Skin Diseases during Floods in Thailand

Vasanop Vachiramon MD*, Ploysyne Busaracome MD*,
Piriyaporn Chongtrakool PhD**, Siripen Puavilai MD*

** Division of Dermatology, Department of Internal Medicine, Ramathibodi Hospital, Mahidol University, Bangkok*
*** Division of Microbiology, Department of Pathology, Ramathibodi Hospital, Mahidol University, Bangkok*

Background: *Floods are natural disasters that occur occasionally in Thailand. The most common form skin diseases due to floods are infectious dermatoses especially superficial fungal infection. However, the microbiologic evidences have not been evaluated.*
Objective: *To evaluate the most common skin diseases during floods and identify the organism that causes skin maceration at web space(s) of toes (Hong Kong foot).*
Material and Method: *Patients who complained of skin problems were evaluated at the temporary outpatient clinic during October 2006. Skin specimens from all patients who had itches and skin maceration at web space(s) of toes were cultured.*
Results: *Ninety-six patients were evaluated (38 males and 58 females). Eczema was the most prevalent dermatosis, which accounted for 34.5% of the total skin problems and the great majority of these cases were irritant contact dermatitis. Sixteen cases presented with itch and skin maceration at web space(s) of toes. All of them were colonized with various microorganisms. Gram-negative bacilli were the most prevalent ones and were found in 14 out of 16 specimens. Fungal culture was positive in only two specimens.*
Conclusion: *Eczema is the most common dermatosis during floods. Skin maceration at web space(s) of toes, which were thought to be fungal infection, are chronic irritant dermatitis with secondary bacterial colonization. Only a few cases were fungal infection. Microbiologic investigation should be done in these patients. Unfortunately, it is not practical in such a situation. Topical medications that have the combination of anti-inflammatory, antibacterial and antifungal properties are the most suitable medications.*

Keywords: *Eczema, Flood, Fungus, Gram-negative bacilli, Hong Kong foot*

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Floods are natural disasters that occur occasionally in Thailand. They cause many problems such as shortage of food and clean water, various health problems and general well being. In September 2006, a major flood occurred in northern, northeastern and central parts of Thailand and included 47 provinces. Approximately 3.1 million Thai people were affected badly from this catastrophe.

The authors had the opportunity to join a volunteer medical team under the Royal Patronage of Her Royal Highness Princess Maha Chakri Sirindhorn and took care of patients in both Singhaburi and Utaithani provinces during October 2006. There have been some reports of skin diseases during other forms of natural disasters, namely tsunami[1] and earthquake[2]. The most common form was infectious dermatoses. However, those studies did not mention microbiologic evidence. The authors evaluated skin conditions by examining skin problems of patients who visited the temporary outpatient clinic. The authors also conducted fungal culture of skin specimens from patients who had itch and skin maceration at web space(s) of toes (Hong Kong foot).

Correspondence to: Puavilai S, Division of Dermatology, Department of Internal Medicine, Ramathibodi Hospital, Mahidol University, 270 Rama VI Rd, Rajthevi, Bangkok 10400, Thailand. Phone: 0-2201-1141, 08-1171-1751, Fax: 0-2201-1141 ext 4, E-mail: spuavilai@yahoo.com

Material and Method

Two dermatologists, who were members of the volunteer medical team under the Royal Patronage

of Her Royal Highness Princess Sirindhorn, evaluated the skin conditions of patients with skin problems at the temporary outpatient clinic of Singhaburi and Utaithani provinces. The age, sex, and diagnosis of each patient were recorded. The skin conditions were classified into three major subgroups including inflammatory skin diseases, infection-infestations and traumatic skin disorders. Standard conventional fungal culture was performed on the patients who had skin maceration at web space(s) of toes. The skin was cleaned with 70% ethyl alcohol before the collection of the specimens and the scales were kept in a sterile bottle during the transportation. The results were presented in frequency and percentage in the frequency distribution tables.

Results

Ninety-six patients were evaluated by two dermatologists in the present study (58 females and 38 males) with 102 skin conditions. The ages of the patients ranged from 2 to 81 years, with a median age of 46 years (Table 1). According to the clinical diagnosis, infectious dermatoses were the most common skin problems during the flood (53% of total skin condition), followed by inflammatory dermatoses (44.1%) and traumatic skin disorders (2.9%) (Table 2). Sixteen patients presented with itch and skin maceration at web space(s) of toes (Fig. 1, 2). The authors initially suspected superficial fungal skin infection, thus, the authors collected 16 specimens for fungal culture from macerated skin at web space(s) of toes. The results were shown in Table 3.

The fungal culture showed two (out of 16) positive specimens. They were *Trichosporon mucoides* and non-spore forming hyaline fungi (specimen 9 and 14). Before the culture was done, only the non-spore forming hyaline fungi specimen (specimen14) was positive in potassium hydroxide preparation (branching septate hyphae) while *Trichosporon mucoides* specimen was negative. Gram negative bacilli, *Corynebacterium* and *Staphylococcus* species were found in 14, 4 and 4 specimens respectively.

After the culture was done, 14/16 patients who presented with itch and skin maceration at web space(s) of toes were reclassified as chronic irritant

Table 1. Age and sex of the patients (n = 96)

Age (year)	Male	Female	Total
< 10	3	7	10
10-20	4	3	7
20-30	2	6	8
30-40	4	2	6
40-50	9	11	20
50-60	6	12	18
60-70	3	12	15
70-80	6	5	11
80-90	1	-	1
Total	38	58	96

Table 2. Skin problems of the patients (before fungal culture)

Dermatoses	Male		Female		Total	
	No.	%	No.	%	No.	%
Infection						
Fungal skin infection	17	16.7	22	21.6	39	38.3
Bacterial skin infection	8	7.8	7	6.9	15	14.7
Inflammatory dermatoses						
Eczema	7	6.9	14	13.7	21	20.6
Xerosis	2	1.9	7	6.9	9	8.8
Prurigo	4	3.9	2	1.9	6	5.9
Chronic urticaria	1	1.0	1	1.0	2	1.9
Seborrheic dermatitis	1	1.0	2	1.9	3	2.9
Lichen nitidus	-	-	1	1.0	1	1.0
Apthous ulcer	-	-	1	1.0	1	1.0
Psoriasis	1	1.0	-	-	1	1.0
Discoid lupus erythematosus	-	-	1	1.0	1	1.0
Traumatic skin disorder	2	1.9	1	1.0	3	2.9
Total	43	42.1	59	57.9	102	100

Fig. 1, 2 Scaly erythema and maceration at web space of toe

Table 3. Culture results

Specimen No.	KOH	Organism
1	negative	GNB
2	negative	GNB
3	negative	GNB
4	negative	GNB
5	negative	GNB, *Staphylococcus sp., Corynebacterium sp.*
6	negative	GNB, *Staphylococcus sp., Corynebacterium sp.*
7	negative	GNB, *Staphylococcus sp.*
8	negative	GNB
9	negative	GNB, *Trichosporon mucoides*
10	negative	GNB
11	negative	GNB
12	negative	*Bacillus sp.*
13	negative	GNB
14	septate hyphae	GNB, Non-spore forming hyaline fungi
15	negative	*Staphylococcus sp., Corynebacterium sp.*
16	negative	GNB, *Staphylococcus sp., Corynebacterium sp.*

GNB: gram negative bacilli

feet dermatitis with secondary bacterial colonization. Thus, the most prevalent skin conditions in the present study were inflammatory dermatoses, which accounted for 57.9%, followed by infectious skin conditions (39.2%) and traumatic skin disorders (2.9%) (Table 4). Among the inflammatory dermatoses, eczema is the most prevalent and accounted for 34.3% of the total skin problems. From Table 5, feet were the most common location of eczema. The vast majority of eczema was irritant contact dermatitis (24 patients, 23.5% of total skin conditions), which have many clinical presentations such as skin maceration at web space, scaly erythematous plaque, dry and hyperkeratotic soles. Superficial fungal skin infection (such as tinea corporis, tinea cruris, cutaneous candidiasis) and bacterial skin infection (such as impetigo, folliculitis, ecthyma) were the major skin conditions of infectious dermatoses and accounted for 24.5% and 14.7% of the total skin conditions respectively. Traumatic skin injury was found in only three patients, the incidence of which was 2.9% of total skin conditions.

Discussion

Natural disasters such as floods, hurricanes, volcanic eruptions, earthquakes, tsunamis and whirlwinds can occur occasionally in any part of the world.

Table 4. Skin problems of the patients (after fungal culture)

Dermatoses	Male		Female		Total	
	No.	%	No.	%	No.	%
Infection						
Fungal skin infection	10	9.8	15	14.7	25	24.5
Bacterial skin infection	8	7.8	7	6.9	15	14.7
Inflammatory dermatoses						
Eczema	14	13.7	21	20.6	35	34.3
Xerosis	2	1.9	7	6.9	9	8.8
Prurigo	4	3.9	2	1.9	6	5.9
Chronic urticaria	1	1.0	1	1.0	2	1.9
Seborrheic dermatitis	1	1.0	2	1.9	3	2.9
Lichen nitidus	-	-	1	1.0	1	1.0
Apthous ulcer	-	-	1	1.0	1	1.0
Psoriasis	1	1.0	-	-	1	1.0
Discoid lupus erythematosus	-	-	1	1.0	1	1.0
Traumatic skin disorder	2	1.9	1	1.0	3	2.9
Total	43	42.1	59	57.9	102	100

Table 5. Location of eczema

Location	No. of cases
Feet	
Web space	16
Non web space	8
Legs	5
Upper extremities	4
Trunk and back	2
Total	35

They affect humans both physically and psychologically[1-7]. Some studies have been done on the relationship between natural disasters and health problems including skin problems. The most common form was infectious dermatoses. However, those studies did not mention the microbiologic evidence. To obtain the best results of the present study, the authors decided to collect the specimens for microbiologic examination.

Eczema was the most common dermatoses in the present study and the great majority of these cases were chronic irritant feet dermatitis. They have many clinical presentations such as skin maceration at web space, scaly erythematous plaque, dry and hyperkeratotic soles. Regarding to the skin macerations at web space(s) of the toes, all of them were colonized with various microorganisms. Gram-negative bacilli were the most prevalent ones and were found in 14 out of 16 specimens. This finding was consistent with the study of Hiransuthikul N et al[8] that found that gram-negative bacilli were the most common organisms isolated from traumatic wounds among tsunami survivors. The high prevalence of irritant contact dermatitis might be due to excessive exposure to contaminated water, friction, high humidity and unhygienic environment.

Infectious dermatoses were the second most common skin problems. Superficial fungal infection and bacterial skin infection were accounted for in most cases. However, the prevalence of these conditions in the present study might not be accurate because some of them were diagnosed clinically and lack microbiologic or laboratory confirmation. Traumatic skin disorders were uncommon in the present study; all of them were minor traumatic wounds and were not considered an urgent problem. This might be explained by the fact that the authors examined the patients' wounds one month after the occurrence of the flood. The urgent problems had probably been managed beforehand.

According to the present study, infectious dermatoses were not as prevalent compared to the studies of Lee SH et al[1] and Bayramgürler D et al[2]. They found that infectious dermatoses were the most common skin conditions during natural disasters. The explanation of this finding could be that some of the patients who presented with itch and skin maceration were clinically suspected to have superficial fungal skin infection initially. After fungal culture was done, most of them were reclassified as chronic irritant feet dermatitis. If the authors had not conducted fungal culture from those patients, they would have been

classified as superficial fungal skin infection clinically and infectious dermatoses would have been the most prevalent in the present study. However, all of the patients who presented with itch and skin maceration at web space(s) of toes did not show signs and symptoms of bacterial skin infection (pain, pustule, malodorous exudates), thus the authors classified them as eczema with secondary bacterial colonization. The low prevalence of positive fungal culture might be due to the inhibitory effect of gram-negative bacilli to dermatophytes[9,10]. Another possibility is the slow growing nature of fungi. In the present study, specimen collection was done at 1-month after the onset, which might be too early for fungi to grow.

In summary, the authors concluded that eczema was the most common skin problem during the period of the flood. Skin maceration at web space(s) of toes which were thought to be fungal infection were chronic irritant dermatitis with secondary bacterial colonization. Only a few cases were fungal infection. Excessive exposure to contaminated water, friction, high humidity and unhygienic environment might have increased the prevalence of bacterial colonization on eczematous macerated skin. Microbiologic investigation should be done in patients who complain of skin maceration at web space(s) of toes. Unfortunately, it is not practical done. The authors proposed that topical medications which have the combination of anti-inflammatory, antibacterial and antifungal properties are the most suitable medications.

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โรคผิวหนังที่พบในช่วงอุทกภัยในประเทศไทย

วาสนภ วชิรมน, พลอยทราย บุษราคำ, พิริยาภรณ์ จงตระกูล, ศิริเพ็ญ พัววิไล

ภูมิหลัง: *น้ำท่วมเป็นภัยธรรมชาติที่พบได้เป็นครั้งคราวในประเทศไทย ในอดีตมีการรายงานโรคผิวหนังที่พบบ่อยเมื่อเกิดภัยธรรมชาติ เช่น สึนามิ หรือ แผ่นดินไหว โรคผิวหนังที่พบบ่อยคือ การติดเชื้อที่ผิวหนัง โดยเฉพาะการติดเชื้อรา อย่างไรก็ตามไม่เคยมีการศึกษาหาชนิดของเชื้อโดยวิธีการเพาะเชื้อมาก่อน*

วัตถุประสงค์: *เพื่อศึกษาโรคผิวหนังที่พบในช่วงน้ำท่วม และหาเชื้อที่อาจเป็นสาเหตุของน้ำกัดเท้าโดยวิธีการเพาะเชื้อ*

วัสดุและวิธีการ: *ศึกษาโดยการจดบันทึกขณะตรวจผู้ป่วยที่หน่วยอาสาสมัครบรรเทาภัยน้ำท่วมในช่วงเดือนตุลาคม พ.ศ. 2549 และเพาะเชื้อจากผิวหนังผู้ป่วยที่มีปัญหาน้ำกัดเท้าหรืออ่องกงฟุต*

ผลการศึกษา: *ผู้ป่วยโรคผิวหนังมีจำนวนทั้งสิ้น 96 ราย (ชาย 38 ราย หญิง 58 ราย) ผิวหนังอักเสบเอกซิมาเป็นโรคผิวหนังที่พบบ่อยที่สุด คือ 34.5% และส่วนใหญ่เกิดจากการระคายเคือง มีผู้ป่วยจำนวน 16 รายที่มีน้ำกัดเท้า การเพาะเชื้อจากง่ามนิ้วเท้าของผู้ป่วย 16 รายนี้ให้ผลบวกเป็นเชื้อกรัมลบรูปแท่ง 14 ราย มีเพียง 2 ราย ที่พบเชื้อราร่วมด้วย*

สรุป: *ผิวหนังอักเสบเอกซิมาเป็นโรคผิวหนังที่พบได้บ่อยที่สุดในช่วงน้ำท่วม ภาวะน้ำกัดเท้าซึ่งเดิมเข้าใจว่าเกิดจากการติดเชื้อรานั้นแท้จริงแล้วส่วนมากเป็นผิวหนังอักเสบระคายเคืองซึ่งมีเชื้อแบคทีเรียเจริญอยู่ด้วย มีเพียงส่วนน้อยที่เป็นการติดเชื้อรา การดูแลผู้ป่วยในกลุ่มนี้ควรจะมีการตรวจทางจุลชีววิทยาถ้าทำได้แต่ในทางปฏิบัติทำได้ยาก จากผลการนิพนธ์ครั้งนี้ผู้วิจัยเสนอให้ใช้ยาที่มีฤทธิ์ลดการอักเสบรวมกับยาฆ่าเชื้อแบคทีเรียและเชื้อรา*