

SEATO MEDICAL RESEARCH STUDY ON MYCOTIC DISEASES

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STUDY REPORT

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OBJECTIVE

The objective of these studies is to gather information on the prevalence and distribution of mycoses in this area of the world. In addition to these survey activities a study was carried out to determine the roles of avitaminosis, anemia, hypoproteinemia and circulating antibodies in the pathogenesis of superficial dermatophytoses in Thai nationals as a basis for evaluation of prophylactic or therapeutic procedures. Because skin problems constitute one of the principle causes of combat non-effectiveness among U.S. troops in Vietnam, a study of dermatological disease in a more stable troop population was initiated during this period. Initial objectives were to determine the etiology and pathogenesis of fungal skin diseases in Thai Army troops.

DESCRIPTION

This study was prompted by the major medical problems the dermatophytic fungi can present to the military in times of stress. Specimens were usually collected by a member of this department from patients with dermatologic problems. Cultures were prepared by first cleansing the lesion with 70 per cent ethanol and transferring material (hair, skin, nail) directly to 2 plates of Sabouraud—Cycloheximide—Chloramphenicol medium. The plates were sealed with paper tape to prevent contamination, and periodically examined during a 21 day incubation at 25 C. Blood agar plates were also inoculated and incubated at 37 C when clinical appearance of the lesion suggested bacterial infection.

In the study attempting to relate malnutrition to mycotic infections routine procedures were employed to determine hemoglobin, hematocrit, serum iron, serum iron-binding capacity, and serum proteins of patients with chronic or acute dermatophyte infections. The indirect fluorescent antibody technique was evaluated as a procedure for determination of qualitative and quantitative antibodies to specific fungi.

PROGRESS

During the period covered by this report 420 routine clinical specimens were received for mycological examinations. Included were 288 from Women's Hospital, and 59 from the U.S. Embassy Medical Unit and the 5th Field Hospital. Results in Table 1 that show the organisms most frequently isolated from Thai patients were Trichophyton rubrum and Candida albicans. Three of 59 dermatologic specimens from U.S. personnel and dependents were positive for Candida albicans and two for Trichophyton mentagrophytes.

There were single isolates of Nocardia asteroides and Microsporium canis and one patient had Tinea versicolor as determined by the KOH test. In specimens from other than human sources there were 16 isolates of Microsporium canis from gibbons; one isolate of Microsporium gypseum from 359 soil samples from 14 provinces and no isolates of pathogenic fungi from 178 water samples from 12 provinces. There were 33 isolates of Trichophyton terrestre from the soil samples but this organism is considered to be a non-pathogen for humans.

The study attempting to relate malnutrition and circulating antibodies to superficial mycoses indicated that there were few significant differences between patients and controls as regards hemoglobin, hematocrit, serum iron binding capacity, serum proteins and circulating antibody values.

A field trip was made to Southern Thailand in November to determine the prevalence of mycotic infections and to locate a site where a study could be carried out on individuals with Trichophyton rubrum or with Trichophyton mentagrophytes infections (Table 2). On this and on a subsequent visit it was noted that 12 of 29 specimens obtained from cadre personnel of the 4th Battalion, 5th Regiment of the Royal Thai Army in Pattani, Thailand were positive for Trichophyton mentagrophytes and/or Trichophyton rubrum. The Commanding Officer indicated that there were increases of dermatophytoses in recruits following training exercises of several days. A study was undertaken to determine the effect of jungle training on the incidence and severity of dermatologic infections in these soldiers. Results in Table 3 indicate that the rate of isolations of Trichophyton spp increased from 29.0% in specimens taken from soldiers before jungle survival training to 34.3% in the same soldiers after the training. The percent of trichophyton isolates was 35.2 percent in specimens from a group of 48 soldiers from whom specimens were obtained only after survival training. Further analyses of the data indicated there were 14 instances of soldiers acquiring this infection during the training period. Notable was the paucity of isolations of Candida albicans in these patients as compared with Thai patients seen in dermatology clinics. It was concluded that these soldiers would constitute a suitable population for studies of prophylaxis or treatment of trichophyton infections in a regimented group.

In support of the Dermatological Research Team Vietnam* selected bacteria isolated from dermatological lesions of US servicemen have been assayed for "in vitro" sensitivities to antibiotics. Studies to date indicate that almost 78 percent of 187 isolates of Staphylococcus aureus were resistant** to penicillin G, 42 percent were resistant** to oxacillin and only 6 percent were resistant** to erythromycin. Approximately 80 percent of 89 isolates of beta hemolytic streptococci were resistant to tetracycline.

SUMMARY

Studies on patients with dermatologic problems and Thai Army troops before and after jungle survival training indicate that pathogenic fungi are present in Thailand and could represent a major problem to the military in times of stress. Organisms isolated most frequently from Thai patients were Trichophyton rubrum and Candida albicans while the mycotic agent isolated most frequently from Thai soldiers was Trichophyton mentagrophytes. The study attempting to relate malnutrition and circulating antibodies to superficial mycoses was curtailed when results indicated there were few significant differences between patients and controls. A field study of Thai troops indicated that jungle survival training increased the incidence and severity of dermatologic infections caused by Trichophyton spp. and that this population would be suitable for evaluation of prophylactic and treatment regimens.

* Appointed by the Commission on Cutaneous Diseases of the Armed Forces Epidemiological Board.

** Resistant to 6.25 mcg/ml

Table 1
Mycology Specimens from Thai Patients
1 April 1968-31 March 1969

Body Area	Total Specimens	Negative for Fungus	Non-pathogenic Fungi Isolated	Positive Cultures
Body (Trunk, Face, Arms & Legs)	153	80	28	<i>Trichophyton mentagrophytes</i> 2 <i>Trichophyton rubrum</i> 16 <i>Candida albicans</i> 2 <i>Tinea versicolor</i> (KOH examination only) 9 <i>Pityrosporum orbicularae</i> 11 <i>Microsporum gypseum</i> 1 <i>Epidermophyton floccosum</i> 3 <i>Microsporum canis</i> 1
Feet	75	51	13	<i>Trichophyton rubrum</i> 4 <i>Candida albicans</i> 4 <i>Trichophyton mentagrophytes</i> 2 <i>Nocardia asteroides</i> 1
Groin	13	5	2	<i>Epidermophyton floccosum</i> 1 <i>Candida albicans</i> 3 <i>Trichophyton rubrum</i> 2
Hands	35	25	8	<i>Trichophyton rubrum</i> 2
Nails	17	7	3	<i>Trichophyton rubrum</i> 2 <i>Candida albicans</i> 5
Scalp	10	8	2	—
Vagina	5	3		<i>Candida albicans</i> 2
Kidney	10	10		—
CSF	2	1		<i>Cryptococcus neoformans</i> 1
Total	320	190	56	74

Table 2
Mycology Survey in South Thailand

Province	Total Patients Examined	Male	Female	Patients with Tinea versicolor	No. of Scrapings Obtained	Negative for Fungus Growth	Nonpathogenic Fungi Isolated	Positive Cultures
Songkla	75	66	9	55	20	5	4	Trichophyton rubrum 8 Epidermophyton floccosum 1 Trichophyton concentricum 2
Satool	20	19	1	Not checked	20	3	8	T. rubrum 9 E. floccosum 1 (1 patient had T. rubrum + E. floccosum)
Yala	51	51	—	30	21	8	9	T. rubrum 3 Candida albicans 1
Pattani	76	72	4	26	50	13	17	T. rubrum 11* T. mentagrophytes 7 C. albicans 3 Candida sp. 1
Narathivas	31	31	—	26	15	2	6	T. rubrum 7

* Includes 1 patient with T. rubrum + T. mentagrophytes and 1 patient with T. rubrum and C. albicans

Table 3

Trichophyton spp. Isolated from Thai Servicemen Before and After Jungle Training

Body Area	Time of Obtaining Specimens Relative to Jungle Training				Specimens Obtained only after Jungle Training	
	Before		After		# of Specimens Obtained	# of Specimens Positive
	# of Specimens Obtained	# of Specimens Positive	# of Specimens Obtained	# of Specimens Positive		
Feet	101	31	77	26	28	11
Hands	1	1	4	0	10	2
Groin	9	3	6	3	8	2
Buttock	4	0	7	4	2	2
Scrotum	5	1	7	2	2	0
Toe Nails	1	0	4	2	2	1
Finger Nails	0	0	0	0	1	1
Other	3	0	3	0	1	0
Totals	124	36	108	37	54	19