MEDICAL GRAND ROUNDS

Parkland Memorial Hospital

February 23, 1967

HAS YOUR PATIENT BEEN TO VIET NAM?

DISEASES TO BE CONSIDERED

"Progress, far from consisting in change, depends upon retentiveness... when experience is not retained, infancy is perpetual. Those who cannot remember the past are condemned to repeat it."

Non-Surgical Medical Problems

I. Prevalent Disease Problems in US Troops
   A. Malaria
   B. Diarrheal Disease
      1. Non-specific gastroenteritis
      2. Bacillary dysentery - Shigellosis more prevalent in northern half of country
      3. Amebiasis - At least 5 cases of hepatic amebic abscesses have been seen
   C. Venereal Disease: Gonorrhea 70%, lymphogranuloma venereum not uncommon. Syphilis relatively uncommon. Chancroid 10-20%.
   D. Respiratory Disease: Mostly URI and bronchitis.
   E. Skin Disease: Tinea cruris common. Severe mycotic external otitis common. Immersion foot.

II. Uncommon But Potentially Epidemic or Serious Disease Problems in US Troops
   A. Plague
   B. Cholera
   C. Dengue
   D. Leptospirosis
   E. Scrub typhus
   F. Rabies
   G. Infectious hepatitis
   H. Melioidosis
   I. Filiariasis
   J. (?) Schistosomiasis
   K. (?) Tropical Sprue

III. Prevalent Disease Problems Among Civilians With Lesser Importance for US Troops
   A. Tuberculosis: 10 to 20% of the population have open cavitary pulmonary tuberculosis
   B. Leprosy: There are 100,000 registered patients
   C. Intestinal Parasites: Hookworm is very prevalent
   D. Trachoma: Estimated 80% of the population is infected at some time

TABLE I

MORBIDITY REPORTS
(Incidence rates in number/1000/annum)
(Jan. 1965-May 1966)

Malaria	27.7
Amebiasis	3.4
Bacillary dysentery	5.0
Gastroenteritis - non-specific	68.6
Fever of unknown origin	32.9
Dengue	4.8
Respiratory disease	70.9
Infectious hepatitis	4.9
Scrub typhus	2.0
Venereal disease	229.9

MALARIA

A major infectious disease problem in Viet Nam is malaria. A brief historical review of the military aspects of malaria is important for perspective. In World War II, malaria was a most serious military medical problem even though enormous amounts of atabrine, insecticides, repellents, and other control measures were used. Approximately half a million US troops developed malaria, in spite of which there were only 302 deaths. In the South Pacific area, malaria caused more than five times as many casualties as did combat. In some operations in the Pacific, the hospital admission rates for malaria reached extremely high levels. For example, in the Milne Bay area of New Guinea in January of 1943, the hospital admission rate (admissions/1000 average strength/year) for malaria reached 3,308. During the Korean conflict (1950-1953) there were only 3,926 cases of malaria in United States Army personnel. The decreased incidence of malaria in Korea was a measure of the effectiveness of continuous improvement in control and preventive measures, especially the chloroquine-primaquine prophylactic weekly medication. In army active duty personnel in Viet Nam, a significant incidence of malaria did not occur until the fall of 1965. In September and October of 1965, increasing numbers of U.S. army personnel became involved in combat operations in the Central Highlands, a region known to be a highly endemic area for malaria. The hospital admission rate quickly rose to the range of 40 to 80 admissions per thousand average strength per year, with an attack rate of 109.8/1000 for November. This high rate occurred in spite of high levels of troop discipline with regard to malaria control and prevention, especially the weekly chloroquine-primaquine prophylactic medication.

The increasing incidence of malaria in Viet Nam was caused by a strain of Plasmodium falciparum malaria that was resistant to chloroquine. Prior to 1948, chloroquine resistance of falciparum malaria was not recognized. Since that time, however, resistant strains have been reported from various areas of the world. In 1961 and 1962, United States and Commonwealth troops and American scientists suffered drug-resistant falciparum malaria in Viet Nam, Thailand, Cambodia and Malaysia. In 1963 and 1964, carefully controlled human

volunteer studies in the United States revealed that a specific strain of falciparum malaria from Southeastern Asia was resistant to all known synthetic anti-malarials used in treatment dosages. These studies also documented the presence of some strains from Viet Nam resistant to quinine.

With respect to malaria in the Vietnamese people, in 1958 26,000 cases were hospitalized. An additional 650,000 cases were treated as outpatients. 1958 statistics list malaria along with tuberculosis, intestinal disease, and other parasitic infections as one of the leading causes of death. A malaria eradication program was initiated in 1958 in cooperation with the World Health Organization. The program was particularly effective in the Delta and the Saigon areas, but it never reached the Highlands. In 1961 and 1962 the Viet Cong started a terror and propaganda program aimed at disrupting the malaria control program. This involved the spreading of rumors that DDT had harmful side effects, and the capturing, killing and threatening of malaria eradication team personnel. Most of the malaria in the Delta and along the coast is the vivax type and was largely eliminated by the control program. Most of the malaria in the Central Highlands is falciparum. Malariae rarely occurs in Viet Nam, and Plasmodium ovale has never been reported. Falciparum malaria is hyperendemic in the Highlands, where it is estimated that everyone is infected at least once by age 25. The role of the climate in Viet Nam is extremely important with respect to the breeding and multiplication of the mosquito vector. Vivax is more common during the dry season, Falciparum malaria during the wet season.

This climatic influence on the female anopheles mosquito vector is seen in the incidence pattern of falciparum malaria in American troops from September 1965 through May 1966. As mentioned above, the number of cases of malaria increased dramatically during the fall of 1965 when U.S. Forces became involved in areas known to be hyperendemic for falciparum malaria. In the winter of 1965-1966, despite continuing operations in these hyperendemic areas, the incidence of malaria decreased. This drop corresponded to the dry season in the Central Highlands. With the onset of the wet season, in the spring of 1966 the hospital admission rates for April and May for malaria again increased to 30 to 60 admissions per 100 average strength per year.

There are at least six recognized anopheline mosquito species in Viet Nam that are capable of transmitting malaria. Most of the malaria in areas below 1,500 feet of elevation is said to be transmitted by "Anopheles minimus". This species breeds in moving water, streams, and at the edges of rice paddies. "A. jeyporiensis candidiensis" is an important vector in the foothills and "A. maculatus" is noted for its tendency to become particularly abundant in newly cleared jungle areas. Recently "A. balabacensis" has been implicated in the transmission of the resistant falciparum strains. All these female anopheles feed on man either at night or in the reduced light of twilight and dawn. The importance of insect repellent, mosquito nets, and protective clothing in the evenings and night-time hours is obvious.

The increasing incidence of malaria has been an important factor in the large number of medical admissions to military medical treatment facilities in

Viet Nam. Depending upon the location in the country, the amount of combat, and the time of the year, the ratio of medical to surgical admissions has varied between 7:1 and 9:1. A large percentage of these medical admissions have been for malaria. In some areas, at times up to 75% of the hospital admissions have been for malaria. Ninety-five per cent of these admissions for malaria have been for the treatment of falciparum.

CASE REPORT: [redacted]

The patient is a 26-year-old [redacted] active duty [redacted] who was admitted on [redacted]/66 with fever, headache, anorexia, and some vomiting.

The patient landed in Viet Nam on [redacted]/66. In [redacted] 1966 he was in the Central Highlands where there was a very high attack rate of "malaria". The patient had a febrile illness characterized by vomiting and fever for 4 to 5 days. A specific diagnosis of malaria was not made and tests were not made. He was on anti-malarial prophylaxis while in Viet Nam, taking one pill daily and a yellow pill one time per week. He left Viet Nam on [redacted] and arrived at Travis Air Force Base on that date. He failed to take any additional anti-malarial prophylaxis upon return. On [redacted] he returned to Texas in the Texarkana area. On approximately [redacted] or [redacted] he began to note headache, fever, and felt poorly. This he related to excessive living. Over that period he apparently developed some personality changes in that his mother felt that he was out of his head. He was seen by his local physician and received injections of penicillin and subsequently while returning to California because of the headache, became quite ill in Dallas and came to the hospital.

On admission the patient's temperature was 101°, weight 160, blood pressure 110/60. The physical examination, except for a spleen tip, was unremarkable. Laboratory studies on admission included hematocrit 41, white count 9080, sedimentation rate 27 and a urinalysis with a specific gravity of 1.010 and urine 100 mg.% albumin. No casts were seen. A BUN of 59 mg.% was noted. Malaria smears revealed ring forms of trophozoites. The patient was treated with chloroquine and his temperature responded and he remained afebrile. However, he also remained lethargic and continued to complain of abdominal pain. On [redacted]/67, his BUN was 96, creatinine 6.9 and CO_2 16. For these reasons he was started on a small dose of quinine with the view of transfer to Brooke Army Medical Center. The last urinalysis revealed 2 to 3 white cell casts and 10 to 20 white cells with specific gravity of 1.006.

He was seen on [redacted]/67, by which time his renal function had returned to normal except for isothenuria. He had received no additional anti-malarial therapy. Renal biopsy revealed an interstitial infiltrate, predominantly mononuclear. There was some increase in glomerular cellularity. The biopsy was considered to show "pyelonephritis" and a glomerulitis. The rapid improvement in function and findings suggest the possibility of DDS renal toxicity.

(Used through the courtesy of Dr. D. Cheatum, DVAH)

Clinical Features:

A. Vivax malaria: Prodromata consist of malaise, muscle aches, headache, anorexia, and slight fever. The acute phenomena begin with an abrupt onset with rigor, varying from slight chilliness to a frank chill accompanied by a sensation of extreme cold, although the temperature rises rapidly to 104-106°. The pulse is thready and rapid; polyuria, nausea and vomiting are common. The "hot stage" begins within 60 minutes. It is usually accompanied by severe headache, extreme thirst, epigastric discomfort with nausea and vomiting becoming more severe, and frequently by mild delirium. This stage is followed by a profuse diaphoresis, lasting 2 to 3 hours, and a rapid fall in temperature. After a period of several days in untreated cases of vivax malaria, the parasites mature on alternate days and the clinical attacks, therefore, occur every other day. In quartan malaria, schizogony, with the accompanying display of clinical symptoms, occurs every 72 hours.

B. Falciparum malaria: The onset is frequently insidious with the appearance of headache of increasing severity and gastrointestinal symptoms. In other cases, the onset may be abrupt with a sensation of chilliness rather than a frank chill, a prolonged intensified "hot stage", and a gradual fall in temperature without marked diaphoresis. The hyperthermia may be prolonged, with a double-peaked elevation. Prostration is usually marked and delirium is common. Falciparum malaria is notorious for the sudden and dramatic appearance of severe and dangerous forms of the disease which can rapidly cause the death of the patient if the condition is not promptly diagnosed and treated. Three chief clinical types have been noted:

1) Bilious remittent fever: Sudden onset with severe nausea and profuse, continuous vomiting. Icterus usually appears on the second day, and is accompanied by epigastric and liver tenderness. Hematemesis is not uncommon and may be associated with an elevated blood urea nitrogen.

2) Cerebral malaria: The onset may be sudden or gradual. The patient may complain of progressively increasing headache, with little or no fever, and gradually lapse into coma; or there may be an uncontrollable rise of temperature in excess of 108°F, leading rapidly to a fatal termination. Papilledema is commonly seen and may be a valuable prognostic sign. Occasionally there is mania or acute psychosis. Corticosteroids have been reported to be of benefit to patients with cerebral malaria and may be used in severely ill patients manifesting evidence of adrenal cortical insufficiency or unresponsive blackwater fever.

3) Algid malaria: Profound prostration with a tendency of fatal syncope, marked coldness of skin with high internal temperatures, severe hemolytic anemia, and intense diarrhea. This is synonymous with the current term "medical shock".

C. Blackwater fever: Blackwater fever is one of the most serious complications of malaria, chiefly that due to P. falciparum, and is characterized by prostrating chills, usually sudden in onset, profuse vomiting, icterus appearing within a few hours of onset, the passage of dark red to black urine, and a rapidly developing anemia. It is an acute intravascular hemolysis with hemoglobinuria, hemoglobinemia, and renal insufficiency. The cause of the hemolysis is unknown. Predisposing factors are thought to be: repeated falciparum infections; irregular therapy with anti-malarials—especially quinine;

previous attacks of hemoglobinuria; sensitization to the malaria parasite; fatigue and chilling. The presence of the three cardinal symptoms (hemoglobinuria, fever and icterus) in a patient known to have had malaria is strong presumptive evidence of blackwater fever. The mortality ratio is 25 to 50%.

Treatment:

A. Prophylaxis: The chloroquine (0.3 gm base)-primaquine (0.045 gm base) is still given once per week. Dapsone (DDS) 25 mg daily is under evaluation as an addition to this regimen.

B. Treatment (April 1966) for falciparum malaria:
   1. Quinine 15 grains po three times per day for 2 days, then 10 grains three times per day for 12 days
      Pyrimethamine (Daraprim) 25 mg po q 8 hours for 3 days
      Dapsone (DDS, diaminodiphenylsulfone) 25 mg po daily starting on day 7 and continued for 28 days
      Relapse rate decreased to 5%. Note: Do not give Compazine with quinine as extrapyramidal signs seen in 10%.
   2. Alternative:
      Quinine 10 grains three times per day for 14 days
      Pyrimethamine 50 mg as single dose on first day
      Sulfadimethoxine (Madribon) 1.0 gm per day for 7 days (data are for sulphormethoxine [Fanasil] which is a longer acting isomer of sulfadimethoxine)
   3. Alternative: If intravenous quinine should be required, quinine dihydrochloride 600 mg diluted in 500 ml given by slow IV drip over an interval of not less than 30 minutes. This may be repeated every 6 to 8 hours as necessary, but no more than 30 grains should be administered in any 24-hour period.
   4. Readministration: Should relapse of falciparum malaria occur after treatment with quinine, retreatment with quinine should be instituted. If necessary, the course may be maintained for 21 days at a dosage of 10 grains every 8 hours as tolerated.

References:

1. Myatt, A. V., and Coatney, G. R. Present concepts and treatment of Plasmodium vivax malaria. Arch. Int. Med. 93:191, 1954.
2. Moore, D. V., and Lanier, J. E. Observations on two Plasmodium falciparum infections with an abnormal response to chloroquine. Am. J. Trop. Med. 10:5, 1961.
3. Contacos, P. G., Lunn, J. S. and Coatney, G. R. Drug-resistant falciparum malaria from Cambodia and Malaya. Trans. Royal Soc. Trop. Med. & Hyg. 57:417, 1963.
4. Eppes, R. B., DeGowin, R. L., Powell, R. D., and Legters, L. J. Clinical studies with a drug-resistant strain of Plasmodium falciparum from Vietnam. Military Medicine 131:362, 1966.

5. Tigertt, W. D. Present and potential malaria problem. Military Medicine 131:853, 1966.
6. Bartelloni, P. J., Sheehy, T. W., and Tigertt, W. D. Combined therapy for chloroquine-resistant Plasmodium falciparum infection. Concurrent use of long-acting sulphormethoxine and pyrimethamine. JAMA 199:173, 1967.

PLAGUE

Another potential military disease problem is plague. Through March 1966, a total of 1,037 cases of plague were reported among Vietnamese civilians. The vast majority of these were in the northern part of the country, particularly in the Danang area. Up to the present time two cases of plague in United States soldiers have been reported. One of these was an individual who was initially thought to have lymphogranuloma venereum and who subsequently developed plague meningitis. This case represents the only fatality up to this time.

Strains of Pasturella pestis resistant to streptomycin, the usual therapeutic agent, have been reported. No resistance to chloramphenicol is known. Streptomycin is still the drug of choice because of its bactericidal action.

Plague control is difficult because of the large rodent populations associated with the sanitation practices in Viet Nam. For example, an epidemiologic investigation in the Danang area traced the plague flea-rodent foci to the market place.

A plague immunization with frequent boosters is routinely given to all military personnel in Viet Nam. Though never field tested, it is felt to be effective.

CASE REPORT: [redacted]

The patient is a 20-year-old [redacted] male. He was admitted on [redacted]/66 with the chief complaint of a mass in the left groin of approximately one week's duration.

Present Illness: The patient was on active duty with the Army, where he served as a cook, and left the Saigon area of Viet Nam on [redacted] On approximately [redacted], he noted a small painful nodule in the left inguinal area beneath the inguinal ligament. At the time of admission he denied lymphangitic streaking or associated constitutional symptoms, though he thought he had some fever. Two days prior to admission, following lifting, this became more painful and began to enlarge medially. At that time he noted headache and fever. The admission notes state he had chills, although on [redacted] he denied this. He had no other adenopathy, no cough, or other constitutional manifestations.

Physical Examination (on admission): The patient was a well-

developed, well-nourished Latin American male, in no apparent distress. There were small shotty nodes in each axilla, the inguinal node, and evidence of excoriation in the inguinal areas, as well as healing athlete's foot. There was no lymphangitis.

Epidemiologic History: The patient had been assigned in the Saigon area throughout his tour of duty. He took anti-malarial prophylaxis only very irregularly. While in Saigon he had numerous contacts with prostitutes. There is a history of gonorrhea, but no other known illness, except for a locked left knee. He had severe tinea cruris and tinea pedis, which remained chronically infected. Several weeks prior to return to the U.S., he had been in an area of new construction where rats were prevalent. In that area, individuals frequently played "rat stomping"; although the patient denies stomping rats, he did have contact with them.

Physical Examination ([redacted]/66): The patient appeared essentially well. There were shotty axillary nodes and small posterior cervical nodes. A spleen tip was palpable but not tender.

Accessory Clinical Findings: Serology non-reactive. White count 6,900 with 44% hematocrit. Urinalysis unremarkable. Chemistries within normal limits. SGOT 35, thymol turbidity 5.5, total protein 8.5 with 7.0 albumin, febrile agglutinins revealed negative typhoid O, paratyphoid A and B, negative proteus OX-19 and brucella. Typhoid H positive 1:40. Blood culture sterile.

Course in Hospital: The patient received no antibiotics, and continued to be febrile, initially with temperatures ranging from 102° to 103°, settling down to 100°, until a lymph node biopsy was performed on [redacted]/66 when he spiked to 104° and subsequently remained febrile. Lymph node biopsy revealed acute suppurative lymphadenitis, with no granuloma. The original culture grew coagulase-negative staphylococci; subsequent special bacterial stain revealed gram-negative bacilli. Special fluorescent anti-plague antibody studies were performed by Col. Buescher at WRAIR and were positive, thus making a presumptive diagnosis of plague (probably "pestis minor").

The patient was subsequently seen at Brooke General Hospital, where his SGOT was elevated. Liver biopsy revealed a moderate cellular infiltrate similar to that seen in tularemia. It was considered consistent with plague hepatitis.

(Case used through the courtesy of Dr. J. Schwade, DVAH)

Clinical Features:

After an incubation of 2 to 6 days, there is usually an abrupt onset with high fever and severe toxicity, including prostration, headache, nausea, vomiting and tachycardia. The incubation period is not modified by immunization. Nodes appear simultaneously with or slightly before the fever. They are usually oval and tender. The overlying skin is smooth and reddened. The sites of adenopathy are as follows: femoral 31%, inguinal 24%, axillary 22%, cervical 9%, multiple 14%. Lymphangitic streaking is not a feature. In the pneumonic form, dyspnea and a cough which becomes productive of thin or frothy blood-tinged sputum after approximately 18 hours are prominent. Mental confusion followed by the development of delirium or coma is common unless prompt appropriate therapy is initiated. Physical examination reveals widespread rales. X-rays demonstrate a bronchopneumonic infiltration. There is a peripheral leucocytosis with a neutrophilia, usually 20- to 25,000/mm^3.

Treatment:

Large initial dosages are usually recommended.

A. Streptomycin 0.5 gm IM q 3 hours for 24 to 48 hours, then decrease to 1.5 to 3.0 gm per day

or B. Tetracycline or chloramphenicol 500 mg IV every 3 hours for 3 days, then 4.0 gm po per day for 48 hours then 3.0 gm po per day for an additional 4 to 5 days.

References:

7. Pollitzer, R. Plague. WHO Monograph #22. Geneva, 1954. 698 pp.
8. Burmeister, R. W., Tigertt, W. D., and Overholt, E. L. Laboratory-acquired pneumonic plague. Report of a case and review of previous cases. Ann. Int. Med. 56:789, 1962.
9. McCrumb, F. R., Jr., Mercier, S., Robic, J., Bouillat, M., Smadel, J. E., Woodward, T. E., and Goodner, K. Chloramphenicol and terramycin in the treatment of pneumonic plague. Am. J. Med. 14:284, 1953.
10. Freely, E. J., and Kriz, J. J. Plague meningitis in a U.S. serviceman. JAMA 191:412, 1965.
11. Quan, S. F., et al. Isolation of a strain of Pasteurella pseudotuberculosis from Alaska identified as Pasteurella pestis: An immunofluorescent false positive. Am. J. Trop. Med. 14:424, 1965.
12. Cavanaugh, D. C, and Randall, R. The role of multiplication of Pasteurella pestis in mononuclear phagocytes in the pathogenesis of flea-borne plague. J. Immunol. 83:348, 1959.
13. Koteen, H. Lymphogranuloma venereum. Medicine 24:1, 1945.

CHOLERA:

Since 1960, disease caused by the El Tor strain of V. comma has been responsible for many of the outbreaks including the 1964 outbreak in Saigon. The disease produced by the El Tor strain is similar to other cholera.

A potential problem in returning servicemen was raised by the observations of Gangrosa, et al., who demonstrated that 8 of 38 convalescent patients whose stool cultures were negative excreted moderate to large numbers after a purge (17). However, asymptomatic carriers have recently been shown to be of little epidemiologic importance (18).

References:

14. Pollitzer, R. Cholera. WHO Monograph #43. Geneva, 1959. 1019 pp.
15. Phillips, R. A. Cholera in the perspective of 1966. Ann. Int. Med. 65:922, 1966.
16. Greenough, W. B., Gordon, R. S., Jr., Rosenberg, I. S., Davies, B. I., and Benenson, A. S. Tetracycline in the treatment of cholera. Lancet 1:355, 1964.
17. Gangarosa, E. J., Saghari, H., Emile, J., and Siadat, H. Detection of Vibrio cholerae by purging. Abstract 6th Interscience Conference, 26-28 October 1966.
18. Khan, A. Q. Role of carriers in the intrafamily spread of cholera. Lancet 1:245, 1967.
19. Sheehy, T. W., Sprinz, H., Augerson, W. S., and Formal, S. B. Laboratory Vibrio cholerae infection in the United States. JAMA 197:321, 1966.

DENGUE:

Dengue is endemic in Viet Nam and periodically becomes epidemic. Because of the difficulty in obtaining serologic confirmation of suspected cases, the exact incidence in Americans is unknown. During May 1966, 35 cases of "clinical" dengue were reported from U. S. military medical installations. The true number of cases is probably higher.

The dengue virus is transmitted by Aedes aegypti and other species of Aedes mosquitoes. Man and monkeys constitute the only known reservoir of infection. The epidemiologic characteristics of dengue closely resemble those of yellow fever; the two diseases also have a similar geographic distribution, except in Southeast Asia, where yellow fever is unknown.

Four related antigenic types of dengue virus have been described. Types 1 and 2 are the most prevalent. Dengue is serologically a group B arborvirus. Other members of this group include yellow fever, Japanese-B encephalitis, and St. Louis encephalitis.

The clinical picture is dominated by fever with accompanying prostration, headache, myalgia, and generalized lymphadenopathy. Dengue is popularly known

as "breakbone fever" because of incapacitating pains in the muscles and periarticular tissues of the extremities in more than half the cases. A bright red morbiliform or punctate rash appears in three-fourths of the patients on the third to sixth day of illness. The eruption starts on the dorsal surfaces of the hands and feet and rapidly extends over the trunk and face.

Dengue types 3 and 4, plus the group A arborvirus chikungunya (literally "doubled-up"), produce the same clinical picture with hemorrhagic complications. Leucopenia and marked thrombocytopenia occur and have led to the descriptive name: "hematodepressive disease". In endemic areas such as Thailand and Viet Nam, the hemorrhagic form tends to attack children and carries a mortality rate of 10%. Mortality is virtually non-existent in non-hemorrhagic forms. No specific treatment is available.

A dengue vaccine is not available. Prevention is based on personal protective measures. As the Aedes aegypti is a day-biter, the use of insect repellent and appropriate protective clothing is encouraged.

CASE REPORT:

The patient is a 42-year-old [redacted] male admitted [redacted]/65 with chills and fever of 4 days' duration. The patient had just arrived in the U.S. after 90 days TDY in Viet Nam. Prophylactic chloroquine had been taken regularly and all of his immunizations had been completed prior to his departure to Southeast Asia. Associated with the chills and fever was the complaint of severe leg, back and testicular aching associated with severe shaking chills. As well, the patient had the complaints of severe occipital headaches, and transient nonpruritic rash 2 days prior to admission. He stated that movements of the eyeballs produced rather severe retrobulbar pain. Physical examination revealed a well-nourished, well-developed man. Vital signs stable. There was the suggestion of a fine macular rash over the trunk and back. There were bilateral anterior cervical and left supraclavicular nodes present. Small epitrochlear nodes were noted as well. The lungs were clear and the heart was normal. There was no abdominal visceromegaly. Extremities were negative. Rectal and genital examinations were normal, and the neurological examination was within normal limits.

Pertinent laboratory values included a rather marked leucopenia with a relative lymphocytosis, normal platelet counts on repeated examinations, negative malaria prep, and febrile agglutinins times 3. On the third day of admission a petechial rash developed on the ankles which spread to the lower legs but never extended above the knees. In 15 days, this subsided, as did his marked myalgias and lymphadenopathy. Blood was drawn for acute phase studies to confirm the clinical diagnosis of dengue fever.

The patient did very well and was discharged on [redacted]/65 for 2 weeks of convalescent leave. At the completion of this, convalescent phase studies will be drawn in regard to the probable diagnosis. While in the hospital the patient was protected with mosquito netting due to the presence of the mosquito vector in this area.

(Case used through the courtesy of Dr. S. Lightfoot, PMH)

References:

20. Dooley, J. R., and Burkle, J. S. Three faces of dengue. Arch. Int. Med. 117:170, 1966.
21. Halstead, S. B., Voulgaropoulos, E., Tien, N. H., and Udomsakdi, S. Dengue hemorrhagic fever in South Vietnam: Report of the 1963 outbreak. Am. J. Trop. Med. 14:819, 1965.
22. Cohen, S. N., and Halstead, S. B. Shock associated with dengue infection. 1. Clinical and physiologic manifestations of dengue hemorrhagic fever in Thailand, 1964. J. Pediatrics 68:448, 1966.
23. Halstead, S. B. Mosquito-borne haemorrhagic fevers of South and South-East Asia. Bull. World Health Organization 35:3, 1966.

SCRUB TYPHUS:

Scrub typhus is a frequent cause of febrile disease. Cases tend to occur in point epidemics within a given military unit. The infection is caused by rickettsii tsutsugamushi and it is not infrequent in U.S. troops. During May of 1966, six clinical cases were reported.

Scrub typhus is known to be present in localized areas of Viet Nam. Fallow rice paddies or abandoned Montagnard fields in the Central Highlands are good ecologic settings for the disease. The infection is maintained in nature by a cycle involving mites ("chiggers") and small rodents. The rodents inhabit the overgrown fields and rice paddies. Human infection represents an accident resulting from proximity to the infected rodents and mites.

The disease is characterized by high fever (104° to 105°F), generalized lymphadenopathy, and a red macular rash. The characteristic lesion is an indurated vesicular lesion at the location of the chigger bite. Within a few days the vesicle ulcerates and a black eschar is formed. The eschar is most commonly found on the lower extremities with the axilla, arms and inguinal area also frequent sites.

The findings of a typical lesion and the occurrence of agglutinins to OX-K Proteus strains (Weil-Felix reaction) are most helpful in establishing a diagnosis.

Dramatic clinical response to tetracycline therapy is usual.

Prevention is based on individual protective measures. These include uniform impregnation with the miticide M-1960. Also, the use of insect repellent is encouraged. If avoidance of known endemic foci cannot be avoided for tactical reasons, the prophylactic administration of chloramphenicol might be considered.

RABIES:

Rabies is a public health problem among the Vietnamese civilian population. Two hundred cases of clinical rabies are reported a year, most of these from the Saigon area. The Buddhist religion poses a barrier to rabies control because of the taboos which prohibit dog destruction. There is no dog immunization program against rabies. Twenty-five per cent of heads from animals that have been killed or died after biting someone are positive by FA technique.

Present recommendations emphasize the need for booster doses of duck embryo vaccine at 10 and 20 days after completion of the primary course, particularly if antirabies serum was used in the initial therapy.

MELIOIDOSIS:

Melioidosis is caused by Pseudomonas pseudomallei, a gram-negative motile bacillus which grows readily on routine nutrient laboratory media. The disease occurs at tropical latitudes throughout the world, with most patients having been reported from Southeast Asia. However, cases have been reported from Panama and Ecuador. The organisms have been isolated from water and mud, especially along riverbanks and in rice fields, and are carried by animals, especially wild rodents, and probably are deposited in water by animal droppings. While earlier cases were commonly reported in morphine addicts, the usual mode of transmission to man has not been elucidated. Man to man transmission probably does not occur.

Clinical Features:

Although frequently described as a rapidly progressive fatal disease with a 95% fatality rate, recent studies have better clarified its clinical spectrum. Infection may be clinically inapparent. Serological surveys among natives in Thailand have demonstrated a frequency of at least 8% positive complement fixation titers in males. Clinically apparent disease may assume three forms.

A. Acute septicemic, a form which begins abruptly with fever, malaise, aches and pains. These general symptoms may be accompanied by non-productive cough and dyspnea. X-rays may reveal scattered pulmonary infiltrates. Other patients may present with an afebrile choleric syndrome. The acute form may be fatal or progress into a more chronic form.

B. Subacute form: This usually follows the acute form. Continuous fever develops in association with pulmonary symptoms, including a severe cough which is usually non-productive. Pleuritic pain is frequent. Subsequently, subcutaneous abscesses and suppurative adenitis may occur. Physical examination may reveal signs of either bilateral broncho- or lobar pneumonia. X-ray examination reveals bilateral pulmonary infiltrates which often show cavitation. Empyema is quite common.

C. Chronic focal or disseminated form: This often presents as a chronic pulmonary disease with abscesses and cavities similar to tuberculosis. Other features include multiple deep abscesses such as iliopsoas abscesses, chronic osteomyelitis and chronic adenitis, features which are not dissimilar from those of tuberculosis or chronic deep fungal infections.

Diagnostic Features:

Diagnosis is confirmed by isolation of the organism or suggested by a rising agglutination titer to Ps. pseudomallei antigen.

CASE REPORT: O.R.

The patient is a 44-year-old [redacted] male [redacted] who was air-evacuated from Viet Nam with pneumonia. Supposedly the patient was in excellent health until [redacted] 1966, when he noted fever, chills, diarrhea and headache. He was seen in his dispensary in Viet Nam and was felt to have pneumonia. He was treated with IM penicillin. Two days later there was no improvement, and he developed vague anterior chest pain with a cough productive of light yellow sputum. He was again seen in the dispensary on [redacted] 1966, where chest film revealed a right middle lobe pneumonia, and he consequently was hospitalized at [redacted] While there, white blood count was 25,000 with a shift to the left, and hemoglobins were normal. X-rays again revealed right middle lobe pneumonia, and he also developed a right lower lobe infiltrate and supposedly a left upper lobe infiltrate which was transient. Cultures grew out Staphylococcus aureus and klebsiellae sensitive to penicillin, chloramphenicol and streptomycin. He lost approximately 20 lbs. and developed anemia and some dyspnea. Subsequently his cough improved and chest pain disappeared. Due to persistent right lower and right middle lobe infiltrate on x-ray he was evacuated for further evaluation.

Laboratory Data: Hemoglobin on admission was 10.1 gm.%, hematocrit 30 vol.%, white count 8700 with a normal differential, reticulocyte count 2.4%. Urinalysis, prothrombin time, blood sugars, liver function studies including cholesterol, bilirubin, thymol turbidity, total protein and albumin, alkaline phosphatase and transaminase, as well as BUN, were negative or within normal limits. Skin tests for blasto, cocci, histo and tuberculosis at intermediate level were negative. Fungal serologies were negative, as were febrile agglutinins. Spinal fluid chemistries and microscopics were negative. Serum iron and total iron-binding capacity were within normal limits. Repeat CBC on Aug. 25 revealed a hematocrit of 38, hemoglobin of 11,5 white count of 7,300 with a relative lymphocytosis of 54%. Melioidosis titer taken on admission revealed bacterial agglutination titer of 1:320. Complement fixation titer was 1:128 and hemagglutination inhibition titer 1:640. Bacterial agglutination on July 20 was not done; complement fixation was still 1:128 with a hemagglutination inhibition of 1:2560. Ten cultures of sputum and bronchial washings between admission and July 22 grew out Pseudomonas aeruginosa sensitive to streptomycin, polymyxin B,

colistin and kanamycin. Five cultures taken following [redacted] grew Pseudomonas pseudomallei sensitive to chloramphenicol, tetracycline, sulfa and kanamycin. Bronchial washings were negative for malignant cells. EEG was normal. ECG was normal. Chest film on admission revealed an irregular patchy infiltrate in the right lower lobe predominantly with some slight middle lobe infiltrate, which on comparison with outside films on June 14 were essentially unchanged. During the course of hospitalization there was gradual clearing of the right lower lobe and right middle lobe infiltrate until chest film of [redacted] revealed residual lower lobe atelectasis and right hilar enlargement.

(Used through the courtesy of Colonel C. Hedberg, Brooke General Hospital)

References:

24. Whitmore, A. An account of a glanders-like disease occurring in Rangoon. J. Hyg. 13:1, 1913.
25. Stanton, A. T., and Fletcher, W. Melioidosis and its relation to glanders. J. Hyg. 23:347, 1925.
26. Mayer, J. H., and Finlayson, M. H. Chronic melioidosis. A case with bone and pulmonary lesions. South African Med. J. 18:109, 1944.
27. Green, R., and Mankikar, D. S. Afebrile cases of melioidosis. Brit. Med. J. 1:308, 1949.
28. Chambon, L. Isolement du Bacille de Whitmore a partir du milieu exterieur. Ann. Inst. Pasteur 89:229, 1955.
29. Prevatt, A. L., and Hunt, J. S. Chronic systemic melioidosis. Am. J. Med. 23:810, 1957.
30. Rubin, H. L., Alexander, A. D., and Yager, R. H. Melioidosis—A military medical problem? Military Medicine 128:538, 1963.
31. Nigg, C. Serologic studies on subclinical melioidosis. J. Immunol. 91:18, 1963.
32. Biegeleissen, J. Z., Jr., Mosquera, R., and Cherry, W. B. A case of human melioidosis: Clinical, epidemiological and laboratory findings. Am. J. Trop. Med. 13:89, 1964.
33. Borchardt, K. A., Stansifer, P., and Albano, P. M. Osteomyelitis due to Pseudomonas pseudomallei. JAMA 196:660, 1966.