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1. PURPOSE: To provide information of interest and assistance to medical service of the US Armed Forces in RVN.

2. GENERAL: This headquarters does not necessarily endorse the professional views or opinions that may be expressed in this pamphlet apart from official notices. The contents of this pamphlet are not directive in force.

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ARMY MEDICAL SERVICE VIETNAM AS VIEWED BY GENERAL WILLIAM C. WESTMORELAND

The following article is a portion of the address made by General William C. Westmoreland, Chief of Staff, United States Army, on 22 August 1968 at the National Convention of the Disabled Veterans, Philadelphia, Pennsylvania.

"It is a high compliment to be invited to speak at the National Convention of the Disabled American Veterans and a great personal pleasure to be here.

Your organization was founded in 1921, three years after "the war to end all wars." Since that time our country has been called on again and again to face new and greater crises. It has met and conquered every single one because it has always had men who are personally and individually equal to any challenge, no matter what the cost. Your membership is drawn from this kind of men -- men who demonstrate every day of their lives that the greatest attribute a human being can show is an unbroken spirit.

There is another human attribute which we all cherish. I refer to the desire to see that the fellow who follows after us gets along a little better than we did. This is really the sum and substance of what we mean when we talk about progress. We hope for better things for our children. We want people to have better working conditions, better homes, and finer care when they are ill. I believe this splendid attribute shows more plainly among people who themselves have known suffering.

With that idea in mind, I thought I would talk to you tonight about some truly great progress that has been made in two areas in which we share a common interest. I refer to the present-day medical treatment of the American soldier and of the work that is being done to help the people and the government of South Vietnam provide aid for their heroic veterans. In conclusion, I will want to say something about the young man coming out of the Armed Forces today.

It is axiomatic that the Army considers people its most important asset, so it follows that his health and well-being are prime considerations. The progress we have made in weapons and equipment has been more than matched by advances in the medical treatment afforded our soldiers, both under normal garrison conditions and on the battlefield. In fact, it has been said -- and I am inclined to agree -- that our soldiers can count on more immediate medical treatment on the edge of the jungle than their families can expect to receive in the average hospital outpatient clinic.

In Vietnam today, the American soldier wounded in battle has the best chance of survival of any war to date. The mortality among wounded admitted to medical treatment facilities is extremely low -- less than three percent. The more seriously wounded casualties are reaching treatment facilities, alive, so that they may receive the full benefits of modern American medicine.

Among the major factors contributing to this outstanding accomplishment are helicopter evacuation, ready availability of whole blood, highly skilled medical teams, well-equipped forward hospitals, and effective management of medical resources. But without effective helicopter evacuation, it would be difficult to exploit the other factors cited, so we have to attribute a lot of credit to the helicopters and their valiant crews.

The greatly increased use of helicopters in Vietnam for the rapid evacuation of wounded brings many patients to surgery and definitive care much earlier than was previously possible. At the same time, by this procedure some mortally wounded patients, whom no skill or care can save, are reaching hospitals alive. In earlier conflicts they would have died on the battlefield and been considered and counted among the "killed in action". Despite this, the case fatality rate for the wounded who are admitted to medical treatment facilities is not higher but is, rather, slightly lower than that of the Korean War.

Army helicopter ambulance units are strategically placed in South Vietnam to provide a network coverage of the entire area of operations. The request for air evacuation is normally made by the medical aid man at the site of the casualty. The call is placed over a radio net and is received by the supporting air ambulance unit. Quite frequently the call is received by an air ambulance already in flight which may be diverted from a less urgent mission.

Once the pickup is made, the patient is flown directly to the medical treatment facility best situated for the care that is required. The inbound medical aircraft commander informs the receiving hospital by radio of his time of arrival, the nature of the casualties on board, and any special reception arrangements that may be indicated. Thus the receiving hospital is able to have everything in order to receive the casualty and immediately provide surgical care.

No soldier in Vietnam is more than 35 minutes away from a medical facility capable of giving definitive, resuscitative lifesaving treatment. There is no group in Vietnam that is more heroic, nor more highly regarded, than the gallant medical crews of the helicopter evacuation system. It is a major factor in the high morale of Army troops in Vietnam.

In many cases, patients are evacuated directly from Vietnam by air to the United States, a trip that takes only 25 hours, including four hours

ground time.

Advanced surgical techniques have saved many lives and prevented a great deal of suffering in Vietnam. One such technique is blood vessel surgery, which, even as late as the Korean War, was used only rarely. In Vietnam, it is commonplace, significantly reducing the number of amputations. Advancement in the art of resuscitation and treatment of severe shock by the use of whole blood and electrolytes have enabled our medical officers to save many additional lives.

No sketch of the medical picture in the Army today -- even one as brief as this -- would serve if it did not include mention of the medical aid men who are found with each unit in the field. They play a key role in caring for our fighting men. I am sure that each of you is fully aware of their dedication -- the drama of lifesaving which begins with these brave men moving shoulder to shoulder in the thick of battle with the foot soldier.

Nor does the dedication and professionalism stop there. The medical technicians and wardmasters play important roles at each level of treatment. They assist skilled doctors and nurses in giving each patient the finest professional care. So, from the battlefield to our finest hospitals, an endless chain of dedicated people serve courageously and tirelessly to care for our fighting men.

The American soldier deserves the best medical care and treatment we can give him -- and he is getting it."

LETTER RESPONSE TO THE FOREGOING ADDRESS

Dear General Westmoreland:

I was very favorably impressed with your speech dated 22 August 1968 at the National Convention of the Disabled American Veterans at Philadelphia, Pennsylvania -- and particularly your description of how the wounded soldiers of the U. S. Army in Vietnam are taken care of by first-aid, evacuation by helicopter and treatment at a medical facility within an average of 35 minutes. This is reassuring information. I wish the American people knew more about this modern way of treating our wounded soldiers.

After reading your speech, I discussed it with a close friend who was a World War I medical officer, I asked him to tell me his experience with evacuating and treating wounded soldiers in World War I. The contrast between 1918 and 1968 is so astounding that I asked him to write a few lines -- and I am sending them herewith to you for whatever use you care to make of them.

Your appearances before conventions of ex-service men may take your time and energy, but I have read each one sent me by the Army Chief of Information and want to compliment you. You have a unique way of telling the Vietnam story -- and it is doing a lot of good in building wholesome public opinion.

With warm personal regards.

Sincerely,

/s/WILBER M. BRUCKER
Penobscot Building
Detroit

ARMY MEDICAL EQUIPMENT 1918 VERSUS 1968

The recent speech by General William C. Westmoreland, Army Chief of Staff, before the National Convention of the Disabled American Veterans at Philadelphia, Pennsylvania, on 22 August 1968, contains a reassuring picture of the Army's modern medical equipment to care for our wounded soldiers.

Looking backward 50 years, it can be seen that we are living in a different world -- speaking medically. In Vietnam we are fighting a guerilla war of movement rather than one of static fixed fronts in comparatively treeless territory. The methods of evacuation of wounded in 1918 were those of our Civil War of 1865 -- using litter bearers from trenches to the immediate rear, then mule drawn ambulances to collecting station from which, after a period, motorized ambulances became available to transport to field hospital or evacuation or base hospitals. These vehicles could use the roads and sometimes the open country when roads were taken over by ammunition trucks.

Our first ambulances, Fords, arrived after 3-4 months in France. Of the four ambulance companies in the 42nd Division the new cars were to be received by only two companies at first. To the consternation of the Michigan Company (168th Ambulance Co.), the motors were assigned to the Tennessee and Oklahoma companies, whom we considered more familiar with mules than motors. We protested to Division Headquarters and someone there appreciated the feelings of men from the motor city, and changed the orders.

In a way the primitive equipment met the needs of static trench warfare since shell-pocked roads were more negotiable for the mule drawn ambulance. However mules may be perverse, they die, lose their shoes, slip on icy hills and must be shot. And assembling a knocked down ambulance whose holes do not fit the bolts on an icy railroad platform is an expe-

rience not to be forgotten.

Certainly we now have available the experience of World War I, World War II, and Korea, which was not available in 1918. Also available are planes, helicopters, mechanical equipment and all kinds of other equipment for communicating and transporting quickly. The fluid nature of most of the operations in Vietnam permits the great use of helicopters for the rescue and transport of wounded in a manner not possible in trench warfare where many guns would have range and sight.

Medical treatment for the Army has advanced 1,000 years since 1918. As General Westmoreland points out, the medical aid man in the unit has effective means of help today that were not at all available in 1918 -- blood transfusion for one. Today there are plenty of communication facilities upon call for transportation -- often within a few minutes.

As for a comparison, at Epieds, north of Chateau Thierry in 1918, some of our wounded were brought in with maggots in the wound, indicating long delays in being able to retrieve the wounded. In the area at our collecting station several score litter cases were often spread around -- awaiting transportation to the rear -- to Coulommiers -- 60 kilometers -- possibly by motor ambulance and often by empty ammunition wagon. Some would be sent to the railroad at Chateau Thierry after traversing the main highway, which was under fire for nearly a week. Such delays created unforgettable incidents. At Epieds my sergeant informed me that the next patient in line for transport to Coulommiers (60 K.) had asked that others be sent in his place. I removed his head bandage and found no top to his skull. His judgment was good -- he did not need the long ride. He died right there at Epieds within an hour.

We can all get satisfaction from the efficiency of the Army and its medical service in the handling of our wounded, and I respect General Westmoreland for the great military task he has performed and for his appreciation of the human side of the man behind the gun.

ARLINGTON F. LECKLIDER, MD
848 Berkshire Road
Grosse Point Park
Michigan 48230

Dr. Arlington F. Lecklider was a former captain in the 168th Ambulance Company of 117th Sanitary Train, 42nd (Rainbow) Division during World War I.

Care begins in the field -

11

- and continues aboard the helicopter.

Arrival at the medical treatment facility -

- for definitive care

VC/NVA MEDICAL EVACUATION SYSTEM

521st Medical Detachment (Intel)

The following is a presentation of a type of VC/NVA evacuation system:

The various echelons of medical evacuation are displayed in Diagram 1. Although this diagram is specifically for one NVA division, the plan holds true through both VC and NVA medical evacuation.

The time between stations may vary somewhat depending on the locality, but in general the average walking times are shown.

The wounded person is moved to the field collecting point by two buddies (3-man cell system). In the 3-man cell system all of the troops are broken down into groups of three. If one member of a group is wounded, the other members of the group are responsible for evacuating him to the rear. The field collection point is usually 300 meters from the area of contact and is selected prior to battle, and in a direction opposite to the intended routes of escape. Only minimal treatment is available at the field collection point. Evacuation to the battalion then is a walk of about two hours' duration. However, the average time from initial wounding to the battalion dispensary is 8 - 12 hours. Definitive surgical care is not available until the regimental dispensary is reached, which is a walk of another 5 - 8 hours. The average time from initial wounding until definitive surgical care at the regiment dispensary is available is between 36 and 160 hours. The division dispensary is equal in size and capability to the regimental dispensary and is used in the same manner.

In this example, rear echelon medical units consist of five B-3 front hospitals, three having a 1000-bed capacity each and being 50% mobile. One has a 1000-bed capacity but is a permanent installation. The fifth installation has at least 2000 beds and has all medical and surgical specialties available and a psychiatric ward.

The four smaller hospitals are approximately equidistant from each other on a north-south line thus facilitating handling of mass casualties and hospital overloading.

Medical evacuation is the responsibility of the battalion surgeon. Various contrivances are used to move injured patients. The most common way is the pole with underslung hammock carried by two people. This method is somewhat facilitated by slinging the pole over two bicycles as shown in Diagram 2. This particular illustration was captured from the VC. Where canals and navigable streams are available, sampans are used. From rear areas motorized vehicles may be used.

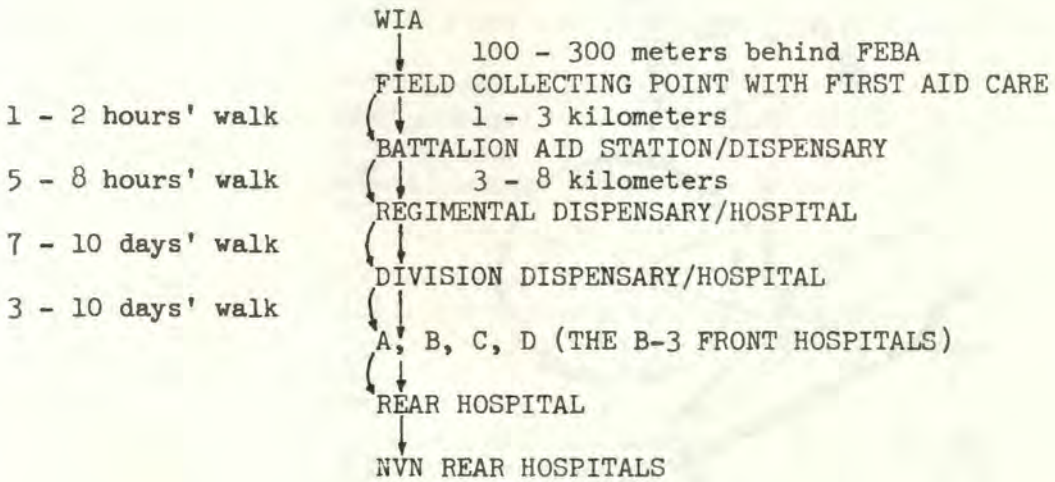
The battalion dispensary is the first level of evacuation where professional medical care is available to the wounded man. Here triage of the wounded is first performed.

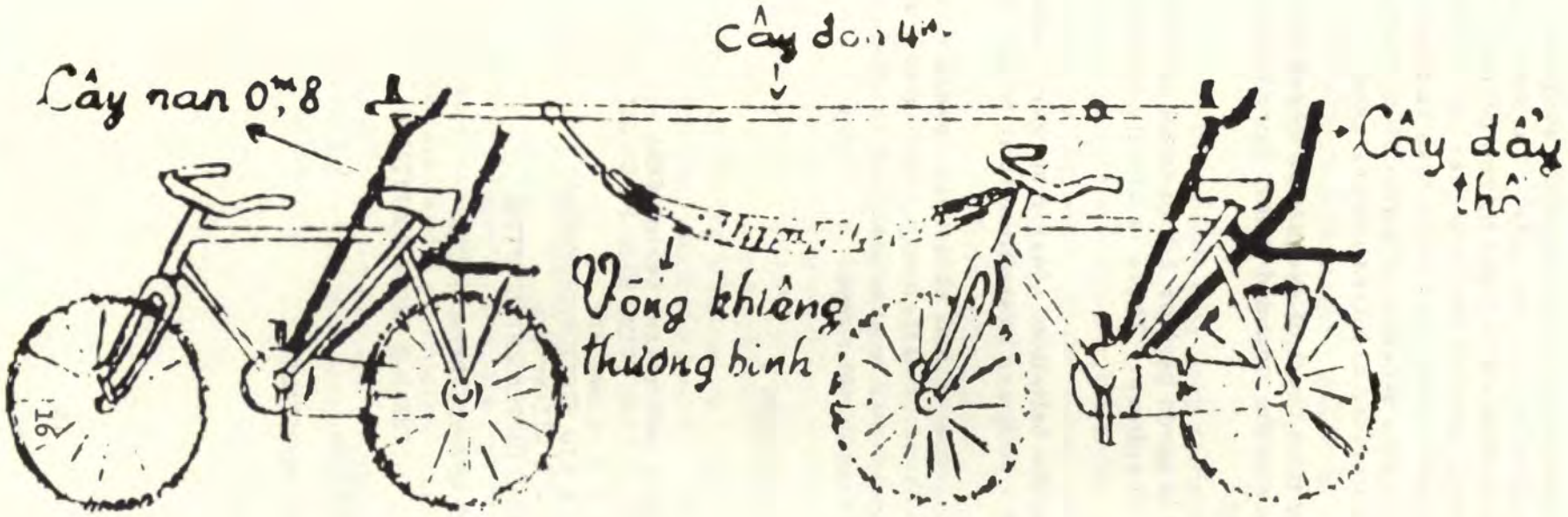
The treatment at the battalion is given by 1 or 2 Y Si (medical technicians), 4 - 8 nurses, and 8 - 20 aidmen. There is usually no Bac Si (doctor) at this level.

Only simple surgery is done at the battalion. Major surgery is performed at regimental level, another 8 - 12 hours' evacuation time to the rear.

Resuscitative equipment and pharmaceutical shortages severaly hamper even a well trained Y Si at the battalion dispensary. Only small amounts of intravenous fluid volume expanders are available and no whole blood. Thus patients in shock are frequently not saved.

DIAGRAM I





CẤU TRÚC, THIẾT KẾ XE THỒ TẢI THƯƠNG

MALARIA IN MILITARY PERSONNEL ON RECUPERATIVE LEAVE (R&R)

CPT Harvey A. Reback, MC*
CPT Bruce F. Boklan, MC*

Malaria causes more loss of duty time in Vietnam than any other medical or surgical illness including battle wounds. In an effort to minimize this loss, all Army personnel are required to take prophylactic malaria tablets. The chloroquine-primaquine (C-P) tablet is given weekly to all military personnel in Vietnam. Certain units are required to take, in addition, 25 mg of diaminodiphenyl-sulfone (DDS) daily.

It was noted that a large number of patients were being admitted to the 6th Convalescent Center directly upon return from out-of-country Rest and Recuperation (R&R). This study was attempted to define a relationship between the occurrence of symptomatic malaria and the discontinuation of chemoprophylaxis while on R&R.

Between May and September 1967 fifty patients with malaria were admitted to the 6th Convalescent Center directly upon return from R&R. All were interveiwed and requested to complete a questionnaire relative to malaria chemoprophylaxis.

One hundred and forty-five healthy asymptomatic individuals returning from R&R were requested to complete a questionnaire and served as the control group.

Results:

A malaria diagnosis was made on 50 patients; 28 had falciparum, 18 had vivax, 1 had malariae, and 3 had both vivax and falciparum infections.

Thirty-eight patients (64 percent) maintained they were well on commencement of R&R. Eleven (22 percent) were ill before they left. One patient did not respond to the question. Of those who became ill while out of the country 23 (60 percent) became symptomatic between the third and fifth days.

Only 21 (42 percent) of the group contracting clinical malaria were instructed to continue their prophylaxis while on R&R whereas in the control group 105 (72 percent) were given proper instructions.

Similarly, C-P tablets were given to thirteen patients (26 percent) before departure as compared with 90 (62 percent) in the control group. Fourteen patients (28 percent) were given DDS tablets as were 50 men (35 percent) in the control group.

* Formerly assigned to the 6th Convalescent Center, Cam Ranh Bay, Vietnam

Tables I and II illustrate the relationship between acquisition of symptomatic malaria and utilization of the chemoprophylactic medication. Only 13 percent of those developing clinical malaria had taken the C-P tablet during R&R. In contrast 62 percent of those who had returned in good health had taken the medication.

Table I

Relationship Between the Development of Symptomatic Malaria and the Use of C-P Tablets on R&R

Took C-P Tablets		Patients*	Did Not Take C-P Tablets	
Number of Patients			Number of Patients	
3	(8%)	Falciparum	22	(56.5%)
1	(2.5%)	Vivax	9	(23%)
0	(0%)	Malariae	1	(2.5%)
1	(2.5%)	Vivax and Falciparum	2	(5%)
5	(13%)	Total	34	(87%)
90	(62%)	Control	55	(38%)

Table II

Relationship Between the Development of Symptomatic Malaria and the Use of DDS on R&R

Took DDS		Patients*	Did Not Take DDS	
2	(5%)	Falciparum	22	(58%)
2	(5%)	Vivax	8	(21%)
1	(3%)	Malariae	0	(0%)
1	(3%)	Vivax and Falciparum	2	(5%)
6	(16%)	Total	32	(84%)
38	(28%)	Control	99	(72%)

* Only those patients who were not ill on departure and who responded to the question are included.

The results with DDS are less striking; although 84 percent of those who missed DDS returned with malaria, 72 percent of those who did not acquire

malaria also missed the DDS tablets.

Table III compares the various prophylactic regimens used with the acquisition of malaria. As can be seen, the combination of DDS and CP was shown to be no more effective than C-P itself. The figures with the DDS alone are too small to draw any conclusions.

Table III

Types of Prophylaxis Used in Patients With Malaria and in the Control Group*

	DDS	C-P	C-P and DDS	None
Falciparum	1	5	1	21
Vivax	2	2	4	10
Falciparum and Vivax	1	1	0	1
Malariae	1	0	0	0
Subtotal (Patients)	5	8	5	32
Control Group	3	51	34	49
Total	8	59	39	81
Percent of Total Acquiring Malaria	63%	14%	13%	40%

* Only those subjects responding to the questions on both C-P and DDS are included.

Conclusions:

Malaria is in large measure a preventable disease. A significant cause of malaria break-through during out-of-country R&R is the direct result of interruption in weekly chemoprophylaxis. The study suggests that the chloroquine-primaquine tablet has significant value in preventing both falciparum and vivax malaria. No such prevention was demonstrated for the sulfone.

All personnel should be oriented to the need for continuing malaria chemoprophylaxis at the R&R Processing Center and assuring that the departees receive a supply of C-P tablets. According to the study, this is a prominent deficiency. Patients who are ill should be treated prior to departure for both immediate medical and public health reasons.

All personnel returning to CONUS for DEROS, emergency leave or 30-days leave prior to extension of tour should be instructed of the necessity for eight weeks of further prophylactic therapy.

OPERATION SAFESTEP: AN APPROACH TO THE PROBLEM OF DERMATOLOGICAL DISEASES IN A RIVERINE ENVIRONMENT

LTC Travis L. Blackwell, MC*
CPT Peter R. Duca, MC**
CPT Timothy F. Hickey, MC***
CPT Philip S. Ellerin, MC****

The 9th Infantry Division has been operating in the inundated delta region of the Republic of Vietnam for 15 months. The greatest medical problem of this hostile environment is dermatological disease. Most significant in terms of magnitude and man-combat days lost is fungal disease involving the feet and ankles. This is followed by bacterial disease, pyoderma and "tropical ulcers." The third, but relatively minor problem, is immersion foot. More man-combat days are lost in this division during the monsoon season because of foot diseases than for any other reason including IRHA. In October 1967, 2,818 man-combat days were lost.

Of greater significance to operations is that the noneffective rate is proportional to length of exposure. After 72 hours of operations in a riverine environment, the noneffective rate may reach as high as 30%. Thus, the method of operation of the riverine battalions is generally to have a stand-down for drying out every fourth day. This is generally followed except when in contact with the enemy. Thus, the noneffectiveness from dermatological diseases is at about 40%.

In the early months of operations of this division, mycotic skin infections were poorly understood. This disease was thought to be primarily a problem of tropical immersion foot. However, a commission headed by Dr. Harvey Blank, Chairman of Section on Cutaneous Disease Armed Forces Epidemiological Board, investigated dermatological diseases in Vietnam in October 1967. They clearly identified the chief problem as a superficial mycotic infection due to T. mentagrophytes, which is a common soil contaminant. [1]

Early efforts to control this disease were chiefly curtailment of operations as has already been described. Silicone ointment[2] and a boot constructed chiefly of a fabric with an open mesh weave were tried and found not to be useful. [3]

*Division Surgeon, 9th Infantry Division
**Preventive Medicine Officer, 9th Infantry Division
***Special Projects Officer, 9th Infantry Division
****Dermatologist, 9th Infantry Division

Because of the magnitude of the problem and unsuccessful control, an organized, coordinated, systematic program was planned by the Division Surgeon's Staff, 9th Infantry Division, and approved by the Commanding General, 9th Infantry Division; Deputy Commanding General, United States Army, Vietnam; and Surgeon, United States Army, Vietnam, then forwarded to the Department of the Army and Surgeon General for approval and assistance. The goal of this program is to provide unlimited tactical operations to the 9th Infantry Division and by the knowledge gained to any type field Army operating in riverine warfare.

This program was called Operation Safestep. Basically, there are three broad programs: (1) basic research into the etiology, pathogenesis, and treatment of the fungal skin disease; (2) environmental research to help determine the best type of uniform, socks, and boots to help prevent skin disease; (3) institution and exploitation of proven prevention measures.

Funding for material in the program was obtained by means of ENSURE action. The primary operational agency is the 9th Infantry Division, but other agencies with aspects of the program which are beyond the capability of the division to perform are as follows: United States Army, Vietnam Surgeon (overall supervision, technical advice, and assistance as is needed in vector research and laboratory facilities); United States Army, Vietnam G3 Section (project officer); Army Materiel Command; Natick Laboratories, Clothing and Organic Materials Division (construct prototypes of boots, socks, and clothing); The Surgeon General; United States Army Medical Research Unit, Presidio, California (technical assistance, cooperative studies, histopathological examination and coordination study of soil and water).

The program was divided into 3 phases: Phase I--Planning: approval, coordination among agencies, funding, preliminary studies to clarify the problem, construction and development of facilities, method of operation for an infantry division in a combat environment, and more effective institution of the known preventive measures within a division. Phase I was completed within two months.

Significant accomplishments in the first phase, besides organization, planning, and funding, were two very important basic studies. The first of these was a study on griseofulvin prophylaxis in the prevention of fungal disease. The second was an attempt to produce the disease by prolonged immersion in clean water and exercise in a clean environment. The results of the second experiment were similar to what was reported by Blank, et. al.[4]

Another major accomplishment during the first phase was exploitation. of known preventive measures. A foot education and conditioning program was started at Reliable Academy, the indoctrination and training center for the 9th Infantry Division. Unit surgeons were updated on diagnosis and treatment through technical letters and personal visits by the division surgeon's staff; all feet were examined and a conscientious program of clearing up minor problems was instituted. A division regulation was adopted presenting command responsibility and giving detailed measures to be employed. The battalion commanders were given lectures by the division surgeon. The basic allowance for socks was tripled and authority given to battalions to launder and exchange them as a daily issue. Laundries were visited and checked and approved by the Commanding General, 1st Logistical Command. The total impact of the program is a decreased incidence early in the rainy season, based on our experience of one year ago.

We are now in Phase II of the program. By performing 18 different studies, we are hopeful of obtaining enough basic information to go into Phase III before the rainy season ends. This is the control of dermatological diseases by knowledge gained through the other phases of the program. Continued success with this program should greatly reduce an extensive medical problem that has thus far been a significant limiting factor on the strategy and tactics employed in the delta. Lessons learned from this study will be incorporated into future military training programs at all levels. This, in turn, should prove to be another important landmark in the Medical Corps' efforts "To Conserve The Fighting Strength."

REFERENCES

[1]Blank, H., Zaras N., and Taplin, D. Unpublished report of the Dermatological Team of the Commission on Cutaneous Disease from its visit to Vietnam.

[2]Taft, F. H. Personal Communication.

[3]Unpublished study performed in January 1968 by the 20th Preventive Medicine Unit and 9th Infantry Division Surgeon

[4]Blank, H., Zaras N., and Taplin D. The Role of Temperature in Tropical Immersion Foot Syndrome, J. A. M. A., 202, pp. 210-12

FILARIASIS IN NATIVE RESIDENTS OF THE REPUBLIC OF VIETNAM

LTC Charles R. Webb, Jr., MC*
CPT Edward J. Colwell, MC*
CPT Joel Brown, MC*
1LT Duane Armstrong, MSC*

Introduction:

Filariasis is a chronic parasitic disease of the tropics caused by a member of the superfamily, Filarioidea. Members of this group infecting man may be characterized as follows:

1. The thread-like adults inhabit the tissues of body cavity of a vertebrate host where oviproduction takes place.

2. Microfilariae are the product of oviposition.

3. Microfilariae are either sheathed or unsheathed.

4. All microfilariae must pass through a development stage in a blood-sucking vector (intermediate host) before they become infective to man (definitive host). Table I lists the filariae of human importance.

Table I

HUMAN FILARIOIDEA, INSECT VECTORS, MICROFILARIA FEATURES, ADULT HABITAT AND GEOGRAPHIC PREVALENCE OF DISEASES

Representative Species	Insect Vectors	Sheath	Adult Habitat	Geographic Prevalence
Wuchereria bancrofti	Mosquitoes	Present	Lymphatics	Widespread in tropics, Spain, Turkey.
Brugia malayi	Mosquitoes	Present	Lymphatics	India, SE Asia, China, Korea, Japan, Indochina, Malaya.

*United States Army Special Forces - Field Epidemiology Survey Team, Walter Reed Army Institute of Research (Vietnam), APO 96243.

Representative Species	Insect Vectors	Sheath	Adult Habitat	Geographic Prevalence
Onchocerca volvulus	Black Flies	Absent	Subcutaneous tissue	Africa, Mexico, Central America, South America
Loaloa	Deer flies	Present	Subcutaneous tissue	Tropical Africa
Mansonella ozzardi	Midges	Absent	Body cavities	Central and South America
Acanthocheilonema perstans	Midges	Absent	Body cavities	South America, Africa, New Guinea

During World War II filariasis resulted in evacuation of thousands of man-days[2].

Wartman reported his experience with 268 men who experienced acute filariasis following exposure on the Samoan and Society Islands[3]. The average duration of hospitalization required for these men was sixteen days. Stricken individuals were evacuated from endemic areas after which symptoms usually subsided. Follow-up studies obtained from 25 patients with filariasis acquired in the South Pacific area indicated that evacuation did not necessarily result in a clinical cure[4]. Indeed, clinical attacks were recurrent in most cases during the sixteen years subsequent to their first exposure.

Filariasis is known to be endemic in Southeast Asia, particularly in Malaysia, Thailand, and North Vietnam. In North Vietnam several surveys have been accomplished in which prevalences for Wuchereria bancrofti and Brugia malayi human infections varied from three to ten percent[5, 6]. The prevalence and geographic extent of filariasis in South Vietnam has not been well documented. In 1947 Canet accomplished studies at Hon Quan, a village 110 km northwest of Saigon, and documented scattered foci of W. bancrofti infections in Vietnam highlands (Montagnards) of the Stieng Tribe[7]. In addition, chronic infections were found in ethnic Vietnamese who had migrated from North Vietnam to Hon Quan. Bancroftan filariasis in Stieng Montagnards was found to be periodic i. e., microfilariae detected in peripheral blood only during night hours. Subperiodic, i. e., microfilariae detected during both day and night hours, B. malayi infections have been demonstrated in Malaya and subperiodic W. bancrofti infections occur in some South Pacific Islands. It has been postulated

for many years that W. bancrofti infections were always nocturnally periodic west of longitude 170 degrees[8]. Recently a subperiodic W. bancrofti infection was reported in Thailand[9].

In 1967 malaria surveys, accomplished by the US Army Special Forces Field Epidemiologic Survey Team at Song Be in western III Corps Tactical Zone (CTZ) of the Republic of Vietnam, revealed a 15% prevalence for W. bancrofti microfilaremia in 110 Stieng tribesmen[10]. Thick blood films were obtained in the morning, thus raising the question of the existence of periodic or subperiodic Bancroftan filariasis in this area.

Studies were then undertaken with the purpose of determining the prevalence, periodicity and geographic extent of filariasis in native residents of South Vietnam.

Materials and Methods:

Experimental subjects consisted of civilian and South Vietnamese military personnel residing in western III CTZ and in the cities of Saigon and My Tho (see Figure I, Inclosure 1).

Blood specimens were obtained as late in the day as practical. One ml of venous blood was added to nine ml of a one percent acetic acid solution, mixed and centrifuged. The supernatant was discarded and all the sediment was smeared on glass slides and examined with a microscope for microfilariae. For speciation of microfilariae positive slides with microfilariae were stained with hematoxylin. Periodicity studies were accomplished by obtaining one-half ml of peripheral blood every six hours for a 24-hour period and quantitating the number of microfilariae in each sample.

Results:

Prevalence for W. bancrofti microfilaremia by location and ethnic group is depicted in Table II. Positivity rates ranged from 5.0 percent in Minh Thanh Stieng tribesmen to 21.7 percent in Budop Stieng tribesmen. Microfilaremia was not demonstrable in Vietnamese residing in Saigon or My Tho. Five European rubber plantation managers who had resided in the Hon Quan area from one to ten years also had negative examinations for microfilaremia.

The results of periodicity studies are shown in Table III. Nocturnal periodicity was established in four of five Montagnards from whom blood specimens were obtain at six-hour intervals. In the other patient the

density of circulating microfilariae was too low to justify conclusions. In the remaining four subjects tactical conditions did not permit an adequate number of collections; however, microfilaremia was detected in nocturnal but not daytime samples.

The two subjects from Budop had advanced filariasis. Both had "lumpy" inguinal adenopathy, mild varicosities and edema of the legs and moderate scrotal enlargement. These patients were initially observed on MEDCAP operations; however, elephantiasis was not seen in this area.

Discussion:

Filariasis was present as an acute lymphangitis, lymphadenitis, inflammation of various scrotal organs or simply as a fever of undetermined origin. A mild eosinophilia often accompanies the disease. Although symptoms have occurred as early as three months following first exposure in an endemic area, the incubation period is usually 5-18 months. The differential diagnosis of acute lymphadenitis in American servicemen deployed in RVN also includes acute pyogenic coccal infections, lymphogranuloma venereum, syphilis, scrub typhus, bubonic plague, tularemia and lymphoma. Confirmation of the diagnosis is achieved by demonstrating the presence of circulating microfilaria. Aspiration of inflamed lymph nodes is not recommended because of the likelihood that this procedure would add to the morbidity by stimulating further tissue destruction. Because oviproduction of microfilariae does not usually occur until one year after contacting infection, the early diagnosis of filariasis is dependent on clinical, epidemiologic and immunodiagnostic methods.

Immunodiagnostic techniques for human filariasis are available and are helpful in early diagnosis before oviposition by adult worms has occurred. Antigens derived from Dirofilaria immitis (dog heartworm) have been utilized for hemagglutination and bentonite flocculation tests. Positive results were obtained with these methods in 92 percent of 42 patients with Acanthocheilonema perstans infections; whereas only seven percent of 295 microfilaremia-negative controls had positive tests[11]. Recently a fluorescent antibody test for W. bancrofti infections has been developed at Walter Reed Army Institute for Research[12]. Positive results were obtained with this method in 82 percent of subjects with Bancroftan filariasis and in seven percent of healthy controls.

Filariasis skin testing, using Dirofilaria immitis antigen prepared by Sawada, was accomplished on native residents of New Guinea[13]. Almost all subjects with W. bancrofti microfilaremia had positive intradermal

tests; however, highland natives residing in a nonendemic area for this disorder all had negative skin tests. Children with demonstrable microfilaremia often do not have positive skin tests. This lack of responsiveness to intradermal antigen is unexplained. Perhaps chronic and/or repeated infections are required for dermal reactivity.

Eradication of filariasis in a given endemic area is dependent on a thorough understanding of the ecology of this disorder. Reservoirs of infection, either human or nonhuman, must be eliminated by a combination of control methods. W. bancrofti is said to be strictly a human infection; however, animal reservoirs play a significant role in perpetuating B. malayi infections in humans[14,15]. Again the periodicity of human filarial infections must be established and related to the biting habits of potential mosquito fectors.

Studies in Western III CTZ thus far have revealed that periodic human W. bancrofti infections are hyperendemic among long-term native residents. Further studies are indicated to define:

1. The geographic limits of the disease.

2. The periodicity of microfilaremia.

3. The importance of animal reservoirs, if any.

4. Potential vectors and their control.

5. The implications of transmission to US troops deployed in Vietnam.

6. The presence of animal microfilariae which would complicate ecological studies.

Summary:

Preliminary surveys for human W. bancrofti microfilaremia have shown prevalences of four to twenty-one percent in Stieng tribesmen residing in Western III CTZ, but none in Vietnamese residing in the same areas or in Saigon or My Tho. Filariasis, manifested by moderate scrotal enlargement, "lumpy" inguinal and femoral adenopathy, and lower extremity edema and varices have been occasionally observed in Montagnards infected with W. bancrofti.

The ecology and control of human filariasis and its implication to US servicemen is discussed.

Table II

Prevalence for W. bancrofti Microfilaremia
By Location and Ethnic Group

Location	Ethnic Group	No. Tested	No. Positive	Percent Positive
Budop*	Montagnard	60	13	21.7
	Cambodian	27	2	7.4
	Vietnamese	24	0	0.0
Song Be**	Montagnard	72	6	8.3
	Vietnamese	18	0	0.0
Hon Quan**	Montagnard	37	3	8.1
	Vietnamese	13	0	0.0
Minh Thanh*	Montagnard	20	1	5.0
Saigon*	Vietnamese	197	0	0.0
My Tho*	Vietnamese	87	0	0.0

*Blood specimens obtained from 2000-2400 hours.
**Blood specimens obtained from 1800-2000 hours.

Table III

Results of Periodicity Studies in Nine Montagnard
Tribesmen Infected With W. bancrofti

		Time (Hours)					
Location	Age	0600	1000	1200	1400	1800	2400
Song Be	18	664*		0		720	3464
Song Be	29	152		0		32	888
Song Be	39	0		0		12	56
Budop	62	0		0		280	760
Budop	70	0		9		0	0
Binh Ninh	33		0		0		192
Hung Chien	40		0		0		132
Hon Quan	32		0				245
Ap Hoa My	24		0			350	

*Per ml.

References:

1. Hunter, G. W. III, Frye, W. W. and Swartzwelder, J. C.: A Manual of Tropical Medicine, 4th ed., W. B. Saunders Co., Philadelphia and London, 1966, Chapter 43, p 453.

2. Medical Department, US Army: Preventive Medicine in World War II 6: 401, 1963.

3. Wartman, W. B.: Filariasis in the American Armed Forces. Medicine, 26: 333, 1947.

4. Trent, S. C.: Reevaluation of World War II Veterans with Filariasis Acquired in the South Pacific. Am. J. Trop. Med. &Hyg., 12: 877, 1963.

5. Gailliard, H.: Contribution a l'etude de la Filariose humaine a Filaria malayi et Filaria bancrofti au Tonkin. Ann. de la l'ecole superieur de Med. et de Pharm. Indochine, 1: 53, 1937.

6. Mathis, L. and Leger, T.: Recherches de Parasitologie et de Pathologie Humaine et Animal au Tonkin, Paris, 1911.

7. Canet, J: La filariose humaine en Cochinchine: Recherches epidemiologiques en pays Moi. Bull. Soc. Path. Exot., 43: 216 and 332, 1950.

8. Manson-Bahr, P. H.: The story of Filaria bancrofti. J. Trop. Med. 62: 53, 85, 106, 138 and 160, 1955.

9. Harinsuta, C. and Sucharit, S.: Nocturnally subperiodic W. bancrofti in Thailand. Trans. Roy. Soc. Trop. Med. & Hyg., 60: 277, 1966.

10. Cottingham, A. J., Boone, S. C. and Legters, L. J.: Studies of malarial prevalence and chloroquine sensitivity in Western II, III and IV Tactical Zones. Annual Report, US Army Med. Res. Team WRAIR (Vietnam) and Inst. Past., Vietnam, p 56, 1966-67.

11. Adolph, P. E., Kagan, I.G., and McQuay, R.M.: Diagnosis and treatment of Acanthocheilonema perstans filariasis. Am. J. Trop. Med. & Hyg., 11: 76, 1962

12. Duxbury, R. E. and Sadun, E. H.: Soluble fluorescent antibody test for human filariasis. Expl. Parasit., 20:77, 1967.

13. Desowitz, R. S., Saave, J. J., and Sawada, T.: Studies on the immunoepidemiology of parasitic infections in New Guinea. Ann. Trop. Med. & Parasit. 60: 257, 1966.

14. Laing, A. B. G., Edeson, J. F. B. and Wharton, R. H.: Studies on filariasis in Malaya: The vertebrate hosts of Brugia malayi and B. pahangi. Ann. Trop. Med. & Parasit., 54: 92, 1960.

15. Wharton, R. M.: Adaptation of Wuchereria and Brugia to mosquito and vertebrate hosts in relation to distribution of filarial parasites. Zoonoses Res., 2: 1, 1963.

AMEBIC INFECTION OF THE LIVER IN VIETNAM

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During the past few years there have been a number of articles in the medical literature concerning serious illnesses occurring in military personnel in Vietnam. These illnesses are of potential importance not only to doctors in Vietnam, but also to physicians in the United States who will be caring for returning servicemen. The principle diseases described have been malaria and its complications and treatment, melioidosis, scrub typhus, leptospirosis, dengue fever, and other arbovirus infections. Amebic infection of the liver should be added to this list. This report presents the clinical data of five patients seen over a ten month period at the 24th Evacuation Hospital in the Republic of Vietnam in whom the presumptive diagnosis of hepatic amebiasis was made. Its purpose is to alert physicians to this serious and not uncommon disease, to emphasize the important points in clinical diagnosis, to relate our experience with the complement fixation test as a reliable diagnostic aid, and to stress the success of the currently employed medical treatment program.

Amebic infection of the liver produces a spectrum of pathology ranging from diffuse hepatitis to localized abscess formation. Since isotope scanning and needle aspiration were not done in these patients, the presence of an abscess was not definitely demonstrated. Therefore, the more general terms "hepatic amebiasis" and "amebic infection of the liver" will be used, although it is believed that these patients did in fact have amebic abscesses of the liver.

The standard therapeutic regimen employed in all these cases consisted of emetine hydrochloride, intramuscularly, 65 mg a day for 5-7 days; chloroquine phosphate by mouth, 1.0 gram initially, then 0.5 gram twice a day for two days, then 0.5 gram once a day for a total of 20 days; Diodoquin by mouth, 650 mg three times a day for 21 days; and tetracycline by mouth, 500 mg four times a day for ten days. The drugs were given concurrently.

The complement fixation test for Entameba histolytica was performed by the 9th Medical Laboratory in Saigon, Commanding Officer Colonel Hinton Baker.

Table I presents the clinical, laboratory and therapeutic data of the five patients in this study who were diagnosed as having hepatic amebiasis.

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Table I

Findings in Five Cases of Amebic Liver Infection

Category	No. of Patients
Prior History of Diarrhea	2
Concurrent Diarrhea	2
E. Histolytica in Stools	0
Sigmoidoscopic Findings	0/3
Fever	5
Hepatic Tenderness	5
Hepatomegaly	3
Leukocytosis (>10,000)	4
Anemia	4
Elevated Alkaline Phosphatase	2
Elevated SGOT	1
X-ray Changes	2
Pleural Effusion	1
Positive Complement Fixation Test	5
Good Response to Chemotherapy	5

Discussion:

Amebiasis is caused by infection with Entameba histolytica, the most important intestinal protozoan parasite of man. The disease occurs in both temperate and tropical climates and the global infection rate has been estimated to be 20% of the world population, although 80% of these are said to be asymptomatic cyst passers. In the northern USA 2-4%, and in the southern USA 4-6% of the population are carriers of cysts. The incidence of amebiasis in United States Army personnel in Vietnam has recently been quoted as being between 1.0 and 5.1 cases per 1000 men per year[1]. This same report also describes a study in which examination of a single purged stool in 97 asymptomatic American soldiers recently returned from Vietnam, revealed E. histolytica in 4%. This figure is low and corresponds with the above noted infection rate of the general population of the United States. In a letter to the editor in the July 1968 issue of the Annals of Internal Medicine, Cifarelli criticizes these figures as being too low. He cites his own study[2] in which he diagnosed amebic colitis in 30 of 32 patients presenting with bloody diarrhea over a four month period at the 93d Evacuation Hospital in Vietnam. Our own experience at the 24th Evacuation Hospital is more in keeping with the lower figures since we have documented acute amebic colitis in only one patient during the past six months. These latter two observations on the occurrence of amebic colitis in Vietnam, of course, do not describe incidence. Needless to say, the incidence of amebiasis has not yet been well documented although it is probably quite low.

Amebic infection of the liver is the most common complication of intes-

tinal amebiasis. The incidence relative to intestinal amebiasis has not been accurately determined. One pathological study of 3,680 autopsies of dysentery cases, found amebic abscesses of the liver in 779 (21%). In another report Kean[3] found 90 liver abscesses in examining 148 fatal cases of amebiasis from the Armed Forces Institute of Pathology (61% incidence). Recent data from the 9th Medical Laboratory in Saigon[4] showed that during a ten month period there were 51 serologically confirmed cases of amebic liver disease. These figures are based on sera sent from Army hospitals scattered all over Vietnam and are necessarily incomplete. However, when one compares this number with the suspected low incidence of intestinal amebiasis and adds our own experience of five cases of hepatic amebiasis at the 24th Evacuation Hospital where amebic colitis is rare, the probability is that the incidence of liver infection in amebiasis is quite high; perhaps as much as or more than the 20% quoted above in one of the pathological studies.

Table II

Findings in Amebic Liver Infection from Two Different Studies

Category	24th Evac (5 Cases)	Sheehy et al (17 Cases)	Total No. (22 Cases)	Per-Cent
Prior History of Diarrhea	2	3	5	23
Concurrent Diarrhea	2	8	10	45
E. Histolytica in Stools	0	5	5	23
Sigmoidoscopic Findings	0/3	2/12	2/15	13
Fever	5	16	21	95
Hepatic Tenderness	5	13	18	82
Hepatomegaly	3	12	15	68
Leukocytosis (>10,000)	4	17	21	95
Anemia	4	14	18	82
Elevated Alkaline Phosphatase	2	9	11	50
Elevated SGOT	1	10	11	50
Elevated Bilirubin	1	2	3	14
Good Response to Chemotherapy	5	17	22	100
Positive Serology	5 (Complement-Fixation)	6/6 (Indirect-Hemagglutination)	11/11	100

Table II provides a composite of the clinical and laboratory finding in the patients from this study and 17 patients with amebic liver abscess recently reported by Sheehy et al[5]. In this latter report the diagnosis of abscess was confirmed by hepatic scanning. The total figures and the percentages based on the total number of patients are similar to our own observations in patients with hepatic amebiasis. They show that current diarrhea, a history of prior diarrhea, the presence of E. histolytica in

the stools, and bowel mucosal abnormalities seen on sigmoidoscopy are variable and relatively uncommon findings. They also indicate that high fever, a moderate anemia, a significant leukocytosis, hepatomegaly, and right upper quadrant abdominal pain and rib-cage "punch" tenderness are the most reliable and common clinical findings. The serum alkaline phosphatase was elevated in 50% of the patients. This test has been reported to be the most reliable and sensitive measure of dysfunction in focal liver disease. The SGOT was elevated in ten of Sheehy's 17 patients. Prior data on the reliability of this test in amebic liver abscess is lacking but assuming significant tissue necrosis in the hepatitic and early abscess formation phase of this illness, elevation of serum transaminases would not be an unexpected finding. Hyperbilirubinemia and clinical jaundice were rare findings in these patients.

There is considerable controversy concerning the value of serological methods in the diagnosis of intestinal and hepatic amebic infections. The complement fixation test was positive in five of five of our patients and the indirect hemagglutination test was positive in six of six of Sheehy's patients. This current experience, then, suggests that these tests would be of value in confirming a clinical diagnosis. Maddison et al[6] have studied intradermal and serologic tests in the diagnosis of amebiasis using patients at the Amebiasis Research Unit, Durban, South Africa. They studied patients with amebic dysentery, with liver abscess diagnosed by aspiration, with clinically diagnosed liver abscess, and those with no symptoms of amebiasis. The three tests used (fluorescent antibody, gel diffusion precipitin, and indirect hemagglutination) showed a 90-100% sensitivity in the first three groups of patients. However the HA and gel diffusion tests gave positive results in a rather high percentage (32.1 and 20.5 respectively) of asymptomatic patients. We should note that these patients came from a highly endemic area for amebiasis and that they may have built up antibodies from a prior infection. The tests might well be more valuable as diagnostic aids in non-endemic areas. This study, then, also suggests that these serological tests would be of considerable value in confirming a clinical diagnosis of hepatic amebiasis. There is less data available about the sensitivity and reliability of the complement fixation test which was used in the patients at the 24th Evacuation Hospital. It has been shown that this test is more often positive and has fewer false positives in extra-intestinal forms of amebiasis than in superficial intestinal infections. The complement fixation test, then, may be of particular value in the diagnosis of hepatic amebiasis. Clearly a controlled study, similar to that of Maddison et al, described above is needed to assess the reliability of this method.

An additional diagnostic "test" in clinically suspected amebic liver infection is a therapeutic trial with emetine and chloroquine. Characteristically the clinical response is so dramatic and so prompt (usually within 72 hours) that it can serve to confirm the diagnosis reliably without fear of losing much time in the evaluation of the patient. The

drugs are relatively non-toxic but emetine does have some potential for myocardial toxicity and patients should be monitored with serial EKG's and the drug given for no more than seven days. Wilmot et al[7] have demonstrated the efficacy of chloroquine and emetine in the treatment of amebic liver abscesses. Chloroquine is absorbed from the gastrointestinal tract and concentrated in the liver. In addition to chloroquine and emetine, we utilized tetracycline and Diodoquin in our five patients to insure the eradication of any persistent bowel infection. Diodoquin has a direct amebicidal action whereas tetracycline acts by altering the normal bowel flora. It has been shown that E. histolytica is unable to survive in the bowel in the absence of certain bacteria or their metabolites[8]. Clinically all five of our patients got a prompt response and complete cure, although two had a somewhat prolonged convalescence. Sheehy treated his 17 patients with emetine, chloroquine and Diodoquin in dosages similar to those which we used. Five of these were treated with chemotherapy plus open surgical drainage of the abscess(es). Four patients received chemotherapy plus needle aspiration and the remaining eight received drugs alone. All of the patients got a good clinical response and eventual cure although in eight the response was somewhat prolonged lasting 8-16 days. Moreover, Sheehy followed his patients with serial hepatoscans using Au 198 and demonstrated that most amebic liver abscesses heal gradually over a period of two to four months following chemotherapy and that needle aspiration and surgical drainage do not hasten abscess resolution time. This information plus the clinical experiences with chemotherapy cited here contradicts the more traditional teaching that amebic liver abscesses should be aspirated or drained surgically. Our experience also is different from that of Bartelloni and Park[9] at the 3d Field Hospital in Vietnam who treated five cases of amebic liver abscess with open surgical drainage plus chemotherapy. It should be noted, however, that several of their cases did not receive an adequate trial or follow-up of chemotherapy before surgical drainage was performed and that none of their diagnoses were confirmed serologically or by microscopic identification of E. histolytica.

Summary:

Acute amebic colitis appears to be a relatively uncommon disease in US Army personnel in Vietnam. However, hepatic amebiasis is a rather common and serious complication of this disease. Physicians caring for these soldiers (and civilians) should have a high degree of suspicion for and be familiar with the clinical picture of amebic liver disease. The most reliable clinical and laboratory features are: high fever, right upper quadrant and "punch" tenderness, hepatomegaly, a leukocytosis (>10,000), a moderate anemia, and an elevated serum alkaline phosphatase. Current or previous diarrhea, the presence of E. histolytica in the stools, and sigmoidoscopic abnormalities are variable

and relatively uncommon features. The complement fixation test and indirect hemagglutination test using E. histolytica antigens have been of value in confirming the diagnosis. When available, hepatoscanning techniques can also be very useful in the diagnosis and follow up of amebic liver abscesses. Treatment with emetine, chloroquin, Diodoquin and tetracycline produces a rapid and complete cure in most cases. The typical dramatic and rapid response to chemotherapy can be utilized as an additional diagnostic test; i.e. the "therapeutic trial". Needle aspiration and surgical drainage are rarely indicated either as diagnostic or therapeutic measures.

References:

1. Gilbert, D. N. et al, Potential Medical Problems in Personnel Returning from Vietnam, Ann. Int. Med. 68:3, March 1968.

2. Cifarelli, P. S., Acute Amebic Colitis, USARV Med Bul 2:19, 1967.

3. Kean, B. H. et al, Fatal Amebiasis: Report of 148 fatal cases from the Armed Forces Institutes of Pathology, Ann. Int. Med. 44: 1956.

4. Personal Communication from Colonel Hinton Baker, Commanding Officer, 9th Medical Laboratory, Saigon, RVN.

5. Sheehy, T. W. et al, Resolution Time of an Amebic Liver Abscess, Gastroenterology, 55:1, July 1968.

6. Maddison, S. E. et al, Comparison of Intradermal and Serologic Tests for the Diagnosis of Amebiasis, Am. J. Trop. Med. & Hyg., 17:4, 1968.

7. Wilmot, A. J. et al, The Comparative Value of Emetine and Chloroquine in Amebic Liver Abscess, Am. J. Trop. Med. & Hyg., 7, 1958.

8. Armstrong, T. G. et al, Aureomycin and Amebic Dysentery, Lancet 2, 1950.

9. Bartelloni, P. J. and Park, G. R., Open Surgical Drainage of Five Amebic Liver Abscesses in Vietnam, USARV Med Bul, 1:4, 1966.

Reference material was also obtained from the following textbooks:

1. Manson's Tropical Diseases by Sir Phillip H. Manson-Bahr, 16th Ed., 1966, Bailliere, Tendall, and Cassell ltd.

2. Craig and Faust's Clinical Parasitology by E. C. Faust and P. F. Russell, 7th Ed., 1964, Lea and Febiger.

3. A Manual of Tropical Medicine by Hunter, G. W. et al, 4th Ed., 1966, W. B. Saunders Co.

GUIDE TO THE USE OF FRESH FROZEN PLASMA IN VIETNAM

MAJ Asa Barnes, MC*

Fresh frozen plasma contains all plasma clotting factors in concentrations comparable to those in freshly drawn whole blood. Platelets are not functionally active in fresh frozen plasma and should be used, when available, in preference to freshly drawn whole blood in all cases in which therapy of coagulation defect(s) is intended and platelets are present in adequate quantity in the peripheral blood.

Fresh blood drawn in Vietnam has been found to have a relatively high risk of transmitting hepatitis, malaria or syphilis. Conversely fresh frozen plasma drawn in PACOM has been shown to cause a remarkably low incidence of transfusional hepatitis.

Because it is complicated to process, must be transported packed in dry ice and stored at below -20°C, fresh frozen plasma cannot be supplied to all hospitals in Vietnam. Furthermore, under present conditions and for the foreseeable future, fresh frozen plasma where it is available can be supplied only in limited quantity. Therefore, its use must be restricted to conditions in which there are adequate indications for it.

Coagulation defects associated with massive transfusion are manifest as uncontrollable oozing from all raw surfaces. Experience has shown that the onset of these defects varies widely in timing of their appearance and may never be manifest although the patient receives as many as 30 units of blood. Therefore, it is recommended that this condition not be treated expectantly by slavishly following a protocol calling for a specific sequence of bank blood and fresh frozen plasma or fresh whole blood. Rather, the patient's clinical condition should be closely observed and diagnosis and therapy undertaken when and if the condition appears.

When the use of fresh frozen plasma is contemplated to treat coagulation defect(s), an attempt should be made to identify the extent and etiology of the defect. The following suggested protocol for screening for a coagulopathy is brief, easy to perform and provides useful information necessary for a rational approach to therapy. Under no circumstances should the performances of these studies be permitted to delay procurement and/or preparation of requested fresh frozen plasma or fresh whole blood if the request is of an emergency nature. Laboratory workup and procedures leading to remedy can be undertaken simultaneously.

The minimum coagulation screening battery should consist of a microscopic inspection of a Wright stained smear of peripheral blood for presence of

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platelets, a Partial Thromboplastin Time and a Prothrombin Time. The peripheral blood smear should be made from a drop of blood taken from a finger, toe or earlobe. Blood in a tube anticoagulated or clotted is not satisfactory. Microscopic examination should reveal an average of at least one platelet per oil immersion field for adequate hemostasis. The Partial Thromboplastin Time is a test that assays the intrinsic system of the coagulation scheme which includes factors VIII (Antihemophilic), IX (Christmas), X (Stuart), XI (PTA) and XII (Hageman) and prothrombin and factor V (Labile). This test will also be abnormal in the presence of a circulating anticoagulant and in hypofibrinogenemia. The Prothrombin Time is a test that assays the extrensic system. It will be prolonged if there is a decrease in factors VII (Stable), X (Stuart), V (Labile) or a fibrinogen concentration less than 80 mg percent. Altogether then, these three simple procedures cover the entire intravascular coagulation mechanism. They may be normal in fibrinolytic states, and they do not reflect an abnormality of vascular contraction. If platelets are found to be absent or markedly decreased and the Partial Thromboplastin Time and the Prothrombin Time are also abnormal, the possible diagnosis of disseminated intravascular coagulation, or consumption coagulopathy, should be entertained. Therapy for this condition must include heparin.

In therapy of burns and factor IX (Christmas) deficiency states plasma from bank blood, or aged plasma, is optimal and fresh frozen plasma need not be used.

Fresh frozen plasma is provided as group AB, group A or group B. Since these preparations contain no erythrocytes, Rh grouping need not be considered. Group AB plasma may be given to any recipient. Group A plasma may be given to group A and group O recipients but not to group B individuals. Group B plasma may be given to group B and group O recipients but not to group A individuals. The recipient's group should be verified when group A or B plasma is administered, but cross matching is not necessary.

Fresh frozen plasma should be thawed in a waterbath at 37°C, never any warmer. Thorough thawing is necessary because any portion remaining frozen will contain most of the factor VIII (Antihemophilic) in the preparation. After thawing it should be administered as soon as possible, and the I. V. should be permitted to run rather rapidly. The patient should be closely observed for evidence of clinical improvement. Fresh frozen plasma that has been thawed should never be refrozen.

Summary:

1. Bank blood is available in unlimited supply and has an extremely low incidence of transmissable disease.

2. Fresh blood drawn in Vietnam has a relatively high risk of transmitting disease.

3. Fresh frozen plasma contains all of the plasma coagulation factors in concentrations comparable to fresh whole blood and has a low incidence of transmissable disease, but is available only in limited quantity.

4. Platelets are not functionally active in fresh frozen plasma.

5. Coagulation defects should be treated when they are clinically manifest, not expectantly, preferentially with fresh frozen plasma if platelets are present in adequate quantity. If platelets are found to be deficient or if fresh frozen plasma is not available, freshly drawn whole blood must be used.

6. A coagulation workup consisting of inspection of a smear of the peripheral blood for platelets, a Partial Thromboplastin time and a Prothrombin Time should be undertaken simultaneously with procedures leading to remedy.

A Day With The NVA DUSTOFF .....

COAGULATION PROBLEMS ASSOCIATED WITH MULTIPLE TRANSFUSIONS SECONDARY TO SOFT TISSUE INJURY

MAJ Donald E. Nelson, MC*

Introduction

Occasionally here in Vietnam, following soft tissue injury, a fatal bleeding diathesis occurs which does not respond to replacement of coagulation factors in the form of fresh frozen plasma or fresh blood. These cases are especially distressing to the surgeon as this bleeding diathesis usually occurs toward the end of a lengthy, apparently successful surgical procedure or within the early postoperative period and progresses to death with generalized oozing from all sites of surgical repair. Although blood loss in these patients is usually considerable, an oozing syndrome is usually not present when the patient is first treated The use of large amounts of fresh blood during this early period in an attempt to prevent the onset of the oozing syndrome appears to hasten its onset and increase its severity in many cases. The fact that the use of fresh blood during surgery can hasten or intensify the onset of this diathesis seems contradictory unless one considers hemostasis as a sum total of coagulation plus "intrinsic anticoagulation." It is the purpose of this paper to briefly discuss current concepts of coagulation and "intrinsic anticoagulation" as they apply to patients with soft tissue injury here in Vietnam.

Coagulation

In vivo coagulation is usually initiated by a disruption of vascular endothelium with exposure of underlying collagen. The platelets quickly fill the endothelial defect and on exposure to the collagen undergo viscous metamorphasis with resulting change in shape, loss of granularity, and release of a number of chemical materials including serotonin, epinephrine, norepinephrine and adenosine diphosphate. The latter diffuses into the vascular lumen, attracting additional platelets in a loose plug which does not undergo viscous metamorphasis until acted upon by thrombin. Simultaneously with the formation of the platelet thrombus, the intrinsic and extrinsic coagulation systems, a simplified outline of which is seen in Figure 1 are activated (1).

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The extrinsic system is activated by the lipoprotein, thromboplasting, which is present in all vascular walls and released by vascular disruption. It is also present in large amounts in lung and brain tissue. The intrinsic system is activated by a large number of different electronegatively charged materials including tissue products such as fatty acids, lysosomes, collagen, lysederythrocytes, as well as by fat emboli and bacteria. The problem here in soft tissue injury is one of excess activation of the coagulation system.

Once the coagulation system is activated, the process is limited by inhibition of coagulation factors, deactivation of coagulation factors in the liver, dilution of activated coagulation factors by the blood stream, the hemodynamic action of the blood stream on the forming thrombus consumption of coagulation factor V, and activation of the fibrinolytic system. For purposes of this discussion, the latter two mechanisms are most important.

Depletion of Coagulation Factors Following Transfusion

Platelet "wash out" after multiple transfusions has not been observed in American troops in the absence of underlying hematologic disease. Crosby noted during the Korean conflict that thrombocytosis was the rule during and following surgery in which multiple transfusions of banked blood were given. Libre, et al (2) has shown that a 40% increase in platelets can be expected within 15 - 20 minutes after a stressful stimulus such as soft tissue injury. Thrombocytopenia usually indicates a diffuse intravascular coagulation, sepsis or an underlying hematologic disease. The author's experience with the use of platelet concentrates and fresh blood to correct thrombocytopenia due to sepsis is singularly discouraging.

The preservation of coagulation factor activity when blood is stored in plastic bags with ACD solution is better than usually appreciated. Table 1 shows the experience of Rosenthal et al (3) in the assay of coagulation factor activity in outdated plasma. The critical coagulation factors with the exception of factor V and factor VIII all have an activity of over 70% that of fresh plasma even after storage of 26 to 35 days. Although the activity of factors VIII and V are only 50% and 32% respectively, clinical bleeding does not usually occur until a factor reaches about 15% of normal activity. We have transfused over 30 units of banked blood in some patients without the addition of coagulation factors in the form of fresh frozen plasma or fresh blood. Factor VIII, unlike the other coagulation factors, appears to be produced by the bone marrow under the control of the spleen. Libre et al (2) has shown that with an intact spleen the mean level of factor VIII activity is 280% of control levels within 20 minutes after a stressful stimulus and that high levels are maintained for at least 2 hours.

It appears that the major limiting coagulation factor in patients receiving banked blood is labile factor V. It should be remembered that consumption of factor V is one of the normal mechanisms in the limitation of the coagulation process. As will be discussed later, low levels of factor V in the presence of soft tissue injury with excessive stimulus of both the intrinsic and extrinsic coagulation systems by tissue products, may be desirable.

"Intrinsic Anticoagulation"

Although inhibitors to activated coagulation factors normally occur as a physiological mechanism, the major consideration in the pathologic state of bleeding diathesis is the fibrinolytic system with its resulting circulating "anticoagulants" (4). A brief outline of the fibrinolytic system is given in figure 2.

Plasminogen is a beta 2 protein of about 89,000 molecular weight widely distributed in tissues, body fluids and circulating blood. Activation of plasminogen appears to be a first order reaction resulting in the endopeptidase, plasmin, representing about 90% of the original plasminogen molecule.

Fibrinogen and fibrin appear to be equally susceptible to plasmin which exerts a hydrolytic effect with resulting release of breakdown products which interfere with the thrombin-fibrinogen interaction in the coagulation process and block polymerization of the fibrin monomer. Other coagulation factors susceptible to plasmin are factors V and VIII. Factors II, VII, IX, and X may be depressed in the fibrinolytic state as a result of circulating plasmin. Plasmin also interferes with platelet adhesion, aggregation, and viscous metamorphosis resulting in a prolonged bleeding time.

Under physiological conditions, activation of the fibrinolytic system, in response to plasmokinase, urokinase, small quantities of activated coagulation factors as well as various other stimuli, is kept in check by specific inhibitors as antiplasmokinase, antiurokinase, and antiplasmin. In soft tissue injury the inhibitors are readily overcome by excess activation of plasminogen both directly by release of tissue kinases and indirectly through a proactivator on which hemolyzed erythrocytes, leukocytes, and exposed collagen act. The resulting excess of circulating plasmin may result in the defibrination syndrome which includes hypofibrinogenemia, diminished factors V, VIII, II, moderate thrombocytopenia and increased fibrinolytic activity (5).

Although release of tissue kinase and other tissue products appears to have an important role in activation of the fibrinolytic system, the simultaneous activation of the coagulation system is equally important. Coagulation products, such as activated factor XII, thrombin and fibrin, act as potent stimuli to the fibrinolytic system. In view of this, it is desirable to limit the amount of thrombin and fibrin formed and to avoid diffuse intravascular coagulation.

Changes in the Balance of Hemostasis Following Hemorrhagic Shock

Hemostasis in the physiological state represents a delicate balance between coagulation and "intrinsic anticoagulation." Both mechanisms appear to be operating at low levels of activity. Attar, et al (6) has demonstrated in 33 patients with hemorrhagic shock that this balance is altered resulting in an initial hypercoagulable phase followed by a hypocoagulable phase. The magnitude of this oscillatory curve, which has also been demonstrated experimentally in dogs (7), is dependent on the severity and duration of the hemorrhage. In Attar's study, the average time elapsed between the onset of hemorrhagic shock and the maximal state of hypercoagulability, as measured by the whole blood clotting time, was 7 hours. The average time for coagulation to return to normal levels was 17 hours Eleven hours later the average maximum state of hypocoagulability was reached with return to normal levels taking 27 hours. In fatal cases, the oscillation was more pronounced and occurred during a shorter time period.

Many patients with soft tissue injury here in Vietnam tend to have an accented oscillatory curve of hypercoagulability followed by hypocoagulability. Some cases develop a severe hypocoagulable phase in less than 6 hours which goes on to a fatal bleeding diathesis. The use of fresh blood alone or abundant fresh blood in combination with banked blood early in the patient's course in an effort to prevent a bleeding diathesis may indeed contribute to such a condition. The patient must be maintained in a state of hemostasis somewhere between a diffuse intravascular coagulation, with its resulting excess thrombin and fibrin, and the fibrinolytic syndrome. Administration of the limiting coagulation factors in the form of fresh blood or fresh frozen plasma during the hypercoagulable state does not necessarily accomplish this aim. In the absence of clinical bleeding, the use of fresh frozen plasma or fresh blood is not recommended.

Local oozing of blood does not necessarily indicate a generalized coagulapathy. Hemorrhagic shock in itself may contribute to a local defect of hemostasis. Adequate warming of banked blood and adequate neutralization of the average of 7 mEq. acid in each unit of blood is recommended

to aid in controlling local oozing. Exogenous calcium administration is not required for hemostasis using banked blood, and in the experience of Howland and his associates (8), calcium administration appears to be contraindicated.

A true coagulation defect may be due to: 1. dilution of coagulation factors by transfusion with banked blood, 2. a consumption coagulopathy, or 3. the fibrinolytic syndrome. The first condition is quickly corrected with two units of fresh frozen plasma, or where this is not available, two units of fresh blood. If this replacement of coagulation factors gives only a temporary correction of the bleeding, a consumption coagulopathy or the fibrinolytic syndrome should be considered before additional fresh plasma or fresh blood is given.

Although most cases of mild bleeding diathesis following multiple transfusions respond to fresh frozen plasma or fresh blood as would a patient with a dilution of coagulation factors, the fibrinolytic system and a degree of consumption coagulopathy appear to be involved. In the author's experience of all cases of fatal bleeding diathesis involved a consumption coagulopathy or fibrinolytic syndrome. Usually a combination of the two mechanisms are operative with the fibrinolytic syndrome predominating terminally. The degree to which a consumption coagulopathy and enhanced fibrinolysis is operative in cases of mild nonfatal diathesis and the factors which contribute to the pathological state in which fresh blood or fresh frozen plasma no longer correct the bleeding diathesis requires further study.

The clinical manifestations of bleeding due to dilution of coagulation factors, a consumption coagulopathy and the fibrinolytic syndrome are usually identical. The laboratory is of limited value in identifying the operative mechanism. In all three conditions there is depression of factor V, and VIII activity, and usually other factors as well, giving a prolonged prothrombin time and partial thromboplastin time (PTT). A patient with a thrombocytosis or normal platelet count, a normal fibrinogen screening test without abnormal lysis of the clot, a normal euglobulin lysis time and an abnormal prothrombin time and PTT who has a quick response with two units of fresh frozen plasma or fresh blood can be assumed to have had a simple dilution of coagulation factors. Patients with a very transient response to fresh frozen plasma or fresh blood, who have an abnormal fibrinogen screening test, a thrombocytopenia and a normal euglobulin lysis time suggest a consumption coagulopathy. A normal platelet count does not rule out the latter condition. The fibrinolytic syndrome is suggested by an abnormal euglobulin lysis time with a normal platelet count or thrombocytosis. All three conditions may result

in an abnormal clotting time. An abnormal bleeding time and abnormal clot retraction may be present in either a consumption coagulopathy or the fibrinolytic syndrome. All three conditions may be operative to varying degrees giving inconclusive results.

Once a consumption coagulopathy with diffuse intravascular coagulation or the fibrinolytic syndrome reaches a certain degree of activity, fresh blood or fresh frozen plasma does not correct the bleeding diathesis. Therapy with heparin, epsilon-aminocaproic acid (EACA) and such agents as Trasylol are needed alone or in combination (4). Administration of fibrinogen may result in death (9).

Conclusions

Soft tissue destruction acts as a potent stimulus to both the coagulation and fibrinolytic systems. Patients in hemorrhagic shock normally pass from a hypercoagulable to a hypocoagulable state. Many of these patients develop an oozing syndrome which is not the result of a simple dilution of coagulation factors after multiple transfusions but the result of an imbalance between coagulation and "intrinsic anticoagulation." Consumption of labile factor V is one of the normal mechanisms for limiting the coagulation process. The use of large amounts of fresh blood in the early hypercoagulable state appears to enhance the onset of the fibrinolytic response, probably by increasing thrombin and the intravascular deposition of fibrin. In the absence of clinical bleeding, fresh frozen plasma or fresh blood should be used with caution, if at all, in patients with extensive soft tissue injury. A consumption coagulopathy with diffuse intravascular coagulation or the fibrinolytic syndrome must be considered in patients who have an oozing syndrome that does not promptly respond to fresh frozen plasma or fresh blood.

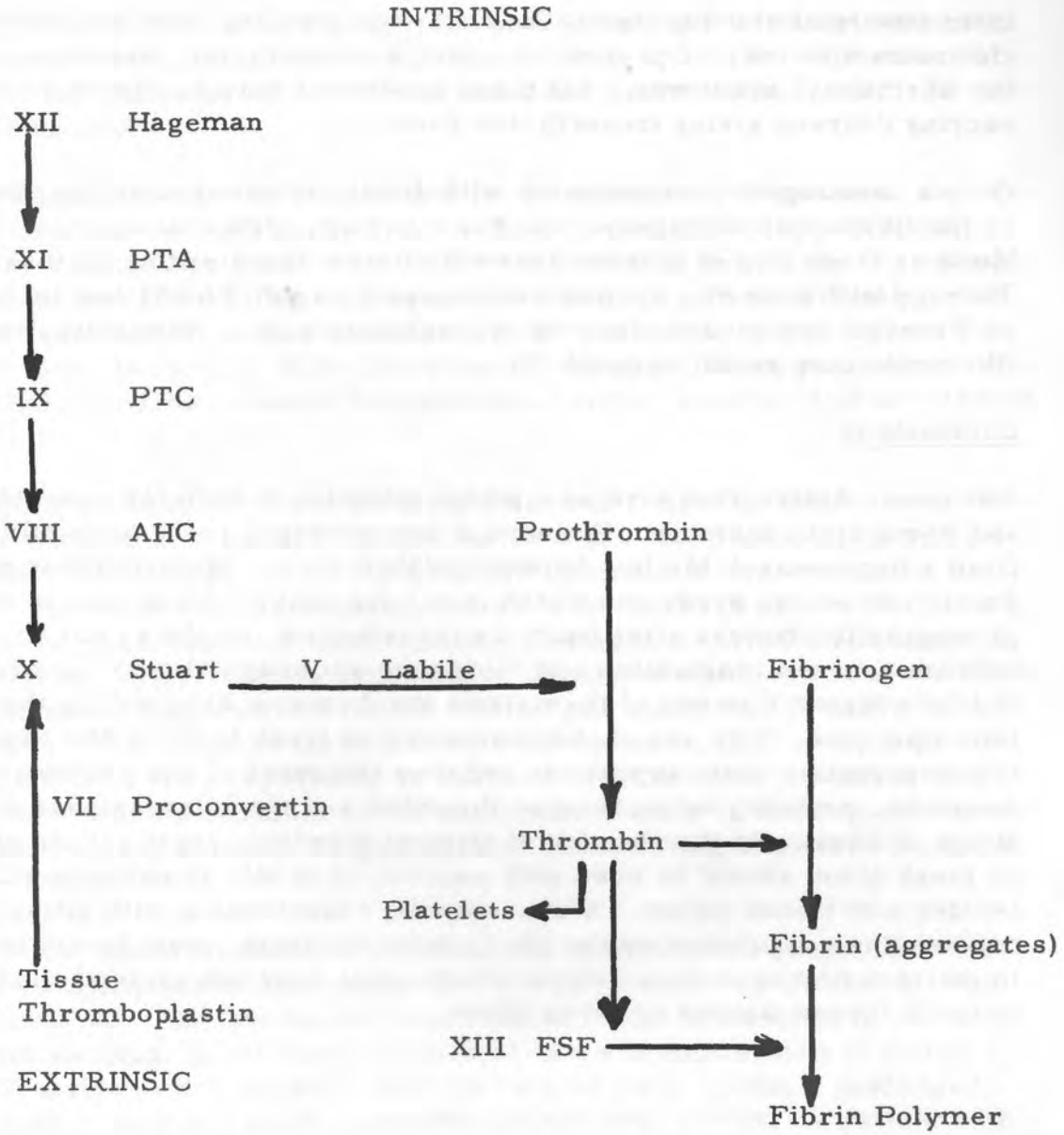

FIGURE 1. SCHEMATIC OF THE COAGULATION MECHANISM

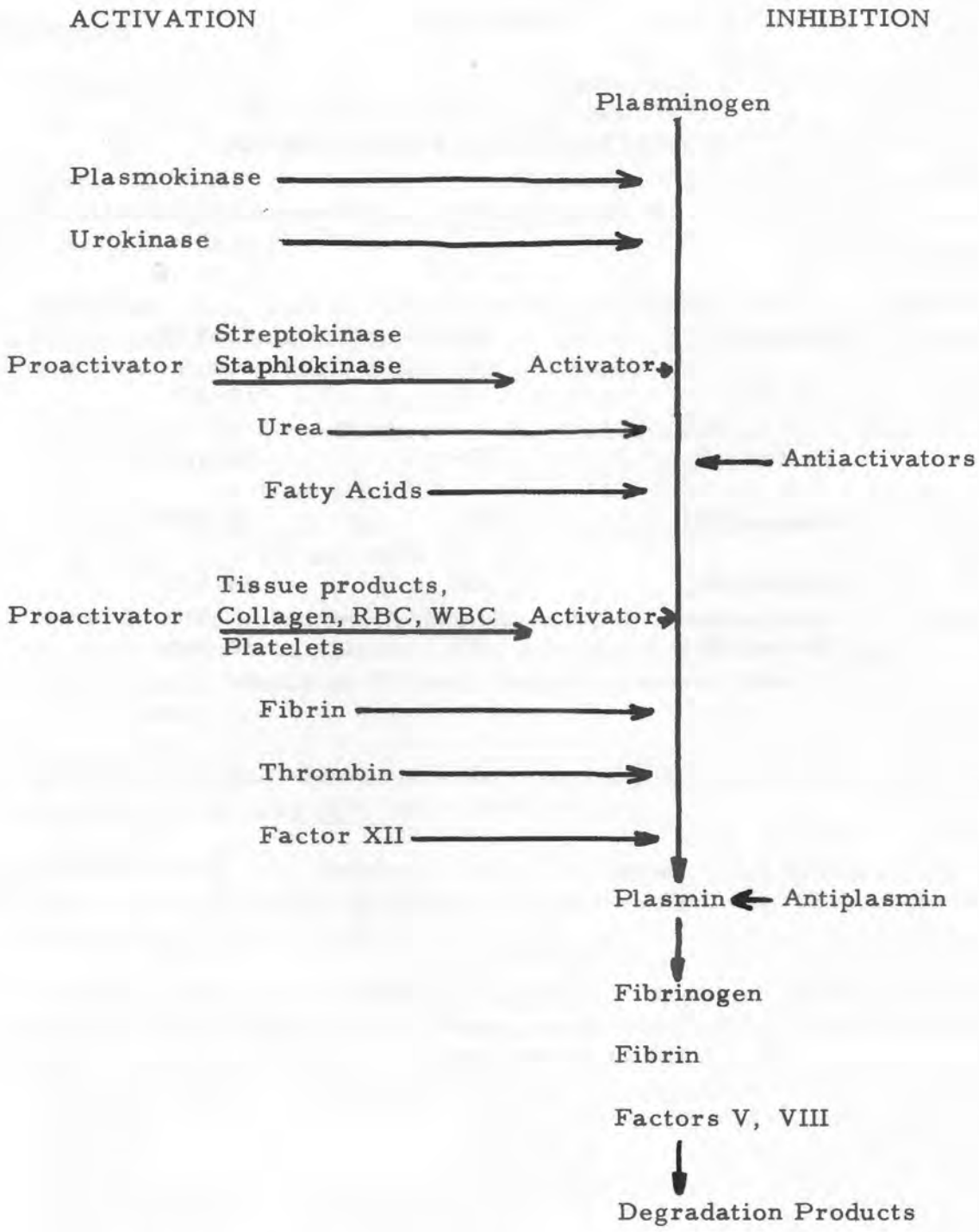

FIGURE 2. SIMPLIFIED SCHEME OF FIBRINOLYSIS

TABLE 1

CLOTTING FACTOR ACTIVITY OF
OUTDATED BLOOD BANK PLASMA

Factor II	83	45-110
Factor V	38	10-87
Factor VII	104	82-140
Factor VIII	56	10-108
Factor IX	84	44-115
Factor XI	80	42-105

References

1. Feingold, D.S. and E.E. Parris: Thrombogenesis. NEJM 276: 622-628, 1967

2. Libre, E.D., D.H. Cowan, S.P. Watkins, Jr., and N.R. Shulman: Relationships between Spleen, Platelets and Factor VIII levels. Blood 31: 358-368, 1968

3. Rosenthal, R.L. and E. Sloan: Assay of Clotting Factors in Outdated Blood Bank Plasma and Its Potential Use for Therapy in Hemophilia and Other Hemorrhagic Dyscrasias, Transfusion 6: 289-292, 1966

4. Pechet, L.: Medical Progress. Fibrinolysis NEJM 273: 966-973, 1022-1034, 1965

5. Rosner, F. and N.D. Ritz: The Defibrination Syndrome. Arch Intern. Med. 117; 17-24, 1966

6. Attar, S., W.H. Kirby, C. Masaitis, A. R. Mansberger, Jr., and R. A. Cowley: Coagulation Changes in Clinical Shock, L. Effect of Hemorrhagic Schock on Clotting Time in Humans, Ann. Surg 164: 34-40, 1966

7. Hardaway, R.M.: The Role of Intravascular Clotting in the Etiology of Shock. Ann surg 155: 325, 1962

8. Howland, W.S., O. Schweizer and C.P. Boyan: The Effect of Buffering on the Mortality of Massive Blood Replacement. Surg, Cynecol., Obstetrics 121: 1.6, 1965

9. Graham, J.H., C. P. Emerson, and T. J. Anglem: Postoperative Hypofibrinogenemia, Diffuse Intravascular Thrombosis After Fibrinogen Administration NEJM. 257: 101-104, 1957

SEVERE HEMOLYSIS FOLLOWING TRANSFUSION OF ONE UNIT OF "O" NEGATIVE BLOOD

CPT Maurice Ballas*
SP5 Edwin C. Nordstrom**

Group O blood is widely and safely used in Vietnam as "universal donor" blood when life-threatening emergencies occur and when cross-matching facilities are not available. For universal donor purposes, the only group O bloods which should be used are units labeled "low-titer." These units have been designated "low-titer" because a 1:200 dilution of serum obtained from them will not agglutinate saline suspensions of A and B cells; i.e., the titers of anti-A and anti-B are less than 1:200. "High-titer" group O blood is considered unsafe for use as universal donor blood and should be administered only to group O recipients. The case described below illustrates the dangers involved in transfusing high-titer blood to heterologous recipients.

Case history: A soldier sustained multiple fractures of the right radius, ulna, and distal humerus during a mortar attack. One unit of O negative high-titer blood was transfused before evacuating the patient to the 8th Field Hospital. Of five units of A negative set up for cross-match, prior to surgery, only two showed apparent compatibility between the patient's serum and donor's erythrocytes. The patient's serum showed evidence of free hemoglobin and the direct Coombs test was positive. A below-the-elbow amputation was performed.

Postoperatively the patient was hypotensive and oliguric. His hematocrit had fallen from 32 on admission to 20. During the next three days, he received only O negative packed cells. By the sixth hospital day, renal function returned to normal. The serum bilirubin and the blood urea nitrogen, which had been mildly elevated on admission (1.9mg/100ml. and 29 mg/100ml. respectively), fell to normal levels. The patient was evacuated.

The following table outlines the studies performed to identify and quantitate the antibodies responsible for hemolysis. Non-ABO antibodies were excluded using a panel of O cells:

*Commanding Officer, 74th Mobile Medical Laboratory and Pathologist, 8th Field Hospital

**Chief Blood Bank Technician, 74th Mobile Medical Laboratory

		Saline		Albumin		Coombs	
		A	B	A	B	A	B
Bag of O Negative Donor Blood	Inactivated[1]	1:256	1:256	(-)	(-)	(-)	(-)
	Noninactivated[2]	1:256	1:1024	(-)	(-)	1:32,768	1:8,192
Patient's Serum	Day #1	NT	(-)	NT4	(-)[4]	1:64[3]	(-)
	Day #3	NT	1:64	(-)	(-)	(-)	(-)
	Day #6	NT	1:64	NT	1:16	NT	1:64

1.) The complement was inactivated at 56°C for 30 minutes
2.) On the A side, hemolysis occurred up to the 1:8 dilution, and on the B side, hemolysis occurred up to the 1:4 dilution.
3.) The titer was not carried beyond 1:64
4.) (-) Not performed
NT - No titer

The data indicates that the unit of O negative blood carried an astronomically high titer of immune (incomplete) anti-A and anti-B antibodies. Because of an unfortunate limitation in the quantity of patient's serum obtained on day #1, it was not possible to carry out the Coombs titer beyond 1:64. Given a normal blood volume at the time of transfusion, the transfused A antibodies would have been diluted only by a factor of ten, hardly sufficient to have ameliorated the hemolysis. That any units of A negative, group-specific blood appeared compatible suggests a prozone phenomenon may have been operating to obscure the in-vitro agglutination.

There is a wide disparity between the saline and Coombs titers obtained on the unit of O negative blood. The titers of the heat-inactivated serum are of special concern since they represent borderline values for acceptability as "low-titer" units. The question arises whether "low-titer" units might really be "high-titer" if Coombs titrations were performed.

The antigenic stimulus which resulted in these high titers is unknown, but recent immunizations could have played a significant role.

Conclusions:

1. Group O "high-titer" blood should never be used as universal donor blood.

2. Single unit transfusions should be discouraged.

CLEANING OF THE FLUOTEC TYPE A

CPT James L. Winter, ANC*

Halothane was used for general anesthesia in 86% of all general anesthetics administered at the 3d Field Hospital in an eleven month period. The anesthetics were administered using the fluotec vaporizer, Federal Stock Number 6515-890-1685. Because we do not have other halothane vaporizers, the fluotec vaporizers are in constant use.

We have had problems with the Fluotec Vaporizer. Sticky control valves and a build up of precipitate have resulted in an erratic output of halothane vapor.

Our fluotec vaporizers have not been calibrated in the past year, although it would be a wise practice to have the fluotec vaporizer calibrated every six months. An extra fluotec vaporizer in the department would permit one to be sent out for calibration and still have a full complement of equipment.

A complete dismantling, cleaning, and reassembly of the fluotec vaporizer should be carried out monthly. The technique for dismantling the fluotec is described in the manual "Instructions for Cleaning Control Valves of Fluotec Vaporizers[1]". This manual is included in the cleaning kit which is a component part of the fluotec vaporizer.

When dismantling the fluotec, extreme care must be taken when removing the circlip on the spindle. A heavy spring is located behind the circlip and can cause the clip to eject at a dangerous speed. Much care must also be taken in removing the control spindle from the bore to prevent damage. This is the metering section of the unit. DO NOT FORCE ANY PART OF THIS EQUIPMENT.

The manual states halothane should be used for cleaning the vaporizer. I have found diethyl-ether to be more effective because it is a better solvent. Ether costs twenty cents for a quarter pound can as compared to halothane which eighteen dollars for a 125cc bottle.

As the parts of the vaporizer are removed, they should be soaked in a pan of ether. This will dissolve the thymol residue which is a preservative in halothane. This residue is the cause of the problems we have experienced with the fluotec vaporizer.

The evaporation canister is dismantled by removing the four nuts on the top cover. The cover is then removed carefully to prevent damaging the bi-metal metering reed. A wick covers the sides of the canister bottom

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and surrounds the bi-metal reed attached to the cover.

A can of ether should be poured over the reed and wick so that it flows into the canister. After rinsing the wicking in the bottom, this ether should not be used again because it contains a high percentage of thymol. Repeat this procedure again with a new can of ether to remove any thymol left in the wicking. The wick after cleaning should be white in colour.

Reassembly should be done with great care. Extra precautions should be taken when reinserting the control spindle in the bore to prevent damage.

After reassembly, the vaporizer may be flushed with oxygen to dry. Set the dial on four percent leaving the drain and fill ports open and setting the liter flow as high as possible for one to two minutes.

The used ether should not be discarded down the sink nor left in stoppered containers. This contaminated ether should be disposed of in accordance with N.F.P.A. bulletin #56 or taken to an open area outside to be safely evaporated.

Conclusion:

The procedure of cleaning a fluotec is easy. Dismantling, cleaning, and reassembly only takes about twenty minutes. This simple preventative maintenance results in less equipment breakdown and a more accurate flow of halothane vapor.

References:

1. Bradford, Leeds and London, "Instructions for Cleaning Control Valves of Fluotec Vaporizers"; Partridge Printers, Keighley, London.

2. W.D. Wylie and H.C. Churchill-Davidson, "A Practice of Anesthesia"; Second Edition Year Book Medical Publishers, Inc., Chicago, 1966.

Editors Note:

The manufacturer recommends laboratory servicing of the Fluotec vaporizer "at the end of twelve months or if preferred at the end of eighteen months". The manufacture also recommends "that the Fluotec be drained once a week. If there is an accumulation of thymol it will appear in the residue which we suggest be drained into a clean beaker. If this is discoloured with the characteristic yellow or brownish colour of thymol we suggest it be discarded instead of being returned to the Fluothane bottle.

We think this procedure should reduce the incidence of sticky valves".

The 32d Medical Depot plans to exchange item for item when laboratory servicing of the Fluotec is required.

A DEVICE FOR MEASURING INTRA-ARTERIAL BLOOD PRESSURE

CPT Jack Norris*

A device which gives the anesthetist and surgeon a constant and more accurate picture of the patient's condition is constantly being sought.

In Vietnam where machines of this type are not readily available to the practitioner, a simple improvised device was put into use. It was used in cases where there was a large blood loss and/or constant arterial pressure reading was desirable.

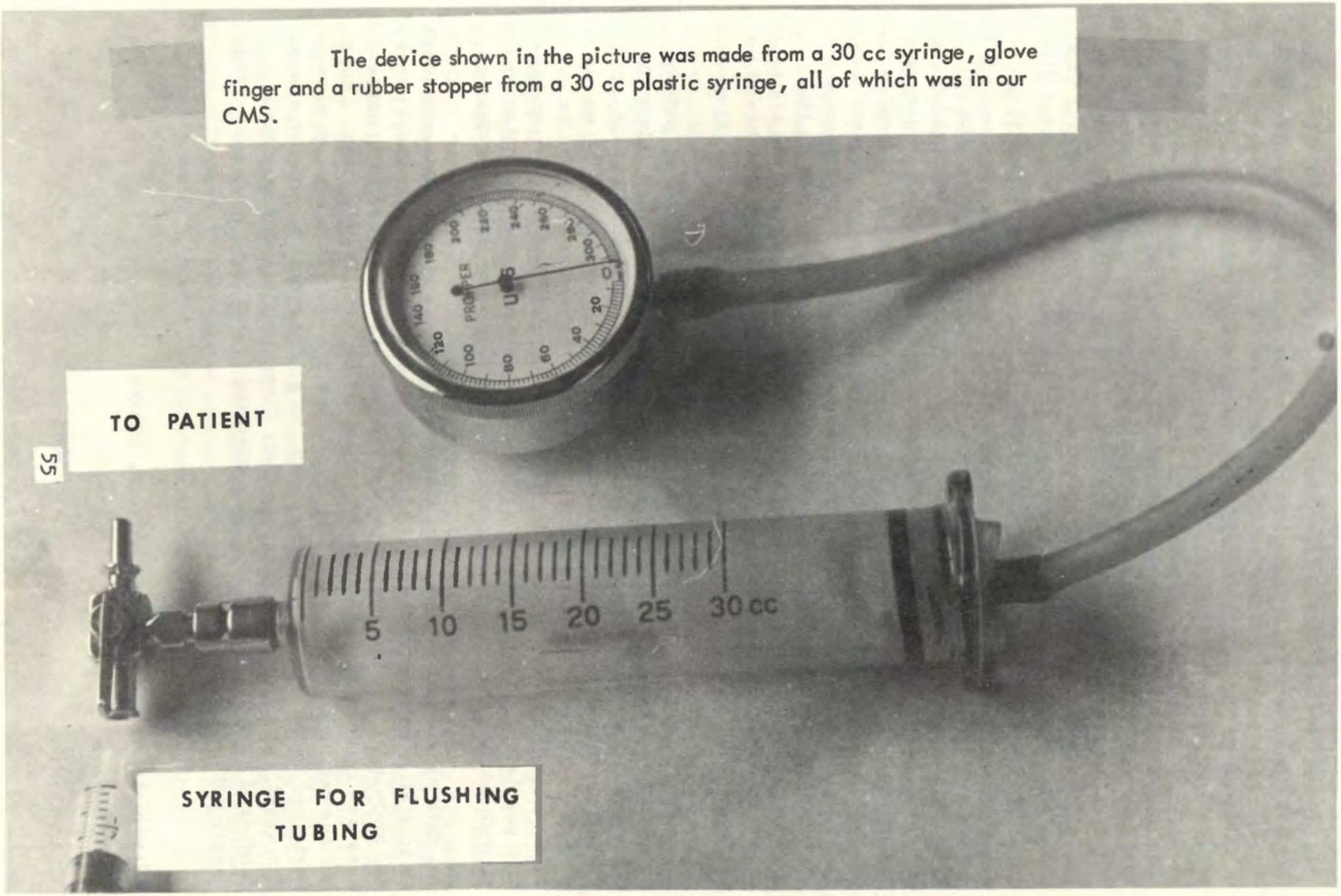
The device consists of a large syringe barrel with an air chamber. One side of the syringe is connected to the patient and the other to some type of pressure measuring system. By the use of a three way stopcock between the syringe and patient, the arterial line may be flushed as needed.

Because of the cushioning effect of the air chamber, distinct systolic and diastolic levels are not seen. The level registered is the mean pressure. This usually was the average of the systolic and diastolic readings when taken by cuff. When first using this device, you must get accustomed to the fact that you are getting the mean, not the systolic pressure.

We found the device very handy and saved a lot of time and work in long and bloody cases, particularily where there were no extremities free from trauma. The radial artery is probably the easiest sight to use for puncture, however, the surgeon can place it where it is most convenient. We found a #18 plastic cannula type needle is excellent and fairly easy to position properly.

* Staff Anesthetist, 93d Evacuation Hospital, APO 96491.

"Memory is what makes you wonder what you forgot to do."


The device shown in the picture was made from a 30 cc syringe, glove finger and a rubber stopper from a 30 cc plastic syringe, all of which was in our CMS.
TO PATIENT
5 10 15 20 25 30 cc
SYRINGE FOR FLUSHING TUBING

MARIJUANA USE IN VIETNAM: A PRELIMINARY REPORT

CPT Wilfred B. Postel, MC*

The use of marijuana by American servicemen in Vietnam is a subject that has provoked much rumor, speculation, opinion, and concern, but little in the way of factual information. This investigation was undertaken to clarify some of the areas of general interest surrounding this drug: when, where, and why do people smoke marijuana, and what distinguishes the smoker from the nonsmoker.

Fifty consecutive new patients at the Mental Hygiene Clinic of the 4th Infantry Division were asked in an interview with the author about their experiences with the drug. One hundred and four patients on the surgical wards of the 71st Evacuation Hospital were given a questionnaire inquiring into their experiences with the drug; each of these patients was given a brief introduction to the nature of the investigation, assured of anonymity, and given the option of completing or not completing the questionnaire. Four patients preferred not to participate; the statements and figures about the surgical population that follow are based on the remaining 100.

The study began with the direct interviewing of the psychiatric patient population. It was felt, however, that any statements based solely on this population would have no general validity and would be subject, rather obviously, to easy dismissal. Patients on the surgical wards were selected for questioning for 3 reasons: they were likely to be currently representative of an environment similar to that of the psychiatric population; they were likely to be randomly selected from that environment by mishap or hostile action; and they were readily available.

All data will be presented simply as percentages and no statements made as to statistical significance. At this time and place the necessary tools and knowledge are not available to do more. For any question, percentages are calculated on the basis of those answering the question. Those not answering are ignored. The questions not answered almost always pertained to the subject's background, e.g., parental income or education level, and for any given question those not answering usually numbered 4 or 5. The questions pertaining to drug use were only very rarely not answered.

*Psychiatrist, 4th Infantry Division, Pleiku

Those who had used the drug fell into two reasonably distinct categories, the experimenters and the habituated. For numerical purposes, a division was arbitrarily established at five experiences: Those using the drug less than 5 times were considered experimenters and those using the drug 5 or more times were designated heavy users, or habituated. The latter's response to the question of frequency of use was usually not numerical, but typically "anytime," or "anytime I can get it." Only with 2 people classed as habituated by the arbitrary division might there be some question as to their classification: one had used the drug 5 times, and one 5 - 10 times.

Among the psychiatric population 56% stated they had used the drug; 30% of the total population were heavy users and 26% experimenters. Among the surgical population 35% had used the drug, 17% frequently and 18% only a few times. The surgical population, unlike the psychiatric population, included a number (24) of career army men (determined by a length of service greater than 36 months. Actually 23 of the 24 described the duration of service in years and only 1 was a relative neophyte with 38 months' service). All of these men had not smoked marijuana. Among the remainder, all of whom had served less than 36 months, 46% had used marijuana. All of the psychiatric population had served less than 36 months.

Among the psychiatric population a large proportion (70%) of the nonsmokers were concerned about possible effects of the drug: addiction, loss of control, insanity. Among the surgical population a large proportion (80%) stated they simply were "not interested" in the drug. One wonders how much of this difference is a manifestation of the difference in the questioning situations and how much any real difference in the populations.

Among both populations smoking marijuana, was a social activity (more than 90% of both groups smoked in the company of other marijuana smokers, more frequently of the field or forward areas than of the base camp or rear areas). This is suggested by four separate group responses: The smokers stated they smoked more frequently in the field than elsewhere. Smokers tended more often to have their first marijuana smoking experience, either prior to service or in the field. Nonsmokers, as a group, had spent a smaller proportion of their RVN tour in the field than had the smokers; and nonsmokers had seen less combat than the smokers. There are at least 2 likely reasons for smoking to be more frequent in the field: Detection is less likely there; and the tranquilizing effect of the drug may be more appreciated in the more stressful forward areas. The usual habit was to smoke the drug after a battle to calm down. Only one person indicated that he smoked the drug while fighting.

Among the habituated in the surgical population, 44% had had their first experience with the drug prior to entering the service, and another 38% had been introduced to the drug in the field. Among the psychiatric habituated 50% had begun to smoke marijuana prior to entry into the military and another 25% in the field. The remainder began either while in the service in CONUS or in a rear area in RVN. The figures for the psychiatric experimenters are very similar to those for the psychiatric heavy smokers. A much higher proportion of the surgical experimenters began to use the drug in Vietnam--50% in the field, 33% in a rear area, and only 6% prior to military service.

The fact that the first experience of the experimenters was much more often unpleasant or neutral than for the habituated is probably an important factor in the experimenter's limited use of the drug. The initial experience was unpleasant for 62% and neutral for 23% of the psychiatric experimenters. A frequent unpleasant effect cited was nausea. Only 1 person described paranoid ideation. Fifty percent of the surgical experimenters maintained they were simply not interested in continuing with the drug and 17% stated they had a bad first experience; 33% reported a pleasant experience. In contrast, 75% of the surgical and 62% of the psychiatric heavy users reported a pleasant first experience with the drug.

Ninety-two percent of the psychiatric patients and 83% of the surgical patients who were habituated described usually pleasant effects. These were predominantly relaxation, a mild euphoria, and pleasant perceptual alterations. An additional 6% of the surgical habituated described unusually neutral effects, most often drowsiness.

Of the habituated, 25% of the surgical and 50% of the psychiatric patients stated they had tried other drugs, usually LSD, amphetamines, and/or opium, the last because of its marijuana-like effects and its easy concealment. One of the psychiatric heavy users had tried heroin on one occasion which resulted in an unpleasant experience. He did not plan to repeat this experiment. A majority of the heavy users who had used other drugs had begun smoking marijuana before they entered the service.

Among the habituated of both populations, 35% stated that they did not intend to continue smoking marijuana after their military service. Among the psychiatric and surgical experimenters, 84% and 83% respectively, indicated that they planned to discontinue smoking the drug after their service. The remainder felt either that they would continue with the drug or were unsure.

The surgical population was asked to estimate the percentage of soldiers who had smoked marijuana in Vietnam. The nonsmokers proposed a figure of 15%, the experimenters 33% and the habituated 57%. This result is perhaps related to the wide variation in the many public statements about the magnitude of this phenomenon in Vietnam.

The socio-economic background of the surgical population was investigated superficially and certain trends were suggested. The nonsmokers and their parents tended to be more often Protestant, more regular in church attendance, more both nonsmoking and nondrinking, poorer (in the case of their parents), and less educated than the habituated and their families. There was a slightly higher percentage of negroes among the nonsmokers. Habituated, experimenter, and nonsmoker were equally law-abiding, as evidenced by similar frequencies of apprehension and correction. The habituated more frequently reported that their parents would be likely to accept their smoking marijuana.

It would be improper to draw weighty conclusions from so small a sample of the troops even in this area in Vietnam. It would be useful, however, to move beyond this preliminary investigation to examine further these suggestive data, and to perform similar studies elsewhere in Vietnam. A more precise delineation of the facts surrounding marijuana use among our armed forces in this area would permit a more realistic assessment of the gravity of the situation.

"It is the giving of one's self that is the best gift of all - giving from one's stock of knowledge, vision, inspiration, enthusiasm, faith, confidence, ambition - all of which makes for opportunity and success."

(Ralph Waldo Emerson)

MARIJUANA IN VIETNAM

MAJ Edmund Casper, MC*
CPT James Janecek, MC**
CPT Hugh Martinelli, Jr., MSC***

Purpose

There were three main reasons for beginning this investigation. First, we wished to determine whether MHCS patients were more prone to use marijuana. Second, we wished to compare soldiers entering and leaving Vietnam to assess the effects of a tour of duty on their use of marijuana and related agents. Finally, it was hoped a tentative answer could be reached as to whether individuals using marijuana were more prone to report for sick call or sustain injuries.

Method

This study began as an informal questioning of all MHCS patients as to whether they had used marijuana. After 200 plus consecutive patients it became apparent that fewer of these individuals had used marijuana than was expected. Also a significant minority of the patients had some sort of deleterious experience. The more the problem was discussed, the more clearly it became apparent that there was a paucity of information regarding the use and abuse of marijuana. To partially prepare for some future investigations the authors decided to statistically assess marijuana usage in (1) MHCS patients; (2) dispensary patients; (3) soldiers entering RVN; (4) soldiers leaving RVN.

To make the study more objective a questionnaire was devised. This series of questions was asked by the professional and technical personnel of the MHCS clinic in as standard a way as possible. Table VII lists the questions and the order in which they were asked. Each research interview was preceded by an explanation of the purposes of the study; that is, "to determine the use of marijuana," and assurances as to both the confidentiality and anonymity of the data. The answers to the questions were then recorded on 5 x 8 cards and filed at the end of each day.

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Results

In the time allotted, 46 MHCS patients were seen in the Americal Division and all 46 were interviewed. The results are tabulated in Table II. Similarily, psychiatric technicians interviewed in the several dispensaries available to us and this resulted in a dispensary patient population of 268. All of the patients seen in the dispensaries suffered from demonstrable organic illness or injuries. The dispensary group data as well as the data collected from the 234 soldiers entering country and the 223 soldiers leaving country are summarized in Table VI. Only those subjects beginning or ending a complete tour of duty were interviewed. In addition to the pertinent questions regarding marijuana and allied subjects, demographic data were compiled as well. As can be seen in Table I length of service, rank, age, and education all seemed within accepted standards of sample equivalency.

A statistical comparison of the 46 MHCS patients and 46 randomly selected dispensary patients was accomplished using nonparametric statistical techniques. The data for these evaluations can be found in Table II. The first hypothesis tested was whether more MHCS than dispensary patients had smoked marijuana. Figure I illustrates a two-way Chi-Square assessment using a one-tail test of significance ($P = .035$). It can be reasonably assumed that more MHCS than dispensary patients had smoked marijuana.

In respect to the absolute quantity of marijuana smoked, a test of medians failed to discriminate a significant difference between the 2 samples. Please see the frequency distribution tested in Table III and the test in Figure II. Because this test compares only those scores above and below a common median, a test using ordinal measurement was accomplished. Using the Mann-Whitney U test, a significant difference was found favoring the MHCS patients ($P = .005$). With considerable assurance, then, one can say that MHCS patients smoke more marijuana than dispensary patients do. Please see Table IV for the distribution tested and Figure III for the test. Further statistical comparison between the MHCS and dispensary patients suggested significant differences. Due to small numbers in some of the analysis the results do not warrant mentioning here. A general approach to the other variables can be found in the discussion section.

When the soldiers entering and leaving Vietnam are compared (see Table V) an upsetting difference is apparent. Contrary to expectancy, 27.7% of the entering subjects are marijuana smokers while only 20.6% of the leaving subjects smoke marijuana. This difference has magnitude since a Chi Square analysis reveals a P of .10 to .05 (see Figure IV) favoring

the entering group. In addition 58.6% of the leaving soldiers reported they used marijuana for the first time in RVN. This enigma will be considered under the discussion section.

The final purpose of this investigation was to tentatively examine the hypothesis that marijuana users were more prone to report for sick call because of organic illness or injury. If this were so, then dispensary patients should report a greater use of marijuana than soldiers entering or leaving country. Some support for this hypothesis can be found in Figures V and VI. Here Chi Square determinations between entering and dispensary group ($P = .01$, $P = .001$). This data only suggests a possible correlation between marijuana use and illness or injury. Only a prospective investigation following marijuana and nonmarijuana users could answer the question with any finality. However, the data is quite strong and an alternative hypothesis is not readily apparent.

Discussion and Conclusions

There are many possible deficiencies in investigations of this nature. Observer bias, sampling errors, and clerical mistakes could lead to erroneous conclusions. For example, the finding that entering rather than leaving soldiers smoked more marijuana could be due to change of marijuana usage over the last year in the general population. That is, perhaps the soldiers who enter RVN now smoke more marijuana than the soldiers who entered RVN a year ago. Also the possibility of conscious distortion, or defensive malingering is real and the results could represent the relative fear of the various groups (MHCS, dispensary, et cetera) to exposure. In this case MHCS patients would be more candid than dispensary patients and dispensary patients more candid than soldiers entering or leaving RVN on the basis of their confidence in the anonymity of the data. Beyond those general restrictions, one of our biggest problems was poorly worded questions. Question 3 where the subject was asked, "Are you using marijuana now?", proved to be particularly troublesome. Many subjects thought this was in reference to the day on which they were being questioned and hence the proportion answering positively was artificially low. Perhaps again, however, this represented a concealment of usage due to fear of exposure and possible punishment. All told, one should view the results previously outlined and those to follow with more than ordinary caution.

Among the more interesting results of this investigation is the finding that MHCS patients are more prone to use marijuana and to a greater extent than dispensary patients. In addition, MHCS smokers are prone to more administrative difficulties than nonsmokers. This propensity for article 15s and court-martials of smokers did not apply to the

dispensary, entering, or leaving groups. This difference between groups in respect to administrative problems, would suggest that the unhappy, impulsive, poorly motivated soldier uses marijuana more frequently or that his problems are accentuated if he uses the agent. It would seem that the latter case, that of marijuana accentuating existing pathology, is more the situation since in the nonmedical subject groups (see Table V), psychiatric contacts are equivalent in the smokers and nonsmokers. Regardless of the possible effects of marijuana on psychiatric morbidity, the user of this agent is more prone than the average individual to use other more hazardous drugs.

An RVN tour does seem to increase the number of soldiers who use marijuana, but as seen in Table II and Table V, a considerable number have already used this drug in the United States. In addition many of them smoked marijuana prior to entering military service. Indeed, a general impression of the investigators is that chronic users of marijuana begin their habit in CONUS or as civilians. We had hypothesized the effect of a tour on the use of marijuana and had anticipated that the leaving group would use marijuana more frequently than the entering group. That the reverse is true puzzles us and if this is a real rather than an experimental difference, then we have a very frightening possibility. It may be that chronic users of marijuana are suffering more illnesses, injuries and wounds than the occasional smoker or nonsmoker. In this case, they are disappearing from RVN sooner than expected: hence, our leaving group has lost a greater portion of smokers than nonsmokers. This tentative hypothesis is questionable and it is more likely that this represents some form of sampling error.

Whether marijuana increases the possibility of reporting for sick call remains unclear. Our data supports this thesis, but only a carefully done prospective study could answer this question. Certainly respiratory diseases are more frequent in marijuana smokers and at least theoretically susceptibility to other illnesses or injuries should increase.

Some of the more general results of this study are at odds with widely held assumptions. First, marijuana smoking is not as common as supposed. Second, most smokers have tried it only on a few occasions and the chronic abuse of marijuana is a small minority. Third, even if marijuana were legalized, only a minority of individuals would try it. Fourth, many individuals report that marijuana was either unrewarding or unpleasant and indicate no desire to repeat the experience. Finally, it would seem individual taste and convictions limit the use of the drug more than fear of exposure and punishment.

At least 20% of all soldiers in the Americal Division have tried marijuana, but only a very few have become chronic users. This would suggest a different approach to effective control of the more chronic abusers of marijuana. Referral of such cases by command to MHCS would seem to be indicated.

Beyond our tentative findings and conclusions the authors feel this investigation has heuristic value. Further research is desperately needed and the question as to the adverse effects of marijuana demand answers. If the user has more of a chance of being wounded or killed in combat, then every effort should be made to determine the degree of risk and how it might be reduced. Medical science would be interested in the effects of marijuana smoking on psychiatric and medical morbidity. Hard, persuasive facts would reduce the ignorance and mystery surrounding marijuana. Until these facts are obtained no intelligent policy of control can be formulated.

Summary

MHCS patients, dispensary patients, soldiers entering RVN and soldiers leaving RVN were interviewed with respect to marijuana smoking. Appropriate statistical analysis suggests more MHCS patients smoke marijuana than general medical patients. The implications of this and other findings are discussed and recommendations are made as to the necessity for further research.

Afterthought: Since the authors had neither a calculator or computer, the reader is cautioned regarding the arithmetic. We apologize for our errors and hope you will assist us with your corrections.

TABLE I

Comparison of 46 MHCS Patients, 268 Dispensary Patients, 234 Soldiers Entering Country and 223 Soldiers Leaving Country With Respect to Demographic Characteristics

	MHCS Pts	DISP Pts	ENTER	LEAVE
Mean Age	21.3	21.9	21.4	22.7
Mean Rank	E-3	E-4	E-3	E-4
Mean Length of Service	20.3 Mos	26.4 Mos	16.2 Mos	28.9 Mos
Mean Education	11.1 Yrs	12.3 Yrs	11.9 Yrs	12.2 Yrs

TABLE II

COMPARISON OF 46 MHCS PATIENTS AND 46 DISPENSARY PATIENTS WITH RESPECT TO MARIJUANA USAGE

	MHCS	Dispensary
Number of Individuals In Each Group	46	46
Number and % Who Have Used Marijuana	24 (52.1%)	15 (32.6%)
Number and % Who Report Marijuana Pleasant	16 (66.6%)	12 (80%)
Number and % Who Report Using Marijuana Now	10 (21.7%)	5 (10.8%)
Number and % Who Began Using Marijuana in RVN	10 (41.6%)	3 (20%)
Number and % Who Began Using Marijuana In US	14 (58.4%)	12 (80%)
Number and % Who Began Using Marijuana as Civilians	10 (41.6%)	10 (66%)
Number and % Marijuana Smokers With Previous Psychiatric Attention	10 (41.6%)	0 (0%)
Number and %Non-Marijuana Smokers With Previous Psychiatric Attention	5 (22.9%)	5 (16.8%)
Number and % Marijuana Smokers Using Other Drugs	9 (37.5%)	3 (20%)
Number and % Non-Marijuana Smokers Using Other Drugs	1 (4.5%)	2 (7.5%)
Number and % Who Would Use Marijuana If Legal	19 (41.3%)	10 (21.7%)
Number and % Marijuana Smokers With Disciplinary Action	16 (66.6%)	6 (40%)
Number and % Non-Marijuana Smokers With Disciplinary Action	6 (27.3%)	12 (38.7%)

TABLE III

Comparison of 24 MHCS Patients and 15 Dispensary Patients
With Respect to Amount of Marijuana Smoked

Times Smoked	MHCS	Dispensary
0-10	14	9
10-50	2	2
50-100	1	0
100-200	1	3
200+	6	1
Total Number of Patients Smoking Marijuana	24	15

TABLE IV

Approximate Usage of Marijuana By
24 MHCS Patients and 15 Dispensary Patients

	MHCS Patients	Dispensary Patients
Usage by Individual Patients	1, 1, 1, 1, 1, 1, 1, 3, 3, 3, 3, 4, 5, 10, 15, 20, 50, 150, 370, 500, 730, 1000, 1300, 3000	1, 1, 1, 1, 2, 2, 2, 3, 5, 10, 20, 100, 100, 150, 10,000 (?)

TABLE V

COMPARISON OF 268 DISPENSARY PATIENTS, 223 SOLDIERS ENTERING COUNTRY AND 234 SOLDIERS LEAVING COUNTRY WITH RESPECT TO MARIJUANA USAGE

Number in Each Group	268	234	223
Number and % Who Have Used Marijuana	106 (35.8%)	65 (27.7%)	46 (20.6%)
Number and % Who Report Marijuana Pleasant	58 (54.7%)	44 (67.6%)	23 (50%)
Number and % Who Report Using Marijuana Now	23 (8.5%)	5 (2.1%)	4 (1.7%)
Number and % Who Began Using in RVN	47 (44.3%)	3 (4.6%)	27 (58.6%)
Number and % Who Began Using in US	69 (55.7%)	62 (95.4%)	19 (41.4%)
Number and % Who Began Using As Civilians	42 (38.6%)	53 (81.5%)	15 (32.6%)
Number and % Marijuana Users with Previous Psychiatric Attention	16 (15%)	5 (7.6%)	4 (8.6%)
Number and % Non-Marijuana Smokers With Previous Psychiatric Attention	17 (10.4%)	7 (4.1%)	13 (7.3%)
Number and % Who Would Use Marijuana If Legal	68 (25.3%)	77 (32.9%)	41 (17.9%)
Number and % Non-Smokers Who Use Other Drugs	7 (4.3%)	9 (5.3%)	1 (0.6%)
Number and % Marijuana Smokers Using Other Drugs	18 (16.9%)	21 (32.3%)	6 (13.1%)
Number and % Non-smokers With Disciplinary Actions	45 (24%)	27 (15.9%)	37 (21.4%)
Number and % Smokers With Disciplinary Action	29 (27.4%)	16 (24.5%)	11 (23.9%)

TABLE VII

MARIJUANA QUESTIONNAIRE

1. Age, Rank, LOS, Education
2. Have you ever used marijuana? Was it a pleasant experience?
3. Are you using it now?
4. When did you first smoke marijuana?
   a. US-RVN
   b. Armed Forces-civilian
5. Number of times used approximately - total number of times
6. How many articles 15 or court-martials?
7. Any psychiatric consultations? Been seen by MHCS or seen by psychiatric agency?
8. Have you used any other drugs for kicks? If so, what kind? Which did you use first?
9. Would you use marijuana if it were legalized?

TABLE VI

Comparison of 106 Dispensary Patients, 65 Soldiers Entering Country, 46 Soldiers Leaving Country with Respect to Amount of Marijuana Smoked

Times Smoked			
0-10	67	35	34
10-50	17	13	4
50-100	4	3	4
100-200	14	6	0
200+	4	8	4
Total Number of Patients Smoking Marijuana	106	65	46

FIGURE I

Statistical Comparison of 46 MHCS Patients and 46 Dispensary Patients with Respect to Use of Marijuana

	YES	NO	
MHCS Patients	24	22	46
Dispensary Patients	15	31	46

$X^2 = 3.37$ df = 1 Tail Test

PL 1/2 (.07) = .035

FIGURE II

Statistical Comparison of 46 MHCS Patients Versus
46 Dispensary Patients with Respect to Amount of Marijuana Smoked

The Test Used is the Median Test with
$A = .05$, $N = 39$, $n_1 = 24$, $n_2 = 15$, and the Median Being 1

		MHCS	DISP	
Number Scores $>$	Median	14	9	23
Number Scores $<$	Median	10	6	16

$X^2 \leqq 1$, N.S.

FIGURE III

Statistical Comparison of 46 MHCS Patients Versus
46 Dispensary Patients with Respect to Amount of Marijuana Smoked

Statistical Test Used is Mann-Whitney U Test with
$n_1 = 15$, $n_2 = 25$, $A = .05$, and Computing of Z

$$U = (15)(24) + \frac{24(24+1)}{2}$$

$$U = 263^*$$

$$Z = 263 - \frac{(25)(14)}{2}$$

$$\sqrt{\frac{(25)(14)\ 25 + 14 + 1}{12}}$$

$Z = 2.59$ Tail

$P = .0048$

* Uncorrected for ties

FIGURE IV

Statistical Comparison of 234 Entering and 222 Soldiers Leaving Country with Respect to Use of Marijuana

	YES	NO	
In-Country	65	169	234
Out-Country	46	176	222
	111	345	

$X^2 = 3.13$ Two tail test

$P = .05 - .10$ (N.S.)

FIGURE V

Statistical Comparison of 234 Soldiers Entering Country And 268 Dispensary Patients with Respect to Use of Marijuana

	YES	NO	
In-Country	65	169	234
Dispensary	106	162	268
	171	331	502

$X^2 = 6.8$ Two tail test

$P \leq .01$

FIGURE VI

STATISTICAL COMPARISON OF 222 SOLDIERS LEAVING VIETNAM AND 268 DISPENSARY PATIENTS WITH RESPECT TO USE OF MARIJUANA

Dispensary Patients	106	162	268
Out Country	46	176	222
	152	338	490

$X^2 = 20.9$ Two tail test

$P \leq .001$

PREVENTIVE MEDICINE IN RIVERINE WARFARE

LTC Travis L. Blackwell, MC*
CPT Peter R. Duca, MC**
CPT Philip S. Ellerin, MC***

Riverine warfare is land warfare conducted where the main lines of communication are by waterways. The 9th Infantry Division and Naval Task Force 117 have conducted extensive riverine operations in the Rung Sat Zone and Mekong Basin Delta areas for the past 14 months. This type of warfare is not new, but the applications of modern medical care have required innovation, modification, research and development[1].

The chief medical problems are generated by the hostile environment for operations. The terrain consists primarily of partially inundated areas of alluvial soil interlaced with waterways. The land is generally very flat and is used chiefly for rice growing. The streams are usually bordered by vegetation consisting of mangrove thickets, Nipa palm, banana trees and assorted vegetation which is usually very thick. The climate is generally hot and humid. This is further complicated by the monsoon season which aggravates the adverse features of the terrain and increases the humidity. It is during this latter period that an increased incidence of disease and injury can be anticipated. All preventive medical measures must be instituted and constantly monitored by timely reports[2].

Commanders must aggressively enforce these measures. Lapses in discipline must be brought to their attention and immediately corrected. Violation of this principle will cause a non-effectiveness rate of troops that will seriously impair the capability to conduct tactical operations.

This paper is a report of the lessons learned. We shall consider only the specific problems faced, our attempts at solution and the results of these efforts. We hope this may be of some value to those who follow us in this war; other units in this theater which may have similar problems but of less magnitude; and to the medical personnel who may be involved in future riverine operations.

General:

The usual principles of immunization, sanitation, nutrition and hygiene are applicable in this environment. They are well established and should receive emphasis. These are readily available from regulation and field manuals and will not be further considered.

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*** Dermatologist, 9th Infantry Division, Dong Tam, Vietnam.

Bacterial Infection:

The most common diseases seen in riverine warfare are superficial skin infections. Pyoderma and "tropical" immersion foot are very common problems. Treatment of these conditions is standard. Two points are worthy of mention. Many of the bacterial infections are due to penicillin resistant staphylococci. Penicillinase resistant drugs should be used in treatment of such cases. Healing of tropical ulcers is hastened by daily debridement followed by application of tissue paper and benzoin daily once the infection has cleared. This saves 3-5 days in returning troops to the field.

Dermatophytosis:

The most serious problem and one which comprises about 70-80% of all diseases is dermatophytosis chiefly of the feet, legs and groin. The etiologic agent is most commonly Trichophyton mentagrophytes. T. rubrum is much less common. Treatment of these diseases is not usually a difficult problem. They respond readily to systemic griseofulvin (preferably of the micropulverized variety given on a full stomach) and topical tolnaftate. The latter agent has been found more useful than undecylenic acid. A scientific study of various agents is being conducted by this division to establish the best treatment regimen.

The control of these diseases is difficult. A broad program of basic research into the etiology, pathogenesis, prevention and treatment of this problem is being undertaken by this division in cooperation with many other agencies. This program is called Operation Safestep. Measures thus far helpful in prevention of Dermatological Disease are:

1. Limitation of Exposure: At the present, operations are planned so that they will last no longer than a previously specified number of days. The incidence of disease is directly proportional to length of exposure. This imposes a limitation on the choice of targets for the commander which is very undesirable.

2. Meticulous Foot Care: The important factors in foot care are frequent changing of socks, massage of feet, and liberal use of foot powder. In this division, sock resupply is accomplished with the same priority as ammunition. This required approval for the increase of the basic allowance of socks from five to fifteen pair, allowing availability of clean socks at all times.

3. Treatment of Early Lesions: Soldiers are evacuated from the field for treatment. All men are inspected on return to the mobile riverine base. Early lesions clear in three days with no loss of duty time. Severe lesions can consume up to three weeks with a considerable loss of duty time. Early lesions are diagnosed by the examination of the entire battalion upon return from an operation.

4. Skin Conditioning: When troops are not on operations they are encouraged to get into "shower shoes" and abbreviated clothing. Ventilation and sunshine are good preventives.

5. Foot Education: As part of the processing into this division each individual is given an hour of instruction on care of the feet. He is also introduced into abbreviated clothing and shower shoes at this time.

6. Griseofulvin Prophylaxis: A preliminary study of griseofulvin prophylaxis has been performed by this division[4]. The results were a significant reduction in fungal disease of about 70%. Three other studies have been completed or are in progress. This should be an important drug in the prevention of non-effectiveness due to fungal infections.

Heat Injury:

The basic principles underlying disability due to heat injury are well known. Current regulations and manuals are readily available to anyone wishing to review this subject. These required a continued emphasis by the medical staff and commanders in the tropical riverine environment. However, there are a few lessons learned in this division which are of practical importance. All personnel must be educated to think differently about the amount of water and salt which is a daily requirement for effective operation in this environment. This is particularly true of commanders who have not had a previous tour in Vietnam.

The soldier with one canteen of water can fight efficiently for three hours. Most of the morbidity from heat injury in this division has been sustained when troops become engaged in heavy contact on the first day of operations. This was invariably due to lack of planning by commanders.

The following are the basic measures of importance. They are given in current division regulations and disseminated by means of command letters, notices in the daily bulletin and by lectures to incoming commanders and command conferences.

1. Staff planning for battle must include an adequate consideration for both salt and water in the initial operation and for resupply.

2. Most paddy water in the riverine environment is not suitable for drinking even after treatment with iodine tablets because of its high mineral and organic material content.

3. Each commander will insure by personal inspection or by inspection by each squad leader that each man prior to an operation has the following items on his person.

a. Two canteens filled with water.

b. Each man has salt and water purification tablets.

c. Each squad has an extra supply of water.

Summary:

Preventive medicine found useful in tropical riverine warfare has been reviewed. Some of the lessons learned which have proven valuable have been given. The unsolved problems have been delineated and the coordinated efforts of this division to solve these problems have been outlined.

References:

1. Blackwell, Travis L., Ziegler, T. W., Ellerin, Philip, S., Duca, Peter R., "Medical Support for Riverine Warfare," Military Medicine, in press.

2. Taft, Foster H., "A New Sick Call Report for Division Use", USARV Medical Bulletin, January-February, 1968.

3. Blackwell, Travis L., Duca, Peter R., Hickey, Timothy F., Ellerin, Philip S., "Operation Safestep: An Approach to the Problems of Dermatological Disease in the Riverine Environment", USARV Medical Bulletin, in press.

4. Ellerin, Philip S., Hickey, Timothy F., and Blackwell, Travis L., "Use of Prophylactic Griseofulvin in Prevention of Dermatophytosis", USARV Medical Bulletin, in press.

"The nice thing about a dull party is that you get home at a decent hour."

GRANNIE PROVES IT CAN BE DONE

MAJ Edythe Sheridan, ANC*

"But, Ma'm," he pleaded, "let me try."

Such an overgrown boy, I thought. A man in physical build, an excited, exuberant boy in spirit, and somewhere between these two extremes lay the workable capability of the young soldier standing before me impatiently awaiting my decision.

Being new in-country I vacillated between absolute negativeness and absolute positiveness regarding the feasibility, possibility, and/or probability of training the Vietnamese patients to package surgical dressings for sterilization. "Major," the voice of my enthusiastic technician interrupted the heated discussion among the men, "don't listen to these guys. I'll prove what I'm saying. I know they'll do it and do it right. Let me try, HUH?" The confidence of youth shone in his eyes. Conviction rang in his words, and assurance sat proudly upon his shoulders. I nodded in agreement and said, "Okay, the job is yours. Give it a try, as the saying goes, it's your baby." So it was upon the dream of SP4 William Campbell that the Vietnamese patients of the 36th Evacuation Hospital, Vung Tau, Vietnam were asked to volunteer their services in packaging surgical dressings for sterilization.

Loud, excited, masculine and feminine voices interrupted my mathematical calculating activity. Leaning back in my chair I tried to decipher the sounds increasing in tempo and intensity with each passing moment. Curiosity, ever present commodity of womanhood, captured me and, laying my pen down, I walked back to the scene of commotion. What a sight! SP4 Campbell, a wide grin on his face and hat cocked rakishly over one eye was leaning against the door jamb watching, with glee and delight, Grannie, probably our oldest volunteer, vigorously scrubbing her hands and supervising her two small charges, Sunshine age 3 and Carnation age 5 as they washed their's. The rest of the crew stood motionless intrigued by the novelty and adding their comments to enhance the confusion. SP4 Campbell's enthusiasm knew no bounds. Seeing me, he straightened up and the words tumbled out almost incoherently as he explained. Grannie had come in demanding a pan of water for the crew outside, whose hands were already washed, then brought the little ones in with her and was saying in effect, "GI too slow. Everyone all ready. Hands washed. Let's get this show on the road!" Her words failed her so she was pointing to the boxes of supplies and gestulating to those present to carry the supplies out of doors so the work could be done. "I hardly believe it myself," Campbell was saying, "Ma'm, it's just GROSS!"

Grannie with her two charges marched out the door. Firmly clasped in

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each hand were the tools of the trade--tape dispenser, marking crayon and an extra roll of tape. Indeed it was an achievement to be proud of.

Standing there listening and watching them walk out proud as peacocks with their own self importance, my mind flashed back to the beginning of the project. Sponges were hidden beneath the building. 2x2s were labeled ABD. Fine mesh gauze more often than not was marked 2x2, and cotton tipped applicators had been found under the misnomer, 4x8. Opening packages on the ward was, depending on one's sense of humor, hilarious or disastrous. When I entered the picture and corrected some of these mistakes, the Vietnamese thought it the funniest thing on earth. Poor Campbell really took a riding. I held him accountable and amazingly enough so did the Vietnamese! Permissive authority. The textbook calls it permissive authority. I turned the whole project over to SP4 Campbell, and I appeared only to encourage and say thank you.

OJT was at its finest--demonstration and return demonstration, repetition and more repetition. Assembly lines had nothing on us. On any sunny day between the hours of 0915 and 1115 our volunteer patients assembled on the Red Cross patio, the only shaded outdoor area. It was a strange mixture of young and old, the well and the infirm, the lame and the halt. They came on foot, on crutches, in wheelchairs and frequently were carried out in the arms of the corpsman. Patients and their relatives, each one did his bit of specialization and specialization it was! It was soon apparent that different aspects of the job held more status than others. Labeling was the first choice. Everyone wanted to label and for some unexplainable reason pulling a length of tape off the dispenser and taping the packages had a thrill all of its own. The smallest members of the crew loved to count.

Each of our patients had been renamed on entering the hospital with an American name suggestive of the patient's personality or special characteristic--Squat, Ignatious, Old Jim, Mary, Grannie, Festus. Each had a different injury and each contributed his part to the assembly line productivity.

When SP4 Campbell initiated his little routine he started buying cokes out of his own pocket money. Needless to say the word spread and his crew swelled. This mistake was easily rectified with the help of our mess sergeant who supplied Koolade or occasionally the real treat, crushed ice and sugar. Then shades of the "union"--if for any reason the cold drink was not delivered on or about 1015, there arose a chattering and clamoring that would rival that of St. Nick arriving on the rooftops. It took only a little imagination to decipher the jargon to mean, "No drinkee, no workee!" Yes, indeed it was an achievement to be proud of.

The system found to be the simplest and most effective is as follows using 4x4s as an example. Screen your personnel and know which task is

best assigned to whom. Manning hours between 0900 and 1130 are most productive as afternoon is siesta time for all Vietnamese. They all prefer to work sitting down, so the long mess hall table was used most advantageously. At the starting point place the item to be packaged, 4x4s. The first individual counts out five or a given specified number and passes them on to the second person for packaging. The package is then moved to the third person for folding of the end of the bag. The fourth person tapes the bag and passes it to the fifth person for labeling and dropping into the storage bin. Depending on the number of persons, two or more can be assigned to the same task. We found labeling as the final step to be most effective. Items were less apt to be mislabeled and there were no marked envelopes left over. One other very important lesson learned was - DO ONLY ONE TYPE OF SUPPLY AT A TIME WITH ONE GROUP. When two or more groups are working, use separate tables and provide more supervision.

Successful? Yes, if there is organization and utilization of personnel, patience, perseverance and continuity of on the job training. As in any transitory situation the fully trained productive worker is most often replaced with the untrained and/or unskilled. In using the Vietnamese patients this variable factor is compounded by the transitory status of the patient and/or the military member working with the patients.

Reward? This comes the day you hear a commotion at the end of you CMS and upon investigation you find Grannie and her youngsters asking to wash their hands so they can help. Your crew passes them the soap and towel and with smiles, move aside to make room for Grannie and the kids to work side by side with "No. 1 GI" packaging surgical dressings for sterilization.

"There is nothing wrong with the younger generation that the best specimens of the older generation did not somehow manage to out grow."

Anonymous

A CASE OF ATYPICAL CANINE RABIES

CPT Howard C. Johnson, VC*
CPT Harold D. Bauman, VC**

INTRODUCTION

Rabies, a fatal infectious disease of warm-blooded animals, is caused by a filtrable virus which is transmitted through the saliva of a rabid animal and is characterized by an emotional and neurological disorder with reflex excitability, paralysis and death. The high incidence of rabies among dogs in Vietnam makes it inevitable that the veterinarian will be confronted with the problem of a rabid dog. This case report illustrates the importance of remaining constantly aware that atypical rabies may accompany other disease conditions.

REVIEW OF LITERATURE

Although the neurotropic virus of rabies primarily affects the canine and feline species, all warm-blooded animals are susceptible. Other than in the saliva, the virus is found in nerve tissue, less frequently in urine and lymph fluid, and rarely, if ever, in blood, milk or other body fluids of infected animals.

The incubation period varies greatly. According to Rife in Canine Medicine, the minimal period under natural conditions is about twelve days and in extreme cases may be as long as one year, but the majority of cases develop in 15 to 25 days. Most authorities are of the opinion that the shorter the distance from the wound to the brain, the shorter the incubation period; however, this has been questioned. Innate resistance or acquired immunity appears to be a major factor. Adult dogs appear to be more resistant and have a relatively longer incubation period than young dogs.

Rife gives the pathogenisis as follows: The number of days between exposure and the appearance of clinical signs is governed by the time at which the virus attached itself to the nerve endings and not necessarily by the time of deposition in the tissues. It is believed that the rabies virus normally remains and multiplies at the site of deposition for about two days before nerve attachment is effected. This is supported by the

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fact that hyperimmune antirabic serum will protect if administered within 48 hours after exposure or before nerve attachment is effected; but, such serum is of little or no value after that 48-hour period. It is notable in that once the virus invades the nerve tissue, it becomes firmly attached and its biological characteristics, repetition and pathogenicity are no longer altered or suppressed by the disease protective mechanisms of the body and death inevitably follows.

Tierkel, in Current Veterinary Therapy, divides the usual clinical course into 3 stages, i. e. the prodromal, the excitative, and the paralytic. Further classification divides the usual case into either "furious rabies" or "dumb rabies." The term "furious rabies" is associated with the animal in which the excitative stage is predominant, while "dumb rabies" is characterized by an extremely short or absent excitative stage, and the disease progresses quickly to the paralytic stage. Another clinical picture, in addition to furious and dumb rabies, is also recognized in which none of the usual clinical features of rabies are readily recognizable. This is referred to as "mongrel" or "atypical" rabies.

The prodromal stage lasts two to three days and is characterized by subtle changes in temperament, a slight temperature rise, dilation of the pupils and a sluggish corneal reflex. The usually unaffectionate dog may become overly affectionate, whereas the affectionate dog may become melancholy and seek seclusion. The animal may have a normal appetite or it may develop anorexia and eat only when coaxed. If the animal is caged, claustrophobia may develop and the dog manifests restlessness, has hallucinations, snaps at imaginary flies, and barks at the slightest provocation with little change in voice. Some dogs become dull and listless, changing their position frequently as if seeking comfort. Females may come in heat. In summary, the animal in the prodromal stage exhibits little change except the mental distrubances which may be manifested by apathy, increased affection or melancholia. During this stage, the saliva is highly infective and is more profuse than in the later stages; the dog will bite if vexed.

The successive signs that develop determine the form of rabies encountered, either dumb rabies or furious rabies.

In dumb rabies, paralysis is the predominant sign. The face shows a sad expression due to relaxation of the facial muscles, and the muscles around the eyes contract causing a squint of the eyes. The conjunctiva may be reddened and a mucopurulent exudate may be present. The pupils are dilated and give the dog a far-away, glassy stare. Upon standing, the dog may weave, have muscle tremors or spasms and may stumble.

The lower jaw generally is dropped because of paralysis and there is a characteristic change of the voice due to a partial paralysis of the vocal cords and muscles of the thorat. The pitch is lowered and the crescendo comes in the middle of the bark instead of the beginning as in a normal dog. The cardinal signs of dumb rabies are paralysis of the jaw and facial muscles, ptosis, change in voice, dilation of the pupils, and protrusion of the membrana nictitans (third eyelid).

Furious rabies presents similar prodromal signs as occur in dumb rabies with perhaps a greater irritability causing the animal to roam and bite at moving objects in its path. The facial expression seen in furious rabies is more alert, simulating fear or anxiety. The eyes follow moving objects intently, and there is a cunning eye expression with strabismus and dilation of the pupils, together with a protrusion of the membrana nictitans. The furious animal will appear more tucked-up in the abdomen than the dumb animal because of muscle contractions. During the wandering period, which may last for two to three days, the animal may travel as much as 20 miles. Upon confinement, evidence of claustrophobia is pronounced and the dog often attacks the cage breaking teeth. Hallucinations and rage definitely portray furious rabies.

In mongrel or atypical rabies, the animal shows neither the hypersensitivity of the furious type, nor the paralysis of the dumb type. There may be incoordination with general weakness, or, as we shall show, the first sign of rabies may be the death of the animal.

CASE REPORT

On 4 July 1968, a soldier presented a female dog, approximately 18 months old and weighing 12 pounds, to our clinic for treatment of traumatic injuries suffered in a fight with another dog 2 - 3 days previously. The initial examination revealed a 5 cm. laceration over the right shoulder and what appeared to be a lacerated cornea of the left eye. The laceration over the shoulder was debrided and sutured under a local anesthetic. The cornea failed to stain with sodium fluroescein indicating that the corneal epithelium had regenerated. Further damage to the anterior or posterior chambers of the eye could not be ascertained due to corneal opacity. An antibiotic-cortisone ophthalmic ointment was placed in the eye B.I.D. and penicillin was administered intramuscularly and repeated daily for seven days. The dog exhibited a friendly, though shy, disposition which was her normal manner according to the soldier.

During the seven days of therapy, the animal responded affectionately to our care and the appetite and bowel movements appeared normal.

The animal's apparent emotional connection with us was such that as we would near the cage she would become excited, although always friendly, and urinate which is not abnormal for many caged dogs. On the fifth day of therapy the cornea cleared sufficiently for examination of the chambers. An anterior synechia was noted. The fundus of the right eye appeared normal, but the fundus of the left eye could not be adequately examined due to a lens opacity.

On the morning of 10 July at 0730 hours the animal was examined and treated. There was no change in her usual temperament and behavior and the examination revealed no abnormal findings other than those previously noted. When returned to the cage following treatment, the animal "circled" several times before lying down. At 0915 hours that same morning the animal was found dead. The intact head was separated from the body and held at 4°C until the next morning when it was sent to the 9th Medical Laboratory for post-mortem rabies examination. This is routinely done with all animals that die for no apparent reason due to the high incidence of rabies in Vietnam. The laboratory report was positive for rabies on Seller's stain for negri bodies, fluorescent antibody examination, as well as on mouse inoculation and reaffirmed by Seller's and flurescent antibody.

COMMENT

Only during the last two hours of life did the dog exhibit a typical suggestive sign of rabies, i.e. "circling," and only in retrospect can this be said to have been significant. At no time did the dog exhibit paralysis, hallucinations, or even an apparent change in temperament.

CONCLUSION

In an area such as Vietnam with a high incidence of rabies, the history of an animal being in a dog fight should alert the veterinarian to treat that animal as a rabies suspect. It should be kept in mind, as the lesson in this case report points out, that rabies may not manifest itself in either its typical furious form or dumb form, but rather as a completely atypical form.

REFERENCES:

1. Rife, Charles C., DVM, in Canine Medicine, Second Edition, revised by Jesse F. Bone, BA, BS, MS, DVM. American Veterinary Publications, Santa Barbara, Cal. 1962.

2. Tierkel, Ernest S. VMD, in Current Veterinary Therapy, 1966-1967, edited by Robert W. Kirk, DVM. W.B. Saunders Co., 1966

The refugee hamlet of Nam Dong is a predominately Catholic village of 4,000 located near Vung Tau on the road to Baria. The hamlet's civic action program is the responsibility of the 147th Assault Support Helicopter, the "Hillclimbers".

Past civic action programs of various other Vung Tau units have produced a Catholic Church, a Grade School, and a Nursery School. With the support of the 36th Evacuation Hospital, a MEDCAP program is held weekly. Approximately 100 to 120 individuals are seen each week.

NEW ARRIVALS

September 1968

Name	Grade	Branch	Arrived	Assigned
AARON, John	MAJ	ANC	7 Sep 68	85th Evac Hosp
BERGMAN, John T.	COL	MC	3 Sep 68	91st Evac Hosp
BROUILLETTE, Robert F.	MAJ	MSC	12 Sep 68	32d Med Depot
CARDELL, Jose E.	MAJ	MC	28 Sep 68	9th Med Lab
CHEW, Willa C.	MAJ	ANC	18 Sep 68	95th Evac Hosp
DRAKE, Donald H.	MAJ	MSC	3 Sep 68	43d Med Gp
FIELD, Richard W.	MAJ	MSC	28 Sep 68	4th Inf Div
GARCIA, Luis F.	MAJ	MC	28 Sep 68	85th Evac Hosp
GODDY, Leonard A.	MAJ	MC	14 Sep 68	8th Fld Hosp
GRAHAM, Paul A.	MAJ	MC	26 Sep 68	71st Evac Hosp
GRANT, Robert N.	MAJ	MC	17 Sep 68	24th Evac Hosp
HAGEN, Raoul O.	LTC	MC	14 Sep 68	93d Evac Hosp
HUTTON, John E., Jr.	MAJ	MC	26 Sep 68	91st Evac Hosp
KNEPSHIELD, James H.	MAJ	MC	25 Sep 68	3d Fld Hosp
KOEBELE, Eberhard	MAJ	MC	21 Sep 68	91st Evac Hosp
LLOYD, Joseph D.	LTC	MC	3 Sep 68	9th Inf Div
LOMBARD, James E.	MAJ	MSC	8 Sep 68	45th Med Co
MACGREGOR, Robert J.	LTC	MC	14 Sep 68	71st Evac Hosp
MAYOTTE, Richard V.	MAJ	DC	20 Sep 68	40th Med Det
MCCLURE, Jack B.	COL	MC	25 Sep 68	71st Evac Hosp
MOTES, Joseph L., Jr.	LTC	MC	4 Sep 68	12th Evac Hosp
MCKEEVER, Frances L.	MAJ	MSC	12 Sep 68	67th Med Gp
NARBUTH, Benjamin L.	MAJ	ANC	19 Sep 68	22d Surg Hosp
OGLESBY, James E.	MAJ	MC	26 Sep 68	27th Surg Hosp
QUINN, Robert H.	COL	MC	3 Sep 68	USARV Prev Med Consul
REID, Robert L.	LTC	MC	22 Sep 68	25th Inf Div
SEBESTA, Donald	MAJ	MC	22 Sep 68	67th Evac Hosp
SMITH, Lilamae	MAJ	ANC	14 Sep 68	36th Evac Hosp
SMITH, Philip P.	MAJ	MC	17 Sep 68	8th Fld Hosp
WHEELING, James R.	MAJ	MC	4 Sep 68	85th Evac Hosp
WILLIAMS, Troy H.	MAJ	MC	26 Sep 68	312th Evac Hosp
ZARNICK, Florence A.	MAJ	ANC	15 Sep 68	74th Fld Hosp

October 1968

ABERILLA, Romulada P.	MAJ	ANC	9 Oct 68	95th Evac Hosp
AIRD, Margery E.	MAJ	ANC	9 Oct 68	312th Evac Hosp
ALLRED, Kate	MAJ	ANC	9 Oct 68	312th Evac Hosp
ANDERSON, James R.	MAJ	MC	7 Oct 68	55th Med Gp

Name	Grade	Branch	Arrived	Assigned
BALIKER, James L.	MAJ	MSC	12 Oct 68	18th Surg Hosp
COOPER, Robert I.	MAJ	ANC	5 Oct 68	17th Fld Hosp
EISENBERG, Benson L.	MAJ	MC	1 Oct 68	68th Med Gp
FLOWERS, Herschel H.	MAJ	VC	2 Oct 68	4th Med Det
HESTER, Pauline W.	MAJ	ANC	9 Oct 68	312th Evac Hosp
JARSTFER, Bruce S.	MAJ	MC	4 Oct 68	67th Med Gp
MASON, Julia	MAJ	ANC	9 Oct 68	67th Evac Hosp
MCFADDEN, Archibald W.	LTC	MC	3 Oct 68	9th Inf Div
PIPER, Jurgen F.	MAJ	MC	6 Oct 68	43d Med Gp
REED, Della K.	MAJ	ANC	3 Oct 68	12th Evac Hosp
REED, Robert L.	MAJ	MC	11 Oct 68	68th Med Gp
RUMBAUGH, James H.	MAJ	MC	11 Oct 68	1st Cav Div
SELBY, David K.	MAJ	MC	3 Oct 68	12th Evac Hosp
SHAVER, Clyndon B.	MAJ	MSC	13 Oct 68	68th Med Gp
SLECT, Dorothy M.	MAJ	ANC	5 Oct 68	74th Fld Hosp
SMITH, William A., Jr.	MAJ	MC	7 Oct 68	82d Abn
WALKER, Minnie S.	LTC	ANC	9 Oct 68	312th Evac Hosp
YELLAND, Graham	MAJ	MC	4 Oct 68	67th Med Gp

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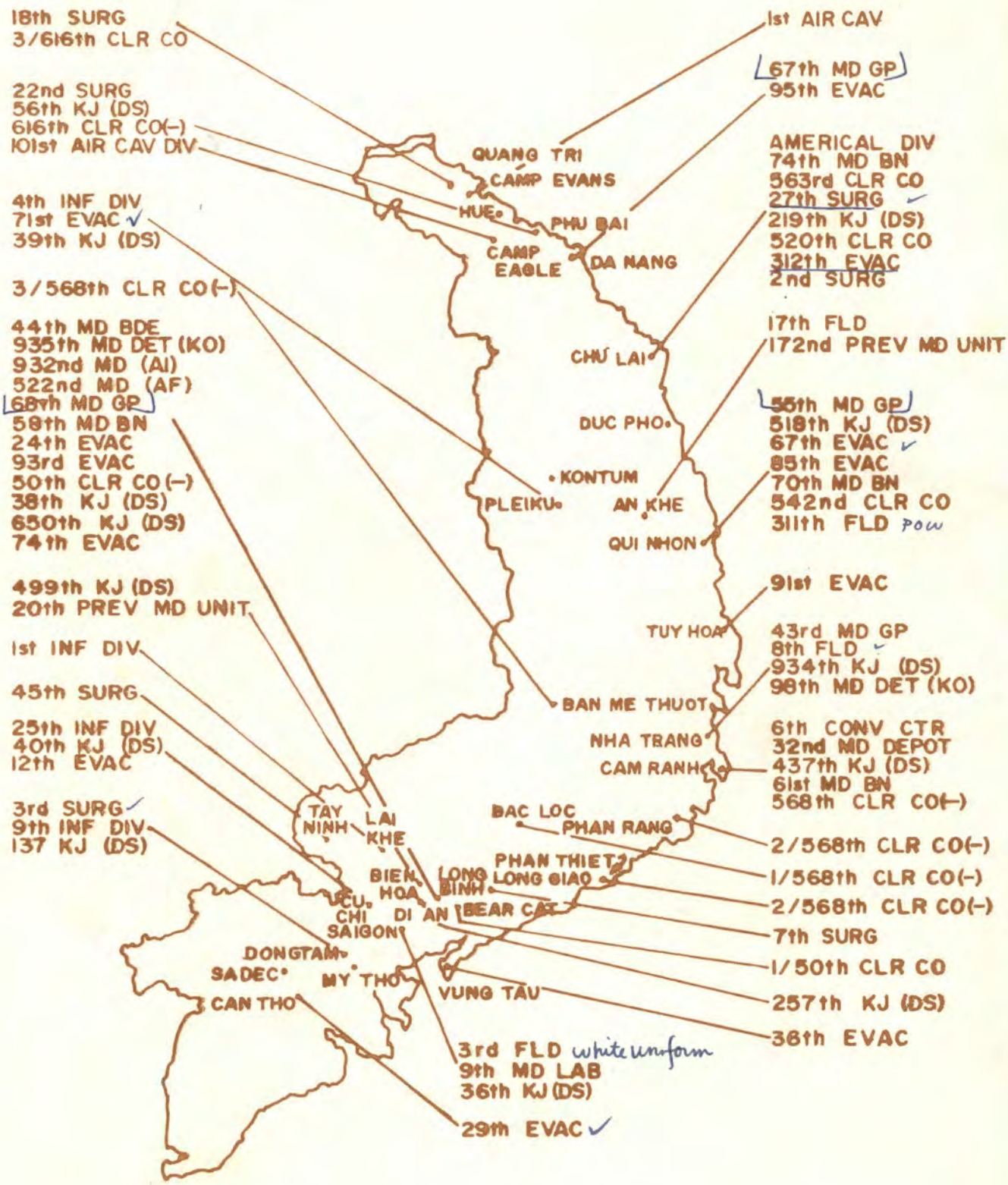
~~Gordon~~ Conley



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