J Infect Chemother 23 (2017) 35–39

Contents lists available at ScienceDirect

Journal of Infection and Chemotherapy

journal homepage: http://www.elsevier.com/locate/jic

Original Article

Diseases affecting patients returning from abroad: Experience of a travel clinic in Japan from 2004 to 2014

Yukihiro Yoshimura*, Nobuyuki Miyata, Makiko Miyajima, Yohei Sakamoto, Yuichiro Amano, Natsuo Tachikawa

Department of Infectious Diseases, Yokohama Municipal Citizen's Hospital, Yokohama, Japan

ARTICLE INFO

Article history:
Received 8 May 2016
Received in revised form
11 September 2016
Accepted 15 September 2016
Available online 22 October 2016

Keywords:
Travel
Japan
Infectious disease

ABSTRACT

The number of patients returning from or staying abroad is likely to increase in the future. We performed a retrospective study of patients returning from abroad in our travel clinic in Japan. All patients presenting within 6 months of traveling abroad between 2004 and 2014 were included in the present study. A total of 2374 (mean age, 35 years) patients were seen by doctors specializing in treating infectious diseases. Of these, 918 were females and 87 of them lived abroad. Diagnoses and exposure regions were recorded for all patients. The most frequent region visited before attending our clinic was Southeast Asia (n = 1050, 44%), with a median duration for staying abroad of 8 days. The major purposes for overseas travel were tourism (n = 1302, 55%) and business (n = 684, 29%). Of the 2399 individual diagnoses made, the most frequent were diseases of the gastrointestinal system (n = 1083, 45%), skin and soft tissue (n = 440, 18%), systemic febrile disease without specific systems (419, 18%), and the respiratory system (353, 15%). The relative incidences of specific diseases changed drastically due to significant disease outbreaks, such as pandemic influenza in 2009. Exposure regions remained relatively constant throughout the study period, except for Japan. Vaccine-preventable diseases accounted for 5.3% of all the diseases, and 402 (26%) patients received pre-travel consultation and prophylaxis with vaccines and/or anti-malarial drug. We should make an effort to make more people notice the risk of travel and properly perform prophylaxis.

1. Introduction

Each year, more than 16 million Japanese residents travel abroad and more than 19 million foreign people visit Japan according to Japan National Tourism Organization. The number of foreign tourists traveling to Japan has been increasing, with more patients visiting clinics in Japan after or during travel. There is a lack of published small case series regarding infectious and non-infectious diseases among patients visiting travel clinics in Japan [1–3]. Our clinic is a member of the global travel-associated disease surveillance network "GeoSentinel," which has recently reported large-scale studies on ill travelers [4]. However, most of the data are provided by European and North American clinics, and the report does not reveal the patients and diseases in real settings, such as the travel clinics in Japan. Accordingly, we evaluated the characteristics of patients visiting our travel clinic following recent travel abroad to help improve the clinical practice of Japanese doctors and establish prevention strategies.

2. Patients and methods

We performed a retrospective study of patients attending our clinic between 2004 and 2014 who had a history of abroad travels within 6 months of their initial presentation. Our clinic is located in Yokohama, Japan's second most populated city (over 3 million residents), approximately 40 km south of Tokyo. Our hospital is a 650-bed community-based acute care teaching facility, and our clinic is run by 2–4 doctors for infectious disease, with inputs from other specialties, such as dermatology and pediatrics. We obtained data regarding patient demographics, travel histories, reasons for most recent overseas travel, and pre-travel vaccinations using a

* Corresponding author. Department of Infectious Diseases, Yokohama Municipal Citizen's Hospital, 56 Okazawa-cho, Hodogaya-ku, Yokohama City, Kanagawa 240-8555, Japan. Fax: +81 45 341 5269.
E-mail address: yymole@gmail.com (Y. Yoshimura).

http://dx.doi.org/10.1016/j.jiac.2016.09.005
1341-321X/

questionnaire for all patients (pre-travel information was added to the questionnaire in 2006). Regions were classified as East Asia (except Japan), Southeast Asia, South Asia, Oceania, Middle East, Europe, Africa, North America, and Latin America. Reasons for traveling abroad included tourism, business, study, missionary or volunteer work, visiting friends and relatives (VFR), and immigration or residence. VFR is defined as a condition when people visit a foreign country to see friends, family, or relatives; it does not depend on where they were born, how developed the foreign country is or which they migrated or not. In cases where there were multiple reasons, the most important reason was considered. Physicians determined exposure regions according to clinical course, travel history, and infection window periods. Therefore, potential exposure regions included Japan, airplanes, or none (disease not associated with any specific exposure). Diagnoses were made according to clinical, laboratory, and imaging findings, with every effort taken to determine the underlying etiologies. For example, in cases where acute bacterial colitis was suspected but no pathogen was detected, the final diagnosis was recorded as acute colitis of unknown etiology. Diseases were classified according to organ system as systemic febrile (no specific organ), respiratory, gastrointestinal, skin and soft tissue, hepatobiliary, genitourinary, and neurological diseases. When patients attended our clinic in the recovery phase, we used information from clinical correspondence to determine their underlying etiology. Real-time PCR was used to detect the pathogenic gene of diarrheagenic *Escherichia coli* strains.

This study is performed independently of GeoSentinel, which collects information only on travel-associated diseases. This study was approved by our institutional review board.

3. Results

A total of 2374 patients were seen at our clinic during the study period (Table 1). The mean age of patients was 35 ± 14 years, with 918 people female (39%). Of the 2374 included patients, 2251 (95%) were Japanese, 120 (5.1%) were born in foreign countries (2 Japanese) and 87 (3.7%) lived abroad (57 Japanese). The most frequently traveled region before clinic visit was Southeast Asia (n = 1050, 44%), whilst 102 patients (4.3%) had traveled to multiple regions. The median duration of overseas travel was 8 days (0–27480 days). The predominant reasons for overseas travel were tourism (n = 1302, 55%), business (n = 684, 29%), and VFR (n = 209, 9%).

Table 1
Demographic data.

Number of patients	2374
Age [years old]	35 ± 14
Female	918 (39%)
Born abroad	120 (5.1%)
Living abroad	87 (3.7%)
Staying regions	
Southeast Asia	1050 (44%)
South Asia	367 (15%)
Africa	281 (12%)
East Asia	245 (10%)
North America	94 (4.0%)
Europe	84 (3.5%)
Oceania	72 (3.0%)
Latin America	68 (2.9%)
Middle East	8 (0.34%)
Multiple	104 (4.4%)
Unknown	2 (0.08%)
Median staying duration [days]	8 (1–27480)
Staying purpose	
Tourism	1302 (55%)
Business	684 (29%)
Visiting friends and relatives	209 (8.8%)
Study	66 (2.8%)
Missionary/volunteer	43 (1.8%)
Residence	39 (1.6%)
Immigrant	5 (0.21%)
Unknown	26 (1.1%)

±SD, a–b: minimum to maximum.

The highest number of patients seen per year was in 2007, with the lowest number seen in 2010. The number of patients has increased since 2012 (Table 2). Of the 2399 diagnoses made in our clinic, the most frequently affected organ system was the gastrointestinal system, followed by skin and soft tissue, and systemic febrile diseases. Acute and chronic diarrhea were the most frequently observed gastrointestinal diseases, with fewer cases of enteric fever, esophagitis, and gastritis (Table 3). Causative agents identified in cases of gastrointestinal disease included *Campylobacter* spp., *Salmonella* spp., *Shigella* spp., and diarrheagenic *E. coli*, with *Giardia intestinalis* being the most frequently observed parasitic infection (Table 3). Three cases of irritable bowel syndrome and one case of drug-induced (atovaquone/proguanil) diarrhea were also observed. The majority of skin/soft tissue diseases were caused by animal exposure with or without post-exposure prophylaxis against rabies, insects bite, and lymphadenitis (Table 4). The predominant sources of animal exposure were dogs, monkeys, and cats, with squirrels, sheep, lions, donkeys, bats, and boars identified as less frequent sources. Systemic febrile diseases are shown in Table 5. A total of 81 cases of dengue fever, 76 cases of malaria, 4 cases of measles, 4 cases of chikungunya fever, 4 cases of leptospirosis, and 1 case of murine typhus were diagnosed. Respiratory diseases were predominantly unspecified upper respiratory infections or influenza (Table 6). Bronchitis and pneumonia were observed in 34 and 26 cases respectively. Frequent causative agents identified in cases of pneumonia included *Haemophilus influenzae*, *Streptococcus pneumoniae*, and *Mycoplasma pneumoniae*. Cases of genitourinary diseases included 10 cases of urinary tract infection and 2 cases of prostatitis (Table 7). There was one case of a foreign doctor developing acute pseudomonas prostatitis. Hepatobiliary diseases included hepatitis and biliary infection (Table 8). Hepatitis A virus was the most frequent cause of hepatitis. The predominant neurological disease was aseptic meningitis (Table 9). The case of rabies developed right shoulder pain, cough, anxiety, and confusion 3 months after a dog bite in the Philippines. He was diagnosed with rabies and provided with intensive care, although eventually died. Data pertaining to infrequent diseases, such as endocrine, bone/joint, ophthalmological, otological, and other diseases, are shown in Table 10. There were 2 cases of newly diagnosed HIV infection. Diseases rarely diagnosed in Japan but observed in the present study included rabies, cutaneous leishmaniasis, melioidosis, and murine typhus. The most frequent regions of exposure were Southeast Asia (n = 1014, 43%), South Asia (n = 377, 16%), Africa (n = 259, 11%), East Asia (n = 225, 9.4%), and "unspecified" (n = 106, 4.5%; Table 11). Outcomes were generally good in the present study, with only one fatal case of rabies and 220 (9.5%) patients admitted to hospital. Pre-travel vaccination or anti-malarial chemoprophylaxis was performed in 394 (25%) and 13 (0.8%) patients, respectively. Vaccine-preventable diseases were diagnosed in 127 cases, including influenza (81), typhoid fever (17), hepatitis A (7), rubella (6), varicella (5), measles (4), pneumococcal pneumonia (3), tuberculosis (2), mumps (1) and rabies (1).

4. Discussion

To our knowledge, this is the largest study of patients presenting at a Japanese travel clinic with a history of traveling abroad. A 12-year study of infectious diseases in travelers presenting to a Japanese clinic was published although this study was not comprehensive [2]. The majority of studies evaluating travel-associated