical density at 260 mμ (ε^P = 7450 in 0.2 M NaCl). The average yield was 2.0 mg/1.0 gm of tissue. In our earlier use of this extraction procedure, tests for protein and for DNA were negative.

Approximately 8 hr after extraction, the RNA from each of the hamsters, experimental or control, was injected intraperitoneally with a ¾-in 22-gauge needle into an untrained rat (the xiphoid process was used as a guide for the injection). Prior to injection, each of the rats had been adapted to the Skinner box (without the aluminum floor) for 4 days, 15 min per day, and during each session the magazine had been operated two separate times, producing a distinct click each time. No food was ever given to these animals during the adaptation series, although food powder was sprinkled lightly over the grid floor to keep the animals active and to counteract any tendency on the part of the rats to approach the food cup on the basis of residual odor.

The 16 injected animals, then, consisted of 8 rats which received RNA from trained hamsters and 8 rats which received RNA from untrained hamsters. These 16 rats were assigned code letters. All testing from this point on was conducted "blind"; the testers did not know the group membership of any animal until the completion of testing. The experimental and control rats were tested in a random sequence; a different sequence was used for each session.

A session of testing for a given rat consisted of placing that animal in the Skinner box, permitting 30 sec to elapse, and then delivering a series of five clicks (produced by operation of the food magazine), spaced no less than 30 sec apart. Five such testing sessions were given, at 6, 8, 10, 22, and 24 hr after injection. Each test animal thus received a total of 25 trials. At the beginning of testing, all rats were approximately 24-hr food-deprived. After the third test session, each rat was fed 4-5 gm of Purina Lab Chow.

A response on a test trial consisted of the rat's placing its nose inside a demarcated 63-cm^2 area surrounding the food cup, within 5 sec of click delivery. The food cup was located in one corner of the box, the floor of which had an area of 670 cm^2. That is, the rat had to approach to within a certain specified distance of the cup in order for a response to be counted. Further restrictions were placed upon the test trials as follows: two judges scored all trials independently, and a response was counted only if their tallies agreed; and trials were given only when the animal was facing away from the cup by more than 90°, was located at least a body length from the cup, and was not making gross locomotory movements. During testing, as during adaptation, food powder was sprinkled lightly over the grid floor.

A comparison of the two judges' tallies revealed that they agreed on 398 out of 400 trials, i.e., on 99.5 per cent of the judgments.

Table 1 presents the score for each test animal in terms of the number of cup approaches, as defined earlier, out of the 25 click-presentation trials. The mean number of responses for the experimental rats was 7.9; the mean for the control rats was 0.6. By a Mann-Whitney U test, the difference between the groups was significant at well beyond the 0.001 level. Total scores of the eight experimental rats for the separate test sessions, in order, were: 16, 12, 13, 12, 10.

Experimental animals, then, showed a significantly greater tendency than controls to approach the cup

Table 1

Total Number of Responses for Each Experimental Animal and Its Matched Control on the 25 Test Trials

Pair no.	Exptl. rats	Control rats
1	4	1
2	5	0
3	7	0
4	8	2
5	9	0
6	9	1
7	10	0
8	11	1

area when the click was presented. Since the control group was equated to the experimental group in terms of feeding, handling, and adaptation to box and click, these factors cannot be invoked to explain the results. "Learning" is sufficiently ill-defined that the possibility of a different interpretation of these results cannot be categorically rejected. Nonetheless, our several studies taken as a group suggest strongly that the effect being transferred is a specific learned response, and thus strengthen the hypothesis that RNA is an important element in the process of memory storage. Further, to the extent that a specific learned response is involved, the present experiment supports the notion that the mechanism of memory storage may be essentially identical in different species. This appears to be the case for at least two related species, the hamster and the rat.

Finally, although our experiments do not conclusively demonstrate that RNA is the effective agent in the transfer effect, this would certainly appear to be the most tenable hypothesis at present. Additional experiments with purified RNA preparations and with ribonuclease should answer this question.

DENTAL SECTION

DENTAL CORPS TRAINING

The Dental Corps Training Committee met in the Bureau of Medicine and Surgery in January 1966. The Committee was impressed by the large number of applicants competing for the available training billets. Although the Committee made some selections to training for FY 1967, it soon became clear that further deliberations would be necessary. Accordingly the names listed below are but a partial listing of those selected for training during the ensuing academic year. An additional listing will be published following further selections by the Committee.

Graduate and postgraduate dental education is in a time of rapid change and advancement. The period reflects the scientific "knowledge explosion" that is occurring world-wide. The dental profession and the population it serves is enjoying the benefits of this remarkable era. The U.S. Naval Dental Corps has not only been a recipient of these gains, but also has made notable contributions to both the scientific and the educational aspects of the period.

It is thus that the objectives of the over-all educational program of the Naval Dental Corps become delineated. Primarily, it has a responsibility to raise the educational level of the entire Corps from that which exists upon graduation from dental school. Secondly, it has the obligation of providing members of the Dental Corps with all the latest developments that may be applied to the clinical practice of dentistry. It has a third responsibility in providing accredited specialists to be made available for consultation and the treatment of challenging or unusual patients. A fourth responsibility is that of assuring the availability of sufficient qualified instructors to staff the various training programs conducted by the Naval Dental Corps. And fifth, but by no means least, is the obligation of providing the Dental Corps with a staff capable of conducting a research program related to the needs of the Navy.

From the above, it is obvious that the burden of responsibility placed upon the Training Committee is by no means light. It strives to distribute the training billets as equitably as is possible for the overall welfare of the Dental Corps. At the same time it endeavors to satisfy the individual desires of the applicants. It is regrettable that all applications cannot be fulfilled.

In order to meet the changing requirements of evolutionary educational concepts, the present Graduate and Postgraduate Programs at the Naval Dental School are currently under survey. This is being accomplished to fit the programs, in the most efficient manner possible, into the complexities of the changing world in which we live. At the same time, the mission of the Dental School in serving the aims and needs of the Naval Dental Corps will not be compromised.

All applicants for courses are, therefore, urged to

carefully consider their goals as related to the above philosophy prior to submitting requests for training. Applications should follow a carefully considered career plan of the individual officer that follows a realistic self-appraisal of his talents. For instance those applying for long courses in civilian institutions should be cognizant of the entrance requirements of most universities, for graduate study. Most graduate schools currently accept only applicants with a "B" average earned in pre-dental and dental school basic science courses. Accordingly, the applicant should tailor his request for advanced training in keeping with his known abilities and interest.

At present there are three levels of advanced training, which the applicant should consider:

1. The Graduate courses, Naval Dental School—Principally for applicants motivated for Board certification, or for subsequent graduate training in a civilian institution.

2. The Postgraduate courses, Naval Dental School—For applicants desirous of refresher training or increased competence in a clinical specialty.

3. The Postdoctoral Fellowship Program—Principally for junior officers to obtain earlier advanced training in a clinical specialty or research field. Secondarily for other officers who desire increased competence in a specialty field, without attending the formal postgraduate courses of the Naval Dental School.

To correct a popular misconception that exists, it should be stated that the Graduate and Postgraduate Courses at the Naval Dental School are not a prerequisite for promotion. The hard-charging, capable, clinical operator stands an equal chance, all other factors being the same.

Accordingly, each officer in the Naval Dental Corps is urged to assume his responsibility in the full realization of the significant part he plays in the overall mission of the Corps. Non-selection to a course of instruction is not to be considered a reflection on an individual or his career. Simply put, there are not enough training billets for each applicant.—Dental Division, BuMed.

OFFICERS SELECTED FOR FY 1967 TRAINING TO DATE

Oral Surgery Training

LCDR R. D. Baker	Second Year Residency
LCDR O. V. Hall	Second Year Residency
LCDR E. G. Mainous	Second Year Residency
LCDR H. O. Scharpf	Second Year Residency
CDR S. M. Smith	Second Year Residency
LCDR D. D. Albers	First Year Residency
LCDR J. H. Charles	First Year Residency
LCDR D. E. Hayes	First Year Residency
LCDR J. (n) Koutrakos	First Year Residency
LCDR E. J. Messer	First Year Residency
LT T. E. Bollinger	Postdoctoral Fellowship
LT W. J. Fitzpatrick	Postdoctoral Fellowship
LT W. S. Harrison	Postdoctoral Fellowship
LT J. M. Mathers	Postdoctoral Fellowship

Prosthodontic Training

LCDR K. E. Brown	Long Course, Civilian Institution
LCDR D. N. Firtell	Residency
LCDR D. M. Grove	Residency
CDR D. L. Johnson	Residency
LCDR L. E. Mark	Residency
LCDR N. D. Wilkie	Residency
CDR T. L. Whatley	Residency
LCDR G. W. Eastwood	Postdoctoral Fellowship
LT T. L. Hurst	Postdoctoral Fellowship
LT J. C. Kelly, Jr.	Postdoctoral Fellowship
LT J. W. Porter	Postdoctoral Fellowship

Periodontic Training

CDR R. J. Chutter	Long Course, Civilian Institution
LCDR R. C. Edwards	Long Course, Civilian Institution (2nd year)
LT S. V. Holroyd	Long Course, Civilian Institution (2nd year)
LCDR J. J. Lawrence	Long Course, Civilian Institution
LCDR M. R. Wirthlin	Long Course, Civilian Institution
LCDR C. J. McLeod	Residency
LCDR J. R. Russell	Residency
LCDR M. Brenyo, Jr.	Postdoctoral Fellowship
CDR E. J. Heinkel	Postdoctoral Fellowship
LT W. G. Housley	Postdoctoral Fellowship
LCDR A. G. Iandolo	Postdoctoral Fellowship
CDR R. H. Orrahood	Postdoctoral Fellowship
LCDR B. E. Pines	Postdoctoral Fellowship
LCDR E. J. Trusz	Postdoctoral Fellowship
LT A. R. Vernino	Postdoctoral Fellowship

Endodontic Training

LCDR R. N. Dodds	Residency
LCDR J. S. Kitzmiller	Residency
LCDR T. H. Chapman	Postdoctoral Fellowship
CDR B. F. Kresl	Postdoctoral Fellowship
LCDR M. Nissenson	Postdoctoral Fellowship

Dental Science and Research Training

LT E. P. Leonard	Postdoctoral Fellowship
CDR W. B. Shreve	Postdoctoral Fellowship
CDR H. D. Tow	Postdoctoral Fellowship

Public Health/Preventive Dentistry Training

CDR L. A. Counsell	Long Course, Civilian Institution

PERSONNEL AND PROFESSIONAL NOTES

REQUEST FOR JOURNAL OF PROSTHETIC DENTISTRY. The Dental School needs the following copies of the Journal of Prosthetic Dentistry:

1963 Vol. 13 Nos, 1, 2, 3, 4, 5, 6
1964 Vol. 14 Nos. 1, 2, 3, 4, 5, 6
1965 Vol. 15 Nos. 1, 2, 3, 4, 5, 6

If anyone has any or all of these editions he would donate to the School, please contact the Commanding Officer, U.S. Naval Dental School, National Naval Medical Center, Bethesda, Maryland 20014.

DENTAL OFFICER PRESENTATION. CAPT J. F. Link DC USN, Chief of Dental Service, U.S. Naval Hospital, Great Lakes, Illinois, presented a lecture entitled "Hospital Dental Service and Training in the Navy," before members of the U.S. Naval Reserve Dental Company 9-16, on Thursday, 27 January 1966, in Evanston, Illinois.

ORAL CANCER CONFERENCE. Two naval dental officers attended the Oral Cancer Conference, Houston, Texas, 21-23 January 1966. CAPT V. J. Niiranen DC USN, Assistant Chief, Dental Division, Bureau of Medicine and Surgery, represented the American Academy of Maxillofacial Prosthetics. CAPT H. H. Scofield DC USN, Head, Oral Pathology Division, Naval Dental School, represented the American Academy of Oral Pathology. Those two officers respectively are president of those two academies. Sponsored by the Cancer Control Branch of the Division of Chronic Disease, U.S. Department of Health, Education and Welfare, the program was devoted to all aspects, from public and professional education, through surgical intervention, to rehabilitation. CAPT Niiranen presented a paper on the history of the American Academy of Maxillo-

facial Prosthetics and described plans for a workshop scheduled for 12-16 September 1966. Captains Niiranen and Scofield participated in panel discussions.

PROFESSIONAL MEETING. Navy Dental Corps Officers from the U.S. Naval Training Center, Great Lakes, Illinois, presented table clinics at the 101st Midwinter Meeting of the Chicago Dental Society at Chicago, Illinois on 27-28 February - 1-2 March 1966.

"Use of Acrylic Prosthetic Teeth for Crown Veneers"

LT W. J. Sweeney DC USNR

"Indirect Crown and Bridge Technique Check-Bite Method"

LT S. J. Chaconas DC USNR
LT F. H. Farrington DC USNR

"The Class V Gold Foil"

CAPT L. M. Armstrong DC USN
LCDR T. J. Lommel DC USN
LCDR G. T. Ballard DC USN
LCDR R. G. Schonbrun DC USNR
LT J. M. Burgette DC USNR
LT J. R. Schaefer DC USNR
LT M. T. Cornell DC USNR
LT R. G. Ottosen DC USNR
LT J. L. Shaw DC USNR

"Great Lakes Caries-Free Study"

CAPT S. Hoffman DC USN
LCDR J. P. Quinn MSC USN
LT P. B. Carroll DC USN

"Dental Office Asepsis"

LCDR R. W. Longton DC USN

"Preventive Periodontics"

CDR C. F. Rau DC USN

DENTAL OFFICER APPOINTMENTS. CAPT Philip J. Boyne DC USN, has been appointed an examiner, and member of the Advisory Committee, of the American Board of Oral Surgery. With this appointment, two naval dental officers will serve this Board.

CAPT Donald E. Cooksey DC USN, is President of the Board. CAPT Boyne is Director, Dental Research Department, Naval Medical Research Institute; and CAPT Cooksey is District Dental Officer, 6th Naval District.

CAPT Gordon H. Rovelstad DC USN, has been appointed to the Committee on Research, American College of Dentists, for a five year term. With this appointment, two naval dental officers will serve on this Committee. CAPT C. A. Ostrom DC USN, was appointed in 1963. CAPT Rovelstad presently is Director, Dental Research Facility, Administrative Command, U.S. Naval Training Center, Great Lakes, Illinois. CAPT Ostrom is Head, Professional Branch, Dental Division, Bureau of Medicine and Surgery.

KNOW YOUR DENTAL CORPS

The Dental Department of Marine Corps Air Station, Iwakuni, Japan, is housed in a nine dental operating room clinic with one room being devoted to prosthodontics and another to oral surgery. There are three dental officers and two dental technicians in the station allowance. Spaces for approximately six dental officers and ten dental technicians are made available to the 11th Dental Company, 1st Marine Aircraft Wing which is based at Iwakuni when not deployed. The Commanding Officer, 11th Dental Company has additional duty as Station Dental Officer. The station, in addition to providing treatment for Marine, Navy and Army personnel, also serves a large number of dependents who have accompanied their Navy sponsors overseas.

Iwakuni is located in Yamaguchi Prefecture approximately 25 miles southwest of Hiroshima on the southern coast of the principal island of Honshu. It is an interesting city of 100,000 population. The Marine Corps Air Station occupies the site of the former Japanese Imperial Naval Air Station on a delta between two rivers (Imazu and Monzen) which flow into the Inland Sea at this point. The climate is temperate with heavy and prolonged rainfall occurring from the latter part of May until late July. The terrain in this area is mountainous with little level land and few beaches.

At the conclusion of World War II, Iwakuni was occupied by the United States Marine Corps. In March 1948, the Royal Australian Air Force assumed command. With the beginning of the Korean War in June 1950, the U.S. Air Force started to operate from here, along with U.S. Navy Squadrons and Fleet Air Wing Six. The Air Force assumed command of the base on 1 April 1952. Then in 1954, Iwakuni became a U.S. Naval Air Station; but the Navy relinquished command to the U.S. Marine Corps in 1958, and on 1 January of that year the base was commissioned Marine Corps Air Facility, Iwakuni, Japan. The designation was subsequently changed in 1962 to U.S. Marine Corps Air Station.

The water supply of the dependent's housing area has fluoride added and a base-wide fluoridation system is being planned. In addition to Navy dental

technicians, two Japanese female dental assistants perform preventive dentistry treatments.

Japanese dentists are frequent visitors. Tours of the dental clinic are arranged for local Japanese dental societies.

The Commanding Officer of the 11th Dental Company is on the Special Staff of the Commanding General, 1st Marine Aircraft Wing. He is cognizant of Wing dental matters and attends all staff conferences. Of particular importance in planning is the matter of training and equipping the Dental Company for deployment. At the present time, the 11th Dental Company has over 60% of its personnel deployed in the Republic of Vietnam.

PREVENTIVE MEDICINE SECTION

PLAGUE IN DANANG, VIET NAM, 1965

LCDR P. F. D. Van Peenen MC USN, Officer-In-Charge, U.S. Navy Preventive Medicine Unit in Viet Nam, Dec 14, 1965.

First Report of Plague in Danang, 1965

I. *Introduction.*

A case of Bubonic Plague in a Vietnamese civilian was diagnosed and reported by the Danang Civil Hospital on 19 September 1965. From that date until 18 November 1965, the date of admission of the last human plague case, the U.S. Navy Preventive Medicine Unit (PMU) maintained careful plague surveillance studies in the Danang area. Results of these studies, including rodent surveys, are incorporated in the present report.

II. *Epidemiology.*

Prior to 1956, the past history of plague in Danang is unknown. Since 1956, when the first nationwide report was published, no cases had been reported from this area, and Quang Nam Province was considered uninfected at the time of writing the 1 October 1964–31 August 1965 annual Progress Report of the U.S. Army Medical Research Team, Vietnam (USAMRTV). The possibility of importation of the disease into this province was recognized in that and other reports.

The plague focus in Danang appears centered around the railroad and marketing area. Interviews with several plague patients revealed that a number of dead or moribund rats had been sighted in this area prior to onset of human illness. Ratfalls occurred about 10 days prior to illness.

III. *Clinical.*

Most patients complained of fever, malaise and inguinal tenderness. One 57-year old female had what appeared to be an infected flea bite on the anterior right lower leg. On 19 September 1965, 3 febrile hospitalized patients were examined and found to have tender inguinal buboes. There were *2 fatal cases in September,* but since that time all patients reportedly responded well to intravenous fluids and antibiotic therapy consisting of 1 Gm streptomycin twice daily, 3 Gms sulfathiazole daily and chlormycetin 2 Gms daily. A *total of 62* individuals were studied at the Civil Hospital during the *3 month period: 20 of these were considered to be confirmed plague cases* (Table 1).

IV. *Laboratory.*

Laboratory work was performed at the Danang Civil Hospital under the supervision of a senior U.S. Operations Mission technician, Miss Racheal West. Bubo aspirates were taken from all suspect patients and stained with Gram stain and methylene blue. Aspirates positive by smear were also studied by

TABLE I. Patients Examined at Danang Civil Hospital

Month	Total Patients Examined	Number of Positives	Deaths
15-30 September	34	10	2
October	15	6	0
1-15 November	13	4	0

culture, and sub-cultures inoculated onto modified Stewart's medium for further study at the USAMRTV in Saigon. In many cases, it was possible to obtain acute sera, but convalescent sera could not be drawn since patients did not return to the hospital after discharge. Table II shows results of laboratory studies performed by Miss West, the PMU and the USAMRTV.

TABLE II. Laboratory Results of Danang Civil Hospital, PMU and USAMRTV

Month	Bubo Smears	Broth Culture	Bacteriological Confirmation	Hemagglutination Titers
September	9 Pos 24 Neg	8 Pos 1 No Growth	No specimens obtained from Civil Hospital	1 (1:16) 2 Neg
October	4 Pos 5 Neg	5 Pos	2 Pos 1 Unconfirmed	1 (1:32) 8 Neg
November	4 Pos 9 Neg	4 Pos	No specimens obtained from Civil Hospital	No specimens obtained from Civil Hospital

V. *Rodent Studies.*

A rodent survey program was initiated by the PMU shortly after announcement of the first plague case. Rodents were trapped using locally purchased live wire traps baited with bacon. Rodents were anesthetized with chloroform, identified as to species, bled from the heart and combed for fleas. Museum preparations were made from approximately one third of the specimens and forwarded to appropriate museums. Fleas from the same species and area were pooled in sterile normal saline; flea pools and spleen snips were preserved by freezing and eventually tested by mouse inoculation at the USAMRTV in Saigon. Sera were examined for hemagglutinating antibodies to *Pasteurella pestis* at the USAMRTV. Seriological and bacteriological procedures are believed to be standard and will not be described.

Between 20 September and 15 November, 291 rodents, representing 8 different species, were examined. Three rodents, representing 3 distinct species, *Rattus norvegicus, R. exulans, and R. rattus subsp.* had hemagglutination titers of 1.8 against plague antigen. These titers are considered significant for plague experience. Spleens from 2 *Rattus norvegicus* were positive for *P. pestis.* All flea pools were negative.

The only fleas encountered were *Xenopsylla cheopis,* the oriental rat flea and usual plague vector. *Rattus norvegicus* was more heavily infested than other rodent species. Although as many as 18 fleas were collected from one individual, the average animal had only 1–3 fleas. In September, 15% of *Rattus* caught had oriental rat fleas; in October and November the percentages were 10% and 32% respectively.

VI. *Control Measures.*

Between 15 September and 29 October 1965, 143,000 Vietnamese civilians were immunized against plague by means of vaccine procured from the Institute Pasteur de Saigon. Immunizations were given by teams from the Agency General for Health and Development. This same Agency undertook residual insecticiding with a water emulsion of DDT and DDT dust in areas surrounding the central plague focus. No rodenticiding was attempted. Families and close contacts of plague patients were offered sulfathiazole prophylaxis. No U.S. military control measures were thought necessary.

VII. *Discussion.*

The occurrence of plague in Danang was not unforeseen, and fortunately the present episode was either self-limited or effectively controlled. Since the monsoon rains commenced shortly after the onset of this outbreak, it is possible that climatic conditions contributed to its rapid termination.

Because of rodent infection within U.S. Military compounds, and because of the present unsettled condition of many Vietnamese civilians including refugees in this area, it seems wise to continue surveillance studies.

THE USE OF ISONIAZID AMONG HOUSEHOLD CONTACTS OF OPEN CASES OF PULMONARY TUBERCULOSIS

Egsmose, T., Ang'Awa, J. O. W. and Poti, S. J., Bull World Hlth Org 33:419-433, Summary, 1965.

A total of 125 rural households were divided at random into 2 groups; the 376 contacts from the first group were given placebo tablets and the 399 contacts from the second group isoniazid tablets. Each household had a tuberculosis index case excreting tubercle bacilli detected in the sputum smear by direct microscopy and by culture. The 2 contact groups were, at the time of commencement of the study, comparable in respect of age, size of household, tuberculin sensitivity and other criteria. The majority of the contacts were under 15 years of age and this corresponds to the age distribution in the general population. The prophylactic isoniazid was in the first instance prescribed for 1 year; the drug was distributed at three-monthly intervals and was taken in a single daily dose ranging from 5 to 10 mg per kg of body-weight. The intake to the study took place over 2 years and the observation period was 2–4 years.

During the first year of medication a remarkable effect of isoniazid was found. Adverse findings were observed in 28 of the contacts in the control group, as compared with only 6 in the isoniazid group. A more precise expression of the isoniazid effect as in terms of tubercle bacilli excretors. In the control group 17 contacts began to excrete tubercle bacilli during the first year, whereas only 2 did so in the isoniazid group. In addition, 6 out of the 7 controls who excreted tubercle bacilli initially continued to be excretors, in contrast to the 4 initial excretors in the isoniazid group, all of whom were cured. In the subsequent period, after the first year, adverse findings were revealed in 4 contacts in the control group and in 3 in the isoniazid group. The number of observations during this period is small and, therefore, possibly not representative. Neither during the first year nor during the whole period of observation did the tuberculin reactors without pulmonary lesions appear to benefit to any significant degree from isoniazid.

There is good reason for believing that the prophylactic effect of isoniazid observed during the first year of medication gives an indication of the benefit that would be obtained if a similar isoniazid scheme were integrated into a tuberculosis control program. One-third of a contact case per household (average 6.2 contacts) was prevented from excreting tubercle bacilli. Thus, prophylactic isoniazid has to be administered to 19 contacts in order to prevent 1 contact case.

SIGNIFICANCE OF DIFFERENCE IN INCIDENCE RATES OBSERVED IN CONTROL AND ISONIAZID GROUPS

Initial status	During first year of study	Control group		Isoniazid group		Significance of the difference at the 5% probability level
		Incidence Rate (%)	SE	Incidence Rate (%)	SE	
Tuberculin non-reactors	Tuberculin conversion	13.19	3.13	5.68	2.07	Significant
	Development of pulmonary lesions	4.32	1.95	1.86	1.09	Not significant
	Excretion of tubercle bacilli	3.78	1.53	0.00	0.00	Significant
Tuberculin reactors	Excretion of tubercle bacilli	1.60	0.87	1.04	0.72	Not significant
Pulmonary lesions (active and inactive)	Excretion of tubercle bacilli	21.43	8.08	0.00	0.00	Significant

COXSACKIE GROUP B VIRUS INFECTIONS

Malcolm S. Artenstein, et al, Washington, D.C., Ann Intern Med 63:597–603, 1965, Mod Med 34 (2):126–127, Jan 17, 1966.

Coxsackie group B virus infections are often associated with pleurodynia epidemics; aseptic meningitis, orchitis, pericarditis, abdominal pain, grippe, or exanthem occurring in patients who have been exposed to a patient with pleurodynia; and neonatal myocarditis. During epidemic dissemination of Coxsackie viruses, patients should be carefully observed in order to differentiate pulmonary or myocardial infarction, appendicitis, or other disease with similar symptoms. Since few signs and symptoms are characteristic of Coxsackie viruses alone, laboratory confirmation is necessary.

Aseptic meningitis is the commonest diagnosis and pleurodynia is next most frequent. Myocarditis, occasionally accompanied by pericarditis, is relatively mild in adults but can be fatal in newborn infants. Abdominal symptoms occur most often in patients less than 10 years old; pleurodynia is rare in children less than 6 years of age. Testicular involvement occurs only after puberty. Coxsackie virus infections are most prevalent from May to November and are unusual at other times of the year in temperate climates. Although as many as 5 serotypes have been implicated over a wide geographic area, a single serotype usually predominates in a given year.

Data are based on study of 180 patients in whom Coxsackie group B viruses were isolated.

SALMONELLA SURVEILLANCE—1963

Virginia Dept of Hlth Morbidity Rpt for week ended 19 Dec 1964.

The national program for salmonellosis surveillance was formalized on 1 January 1963. A summarized report of the first year of salmonella surveillance (28 December 1962–27 December 1963) was recently released. Reported human isolations of salmonella totaled 18,649 during 1963. In the United States, the peak incidence occurs in late summer or early autumn. The peak month is October; the month of lowest incidence is February. During 1963, 124 of the 900 known serotypes were isolated from humans. The age group most often infected was one to four years. The highest attack rate was in those under one year. The mortality rate for salmonella was estimated to be 0.34 percent.—Sanitation Section, PrevMedDiv.

SHIPBOARD COCKROACH INFESTATION

COMSERVFORLANT Information Bulletin II:E–2, E–3, June 1964.

A cockroach infestation aboard a COMSERVLANT ship necessitated the formation of an unusual "hunter-killer" group for the specific purpose of eradicating the roach infestation. It was discovered that the infestation was particularly prevalent in inaccessible spaces behind flashing, false bulkheads, and coverings that had been installed in the interest of eye appeal and habitability, but unfortunately turned out to be excellent hiding and breeding places for roaches.

The "hunter-killer" group, after a thorough study of the situation, decided on an all out attack on poor sanitation. Every effort was made to eliminate the most minute residues. Food preparation and serving areas were meticulously cleaned after each meal. Garbage cans were washed after each use. Installed galley equipment was repositioned to facilitate cleaning and eliminate roach harborages. Storage racks were designed to be easily removable for cleaning. Flashing behind sinks was eliminated. Counters and table tops were rebuilt eliminating overlapping seams and hidden corners which would harbor roaches. Old and infested insulation was replaced and carefully sealed. The soft drink machine was suspended from the overhead to eliminate another troublesome roach harborage. Mixers, meatsaws, and similar equipment were disassembled down to the smallest component and thoroughly cleaned after each use. THE RESULTS OF THESE ACTIONS—A CLEAN AND ROACH-FREE SHIP.

It is strongly recommended that all ships examine their cleaning and sanitation procedures with eradication of cockroach infestation as a goal. No amount of insecticide will be effective unless coupled with good sanitation. False bulkheads and coverings should be designed to eliminate roach harborages. An "All Hands" effort in establishing and maintaining good sanitation will result in a roach-free ship.—Sanitation Section, PrevMedDiv.

METHEMOGLOBINEMIA—NEW YORK CITY

Morbidity and Mortality Weekly Rpt, HEW, Communicable Disease Center, Atlanta, Ga., 13(49):430, Dec 11, 1964.

Five infants in a newborn nursery developed methemoglobinemia due to exposure to aniline dye.

On Oct. 13, a resident physician in a New York City hospital noticed that 2 infants in the newborn nursery had become cyanotic in appearance. Additional cases were searched for, and a total of 5 infants were discovered to be cyanotic. A blood sample was taken from one of the affected infants which contained 67% methemoglobin. Following this, all of the cyanotic infants were treated with concentrated oxygen and intravenous methylene blue.

It was observed that the diapers the cyanotic infants were wearing had been freshly labeled and a definite phenolic odor was noted. These diapers had been clearly labeled with heavy ink stain across the entire surface. Because of an urgent need for diapers, and contrary to regulation, these diapers had been autoclaved rather than boiled prior to use. The dye contained 30% aniline. The situation was remedied by boiling all of the diapers and no further cases occurred.

Editor's Note: There have been several previous outbreaks of methemoglobinemia in newborn infants due to cutaneous absorption of aniline dye in freshly stamped diapers. The first reported outbreak dates back to 1886, in London, England. (Rayner, W.: Cyanosis in Newly Born Children Caused by Aniline Marking Ink, Brit Med Jour 1:294, 1886).

A CASE OF MULTIPLE BEE STINGS

Murray, J. A., Central African Jour of Med 10(7):249–251, July 1964. Abstract in Trop Dis Bull 62(1):56, Jan 1965.

Survival following 2,243 stings by the common honey bee *Apis mellifera* is reported in this paper: the previous maximum number of stings survived is 600. The victim, a European male, aged 30 years, was walking along a river bank when he was attacked without warning or provocation and the upper half of his body was covered in a layer about 3 inches thick. He dived into the river, but the bees continued to sting him. Headache, burning abdominal pain, persistent vomiting and diarrhea with incontinence ensued. He covered his head with his shorts but the bees stung through the material; he then plastered the shorts with mud but had to leave a hole for air, which the bees soon found; finally, he kept his mouth close to the hole biting the bees as they flew in. Despite having to swallow many bees, he had no difficulty with respiration. He was in the water 4½ hours being stung continuously and was ultimately found on the water's edge in a shocked and exhausted condition. The pulse was rapid and thready. The face, scalp, neck, trunk and upper limbs were black with stings and the hair matted with dead bees. There was considerable facial edema but he could see and talk. Response to intravenous hydrocortisone was satisfactory and after 5 days he was discharged from the hospital. He was later accidentally stung by a bee without any allergic reaction.

The clinical picture illustrated the histamine effect: no haemolytic, haemorrhagic or neurotoxic effects were evident. Stings should be scraped as forceps may express further venom from the sac which remains attached to the sting. Tincture of iodine locally and adrenaline for systemic treatment are the drugs of choice. Analgesics should be used in low dosage if the blood pressure is low.

DICHLORVOS TESTED AGAINST *A. AEGYPTI* IN VIRGIN ISLANDS

Vector Control Briefs, HEW PHS, Issue No. 15:11, Aug 1965.

Thirty-two treatments of 20% dichlorvos resin-plastic dispensers were installed in 18 cisterns in Charlotte Amalie, St. Thomas, Virgin Islands, at rates of ¼, ½, 1, 2, or 3 dispensers per cistern. Satisfactory mortalities of caged adult female *Aedes aegypti* were obtained for 2 to 6 weeks at these dosages with the dosage of 3 dispensers per cistern giving the most effective kills (4 to 6 weeks). A bioassay technique utilizing third instar larvae and chemical analyses of samples of the cistern water at no time indicated dichlorvos levels in the water to be greater than 0.1 ppm with most of the determinations at or below detectable limits of 0.01 ppm.

KNOW YOUR WORLD

Did You Know?

That 533 cholera cases with a total of 32 deaths were reported by the USSR to the World Health Organization from 21 August to 13 September 1965? (1)

That about 75,000 persons were stricken with malaria after "Hurricane Flora" whipped through Haiti in October 1963?

The epidemic started 6–8 weeks after the hurricane and completely wiped out gains that may have been made by 2 years of spraying with DDT accord-

ing to the National Malaria Eradication Service, Port-au-Prince, Haiti. (2)

That 2,922 cases of tuberculosis were reported for the first 38 weeks of 1965 in Belgium?

This showed a decrease of about 3% as compared over the same period for the preceding year. In addition, there were 74 cases of diphtheria reported and 22 cases of tetanus; proving that immunization still has not reached 100% of the population. (3)

That although rabies was eradicated from Uruguay in 1945, an epizootic erupted in August 1965 in Montevideo and environs, with 2 human deaths due to rabies and a total of 158 canine cases by 11 December 1965?

By 31 December, 27,199 dogs had been vaccinated and 4,419 eliminated. The control program is being expanded and intensified in 1966. (4)

That 116 bronchial asthma patients have been reportedly successfully treated in the salt mines in Poland?

Patients spend 4 hours a day in the treatment chambers of the mines, 417 to 703 feet underground. Treatment is in 30 sessions over a period of 6–8 weeks. The beneficial effect of the salt mine atmosphere is attributed to the increased CO_2 pressure (0.1 to 0.2%), which stimulates the asthma patient's respiratory center and peripheral chemoreceptors. This stimulation, in turn, increases respiratory volume and improves oxygen saturation of the circulating blood. The salt aerosols present in the mine atmosphere reduce the total number of positive ions that have been implicated in the pathology of bronchial asthma. These patients had bronchial asthma, chronic upper respiratory diseases, allergic catarrh, chronic bronchitis, bronchiectasis, pulmonary emphysema, or protracted pneumonia. It is further reported by the Polish doctors that laboratory tests show that salt mine therapy decreases the number of leukocytes and eosinophilic granulocytes, and roentgenograms show improvement or disappearance of the inflammation in pulmonary tissue. Remissions last from 6 months to 5 years. Plans are being made to install underground chambers so that future patients can sleep there at night and spend the daylight hours above ground. (5)

That there is a world shortage of derivatives of the cinchona bark?

Supplies of quinine and quinidine are imported from the Netherlands, Germany, Indonesia, and Latin America. While Latin America actually grows a tremendous number of trees of the cinchona family, the content of anhydrous quinines in them is less than the normal 3% expected in the bark of good cinchona trees. Only Bolivia has trees rich in alkaloid growth, but at present produces only about 100 tons of bark. Newer sources are being developed in the western hemisphere, such as Nicaragua, etc. In Indonesia and the Congo, changes in plantation ownership have been hindering the harvest of the prefered product. Twelve to eighteen years are required to grow a prime tree for supplying the best bark. Several American producers are spending a great deal of money on research to find the best methods for producing acceptable synthetic quinine and quinidine preparations, and to develop new compounds which could duplicate the action of quinine salts. (6)

That there are 3 principal theories as to the cause of Reiter's disease?

These are reported to be: infection by an unidentified virus; infection by pleuropneumonia-like organisms (PPLO); and hypersensitivity of a delayed type of *Neisseria gonorrhoeae* or, perhaps, such organisms as *Shigella dysenteriae*. Investigations were carried out on the first two theories, and virological studies were undertaken in 24 instances, including 7 of Reiter's disease. (7)

That industry lost 10 million man-days in 1965, with an estimated loss of 200 million dollars because of allergies of production personnel?

The Allergy Foundation of America believes the annual loss is closer to 400 million dollars. (8)

REFERENCES

1. JAMA 195(6): 509, 7 Feb 1966 (Med News, London, 31 Dec 1965).
2. USDHEW PHS Rpt 80(2): 120, Feb 1965.
3. JAMA 195(1): 55, 3 Jan 1966.
4. WHO WKLY EPID Rpt (PASBU) XXXVIII(5): 23, 2 Feb 1966.
5. Med News World 6(47): 28-29, 17 Dec 1965.
6. JAMA 195(2): 153, 10 Jan 1966.
7. Clinical Med 73(1): 54-55, Jan 1966, (Reiter's Dis: Microbiologic Studies).
8. Mass Dept of Publ Hlth, "This Wk in Publ Hlth," 15(1): 2, 3 Jan 1966.

OPERATIONAL MEDICINE SECTION

TUBERCULOSIS CONTROL

With the discovery of streptomycin and isoniazid, the treatment of tuberculosis was greatly simplified. The use of these chemotherapeutic agents, however, has not simplified the overall problem of tuberculosis control.

Tuberculosis continues to be an important health problem in the Armed Services. It is a special problem in the Navy where men are aboard ships in close quarters for prolonged periods of time. A patient with an active case of tuberculosis aboard a vessel can infect many shipmates before he is diagnosed and hospitalized.

If tuberculosis is ever to be eradicated, the disease must be discovered early before the patient becomes infective. The Navy's program for tuberculosis control and prevention has been diffusely outlined in various instructions and directives. BUMED Instruction 6224.1B which deals with tuberculosis prevention is currently being rewritten. This revision will bring together all directives on the subject into one instruction. In addition new policies, methods, and procedures will be promulgated in this instruction.

The revised form will be officially released in the near future. However, since tuberculosis is such a pressing problem a brief preview of the instruction is presented.

1. Tuberculosis is a highly infectious disease of insidious onset and progression. For this reason, a patient who becomes infected may not develop symptomatic disease for a year or even longer. Part of this time, however, he is infecting others; and so the cycle continues.

2. This viscious circle must be broken. This is best done by periodic surveillance of all naval personnel and by vigorous contact studies when an index case is discovered. The new BUMED Instruction 6224.1B contains several important modifications from the previous program.

3. Several changes regarding skin testing have been made. A positive tuberculin reaction is redefined. A diameter of induration greater than 9 mm at 48 to 72 hours after administration of tuberculin PPD shall be considered a positive reaction rather than 5 mm of induration.

4. Tuberculin skin testing of Navy and Marine Corps reserve personnel reporting for active duty in excess of 30 days is now required.

5. Only the Mantoux technique is to be employed in skin testing individuals 6 years of age and older. The multiple puncture technique is permitted in children under the age of 6.

6. Finally, annual tuberculin skin testing is recommended when practical on all personnel with previously negative skin tests. Such an annual surveillance program would result in detection of minimal early disease and prevent the progression of tuberculosis to an infective state.

7. The greatest modification is in regard to contact studies aboard a ship. In the past, "intimate" contacts were men in the patient's division or other close social contacts of the patient. Due to experience gained from the past, in the new instruction it is recommended that the *entire crew* be placed in a contact study when a case of tuberculosis is discovered aboard a ship. The contact study will consist of periodic chest X-rays and skin testing.

8. When personnel included in a contact study are transferred, it is imperative that the next duty station be properly notified. Such notification should include data regarding isoniazid prophylaxis, skin test reactivity, and dates of future testing.

9. Because of the high incidence of tuberculosis in the indigenous population of South Viet Nam, the threat to Navy and Marine Corps personnel in that area is quite serious. All personnel should have a base-line tuberculin test upon arrival. It is also recommended that tuberculin negative individuals be skin tested every 6 months while on duty in the area. If conversion of the skin test occurs, then BUMEDINST 6224.1B should be consulted for proper disposition.

10. The ultimate goal of tuberculosis control is the eradication of the disease. It is only by aggressively applying the latest and most effective established principles and techniques of tuberculosis control that this will be accomplished.—Tuberculosis Control, PrevMedDiv.

EDITORIAL DESK

AMERICAN BOARD OF OB-GYN

SPECIAL NOTICE

The date of the next Part I (written) examination has been changed and is now scheduled for *Friday, July 1, 1966, at 2:00 P.M.*

Admittance Slips indicating where to report for examination will be sent several weeks in advance to all candidates scheduled for the Part I examination. Candidates are urged to inform the Board office of any change in address.

Applications to take the Part II examination February 20–25, 1967 will be accepted during April or May, 1966. Each application is to include a duplicate list of patients dismissed from all hospitals during the twelve months immediately preceding the month of application.

Current Bulletins and application forms may be obtained by writing to the office of the Secretary,

Clyde L. Randall MD
Secretary and Treasurer
American Board of Obstetrics and Gynecology
100 Meadow Road
Buffalo, New York 14216

DOCTORS SHAW AND SUMMITT SHARED HONORS

On 7 January 1966, twenty-eight medical officers graduated from the School of Submarine Medicine, a department of the U.S. Naval Submarine Medical Center, U.S. Naval Submarine Base New London, Groton, Connecticut.

CAPT Walter A. McGuinness, USN, delivered the commencement address. CAPT McGuinness is the Commanding Officer, U.S. Naval Submarine Base New London, Groton, Connecticut. He was introduced by LCDR Julio C. Rivera, MC USN, Director of the School of Submarine Medicine. Diplomas were presented by CAPT McGuinness. Lieutenants James O. Shaw and James K. Summitt were the honormen of the class. Doctor Shaw is a native of Pontiac, Michigan and is married to the former Elizabeth Asher of Pontiac. They reside with their son in Ledyard, Connecticut. He graduated from the University of Michigan Medical School and has been ordered to the Gold crew of the USS James H. Polk, homeported in Groton, Connecticut.

Doctor Summitt, a former Navy pilot from Searcy, Arkansas and a graduate of the University of Tennessee Medical School, was nominated to receive the Surgeon General's Award. He was selected just prior to graduation on the basis of academic and personal performance grades attained in the daily pursuit of his studies. His leadership qualities and military competence were also considered. The award in the form of a Certificate of Recognition was presented by CAPT Charles L. Waite, MC USN, Commanding Officer, U.S. Naval Submarine Medical Center.

Doctor Summitt received the Surgeon General's Award in absentia, since an operational assignment with the Blue crew of the USS Casimer Pulaski required LT Summitt's departure prior to graduation. Five other members of the class graduated with distinction: LT Charles S. Crummy, LT Donald J. Jarzynski, LT Dan A. Kelly, LT William E. Powers and LT Robert D. Staub, all of the Medical Corps. Other graduates were:

LT Anthony P. Belmont
LT Robert L. Bonsanti
LT Robert F. Brill
LT Donald R. Eisert
LT Robert F. Gomez
LT G. William Hays
LT Norman M. Heyman
LT Michael J. Logan
LT August D. Kropp
LT Joseph D. McLaughlin
LT David K. Miller
LT Shelby W. Miller
LT Presley J. Mock
LT Larry W. Piebenga
LT Charles N. Reed III
LT James W. Reid
LT William A. J. Ross
LT James P. L. Schmidt
LT Robert H. Wheelock
LT William F. Wieting

All twenty-eight of the graduates were assigned to Polaris submarines. While on their initial assignment as Submarine Medical Officers, they may earn their "dolphins", thereby adding "qualified submariner" to their file. To accomplish this, they must receive the recommendation of their Commanding Officer, publish a thesis pertaining to submarine or diving medicine, satisfactorily complete a comprehensive examination, and serve three months in a submarine or diving billet.

Submarine Medicine is the military medical specialty which supports all underwater operations in the Navy. This includes providing medical services to the crews of all submarines, deep sea divers and underwater swimmers. In general the practice of submarine medicine can be considered a combination of general practice, occupational medicine and research.—U.S. Naval Submarine Medical Center, U.S. Naval Submarine Base New London, Groton, Connecticut.

GROUND-BREAKING CEREMONIES JACKSONVILLE, FLA.

Ground-breaking ceremonies for the 7 million dollar 400 bed U.S. Naval Hospital at Jacksonville Naval Air Station were held Saturday, February 5 at 4 o'clock in the afternoon.

RADM Robert O. Canada, Jr., MC USN, Deputy and Assistant Surgeon General and former Commanding Officer of the Naval Hospital (1961–1962) was the first to turn over a spade full of earth. He was followed by Congressman Charles E. Bennett, a senior member of the House Armed Services Committee and the keynote speaker for the ceremonies. RADM Edward C. Kenney, MC USN, retired Surgeon General of the Navy and a former Commanding Officer of this hospital (1955) also turned over a spade of earth.

Other Navy, government and community officials on hand to witness the ceremony were RADM H. H. Caldwell, Commander Fleet Air Jax; CAPT J. R. Mackroth, Commanding Officer NAS Jax; CAPT James A. Hiegel, Public Works Officer, NAS Jacksonville and Resident Officer-in-Charge of Construction; Mayor Louis H. Ritter; William S. Johnson, Naval Consultant to the Jacksonville Chamber of Commerce; and James D. Holmes III, President of the Jacksonville Chapter of the Navy League.

U.S. Representative Charles E. Bennett of Florida in delivering the main address said there was a great need for new military hospitals to replace those overaged and temporary of which we have many.

CAPT R. V. Berry, MC USN, Executive Officer of our hospital, was the master of ceremonies and CAPT W. S. Baker, Jr., Commanding Officer, gave the welcoming remarks and introduced the distinguished guests.

The 400 bed, eight story hospital will occupy 2 acres and will replace the present 34 temporary World War II buildings now occupying about 50 acres. The firm of Reynolds, Smith and Hills are the architects and engineers for the new hospital. The construction contract was awarded to W. E. Arnold Company of Jacksonville and it is expected that the structure will be completed in late 1967 or early in 1968.—U.S. Naval Hospital, Jacksonville, Florida.

BRONZE STAR TO HM3 GALBALLY

Hospital Corpsman Third Class Thomas E. Galbally USN, was a recent recipient of the Bronze Star Medal with Combat "V" for his actions while serving with the Third Marine Division at Da Nang, Viet Nam.

The accompanying citation read in part; "On the night of 9 August 1965 the Battalion Command Post was subjected to a sudden and intense mortar attack. Reacting immediately, Galbally proceeded to a tent which had received a direct hit. Seemingly oblivious to the incoming fire, he immediately commenced to administer first aid to the wounded occupants of the tent. By his skillful application of pressure and tourniquets, Galbally was able to keep alive a seriously wounded officer who had received multiple shrapnel wounds and was bleeding profusely. Continuing his lifesaving efforts, he accompanied the wounded officer during the five mile evacuation trip to medical facilities. HM3 Galbally's exceptional professional ability, inspiring devotion to duty and courageous actions throughout were in keeping with the highest traditions of the United States Naval Service."

The award was forwarded by the Commanding General, Fleet Marine Forces, Pacific, and presented in the name of the President of the United States by CAPT J. W. Albrittain MC USN, Commanding Officer, U.S. Naval Hospital, St. Albans, New York.

Galbally is a native of Auburn, New York where he was graduated from Auburn East High School, later attending the University of New York. He is the son of Mr. and Mrs. James Galbally of 12 Bradford in Auburn. HM3 Galbally is currently a member of the St. Albans Naval Hospital staff where he works in Neurosurgical Service.—U.S. Naval Hospital, St. Albans, N.Y.

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