Skin and Soft Tissue Infections in Returning Travelers

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Abstract. Skin and soft tissue infections (SSTI) are a leading cause of cutaneous problems in travelers. Sixty travelers who presented with an SSTI were prospectively included over a 20-month period. Bacterial analysis and research for Panton-Valentine leukocidine (PVL) were performed according to clinical and bacterial presentation. The SSTI appeared abroad in 73% and were predominantly localized on lower limbs (75%). The main clinical forms were impetigo (35%) and cutaneous abscess (23%). Insect bites were significantly associated with impetigo and ecthyma. Methicillin-susceptible Staphylococcus aureus (MSSA) was identified in 15 patients (43%), Group A Streptococcus (GAS) in 12 patients (34%), and an association of both in 8 (23%) among the 35 patients for whom bacteria were identified. The MSSA producing PVL were found in 4 patients. Travelers should be advised on how to prevent arthropod exposure and susceptibility testing should be recommended considering that methicillin-resistant S. aureus (MRSA) is increasingly reported, although not identified in our study.

INTRODUCTION

Skin and soft tissue infections (SSTI) cover a large spectrum of bacterial cutaneous infections, ranging from self healing impetigo to life threatening necrotizing cellulitis. The SSTI are a leading cause of cutaneous problems in travelers during and after return. In an international study where dermatologic disorders were the third most common cause of health problems in 17,353 returning travelers, insect bites, with or without super infection, skin abscess, impetigo, and erysipelas were the first, fourth, and eleventh cause of skin diseases, respectively. Similarly, in two prospective studies of returning travelers with dermatoses, SSTI, including impetigo, ecthyma, and infectious cellulitis, were the leading skin diseases. Nonetheless, these studies were not specifically focused on SSTI. Our objective was to evaluate the clinical spectrum of SSTI and their bacteriologic causes in returning travelers.

PATIENTS AND METHODS

All consecutive adult travelers consulting our tropical diseases unit between January 1, 2006 and August 30, 2007 were included if they presented with an SSTI occurring abroad or within one month after return. Those presenting within one month after return were included if they reported a history of insect bites in the area of SSTI and the persistence or worsening of lesions since the day of occurrence of infection. Patients with impetiginized scabies or marine envenomation were excluded. Children < 15 years of age were not included, given the absence of pediatricians in our hospital.

Travelers were defined as adults with a history of travel outside Europe. Fever was defined as a temperature of more than 38°C on admission. Within the spectrum of SSTI, we distinguished different clinical forms according to the literature. Impetigo was defined as a superficial infection of the skin (initially vesicular, later crusted) and could be bullous or nonbullous. Ecthyma referred to a pyoderma, which is very similar to impetigo, but extending more deeply through the epidermis to produce a shallow ulcer. Cutaneous abscess was defined by a collection of pus within the dermis and deeper skin tissues. Cellulitis referred to an acute spreading infection of the skin that may also involve the subcutaneous tissues. Furuncles referred to localized but deep inflammatory necrotizing infection of the hair follicle. Folliculitis referred to more superficial infection of the hair follicle without necrosis.

During the study period, 60 travelers (38 male, 63%) presented with an SSTI. The median age was 42 years [17–72].
The median length of stay abroad was 15 days [5–180]. The median lag time between return and consultation was 7 days [1–84]. The lesions appeared abroad in 44 cases (73%). In the 16 remaining cases, the lesions appeared after a median of 3 days [1–21] after the patient’s return. Thirty-four patients (57%) returned from Africa, 6 (10%) from Asia, 5 (8%) from South America, 5 (8%) from the Indian Ocean, 5 (8%) from the Pacific, 4 (7%) from the Caribbean area, and 1 (2%) from North America. Reasons for travel were tourism for 41 (68%), business for 11 (18%), visiting friends and relatives in their country of origin for 6 immigrants (10%), and expatriation for 2 (3%).

The two main clinical forms of SSTI were impetigo (35%) and cutaneous abscess (23%) (Table 1). Fever was present in 9 patients (15%) and satellite lymphadenopathy was present in 20 cases (38%). Localizations of the SSTI were as follows (each patient could have several localizations): lower limb for 45 patients (75%), upper limb for 16 (27%), trunk for 8 (13%), and head for 3 (5%).

Overall, 34 (57%) patients reported a history of insect bites in the area of SSTI and 20 of them were confident about the type of culprit insect: mosquitoes for 15 patients, spider and flea for 2 each, and horsefly for 1 patient. When compared with others, patients with ecthyma were significantly more commonly reporting a history of insect bites (P = 0.044) and presenting with multiple localizations (P < 0.001) (Table 1). Toe-web intertrigo were observed in 3 patients (5%), 1 presenting with cellulitis and 2 with impetigo.

Bacterial identification was obtained in 35 patients (58%). The culprit bacteria were methicillin-susceptible Staphylococcus aureus (MSSA) in 15 cases (43%), Group A beta-hemolytic Streptococcus (GAS) in 12 cases (34%), and an association of MSSA and GAS in 8 patients (23%) (Table 2). Of the 23 MSSA strains, 1 (4%) was resistant to erythromycin and all were susceptible to pristinamycin and quinolones. Of the 21 GAS strains, 1 (5%) was resistant to erythromycin. Both GAS and MSSA were isolated during impetigo and ecthyma (Table 2), whereas MSSA was the only bacteria isolated from cutaneous abscesses (statistical analysis was not performed because the number of bacterial identification was too small). Panton-Valentine leukocidin was identified in 4 patients with severe MSSA related SSTI. One of these patients, a female with recurrent ecthyma after a trip to Ivory Coast transmitted its strain to her male companion who later presented with an MSSA related lower limb cellulitis.

Blood tests were available in 14 patients: 7 had leukocytosis and 12 an increase in CRP. Outcome was favorable in all patients, 2 patients (with infectious cellulitis) required hospitalization and 5 patients (with abscess) required surgery. Antibiotics were prescribed in 58 (97%) patients and local antibiotherapy in 2 (3%); oral antibiotics were pristinamycin in 46 (77%) patients, amoxicillin in 6 (10%), and amoxicillin-clavulanate in 6 (10%).

### DISCUSSION

This study illustrates the broad spectrum of SSTI in returning travelers and the role of insect bites as a potential portal of entry for these infections. In this setting, SSTI were only a result of MSSA and/or GAS, some of these bacteria carrying the risk of secondary transmission in the community, as illustrated in one of our cases.

The main clinical forms of SSTI (95% of cases) diagnosed in this cohort were impetigo, cutaneous abscess, ecthyma, and cellulitis. This spectrum looks similar to that reported in prospective studies in returning travelers where the leading skin diseases were cutaneous abscess, impetigo, ecthyma, erysipelas, and infectious cellulitis.

Bacterial identification was obtained in 58% of our patients with positive cultures exclusively for MSSA and/or GAS. This result can be compared with only one study in which bacterial cultures yielded Staphylococcus aureus or/and GAS in 80% of the cases of impetigo in returning travelers. Although widely reported in the community in various countries and occasionally in travelers, we did not identify a methicillin-resistant strain of Staphylococcus aureus. Meanwhile, we identified only one erythromycin-resistant strain of group A beta-hemolytic Streptococcus. Nevertheless, susceptibility testing should be recommended to every traveler because the antibiotic resistance pattern can vary according to the country visited.

Of the 23 patients with a staphylococcal SSTI, 4 (2 abscess, 1 ecthyma, 1 with recurrent furuncles) were infected by a strain producing PVL. Such strains have now been clearly associated with community-acquired severe or recurrent necrotic SSTI, mainly furuncles, carbuncles, and cutaneous abscesses. Similar to what was observed in one of our patients returning from Ivory coast, PVL producing Staphylococcus aureus can be transmitted by close contact and carry a risk of diffusion in the community. As an illustration, two outbreaks of severe staphylococcal cutaneous infections caused by the
same clone of doxycycline-resistant, PVL-positive MSSA have been reported recently in French soldiers who had served in Ivory Coast and who received doxycycline for malaria prophylaxis. The clone spread within families and recurrent abscesses were reported after the soldiers’ return from Ivory Coast.16 Although our patient also presented with a recurrent ecthyma resulting from PVL-positive MSSA after a trip to Ivory Coast, the isolated strain was found to exhibit different bacteriologic features after polymerase chain reaction (PCR) analysis (Croze M, Lina G, Etienne J, Vandenesch F, Center National de Référence des Staphylocoques, Lyon, France, unpublished).

Our data and previous report of PVL-producing MSSA and methicillin-resistant S. aureus (MRSA) in returning travelers emphasize the need for prospective studies to assess the importance of PVL in this setting, together with management issues and outcomes.8,10,17,18

A history of insect bite (mainly by mosquitoes) in the affected area was reported by 57% of our travelers and was significantly more frequently reported by patients presenting with impetigo and ecthyma. The association between impetigo and insect bites had already been suggested in a community-based epidemiologic study conducted in England and Wales where impetigo followed the peak of insect bites, which peaked almost coincidentally with temperature.19

Insect bites are therefore a major cause of concern for travelers, because of the risk of malaria and arbovirus infection but also in view of the risk of secondary bacterial infection. With or without superinfection, insect bites were the first etiologic diagnosis in 2,947 returning travelers with a dermatologic disorder.20 Similarly, an insect bite in the affected area was reported by 12 (63%) of 19 returning travelers with impetigo,3 and 6 (28.6%) of 21 returning travelers with infectious cellulitis.4 Nevertheless, it is still unclear whether the superinfection is associated with scratching or whether the arthropod’s bite or sting acts as a portal of entry.

Although toe-web intertrigo had been identified as a significant risk factor for cellulitis of the leg in studies conducted in France (odds ratio [OR] 3.2, 95% confidence interval [CI]: 1.6–6.3) and in Tunisia (OR 5.4, 95% CI: 2.6–11.4), it was observed in only one of our patients with cellulitis, whereas insect bite was reported in 45% of these patients.20,21 This is not really surprising, given that rupture of the cutaneous barrier, whatever its cause, has been shown to be a common factor associated with cellulitis in the studies conducted in France (OR 22, 95% CI: 9.4–51.5) and in Tunisia (OR 13.6, 95% CI: 6.3–31).20,21 Other risk factors apart from toe-web intertrigo have been associated with disruption of the cutaneous barrier in erysipelas of the leg in Tunisia. Such factors were traumatic wound (OR 8.8, 95% CI: 3.7–20.8%), excoriated leg dermatitis (OR 5.6, 95% CI: 1.8–17.6), and plantar squamous lesions (OR 1.8, 95% CI: 1.1–3).20 Our results suggest that insect bites can be added to this list.

The outcome was favorable in all patients. The main antibiotic used was pristinamycin, a streptogramin antibiotic equally effective on GAS and S. aureus strains, including erythromycin-resistant S. aureus.22 Practice guidelines for the diagnosis and treatment of SSTI have been recently published and are widely applicable.1 However, some aspects need to be targeted in the setting of travel related SSTI. Travelers, at least those with identified risks, could be recommended empiric self-treatment in the case of some SSTI. Of note, the antibiotics to use in this setting must include agents with activity against potentially resistant strains of both S. aureus and S. pyogenes. Subsequently, two radically different strategies need further evaluation. On the one hand, travelers with mild infection could be recommended empiric self-treatment with penicillín, oral cephalosporins, macrolides, clindamycin, trimethoprim-sulfamethoxazole, or tetracycline.1,2,3 They must be medically reevaluated in the absence of clinical response at 24–48 hours.1 On the other hand, patients with SSTI accompanied by signs of systemic toxicity or whose infection is progressing despite empirical antibiotic therapy, should be evaluated by physicians rapidly to consider immediate hospitalization, to ensure specific bacterial diagnosis procedure, and to provide appropriate antibiotic management, assuming the risk of community-acquired MRSA and surgical consultation in cases of abscess and necrotizing cutaneous infections.3

Our results emphasize that travelers should be specifically advised on how to prevent arthropod exposure, the most likely portal of entry for SSTI in this setting. Moreover, susceptibility testing should be widely recommended considering that MRSA is increasingly reported in various touristic countries, although not identified in our study. Finally, the real importance of PVL-producing S. aureus in this setting needs further prospective studies to evaluate the necessity of more specific management.

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