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<THE TOPIC OF THIS MONTH>

Leptospirosis in Japan, January 2007-April 2016

Leptospirosis is a zoonotic infectious disease caused by *Leptospira* spp. (IASR 29: 5-7, 2008). The bacteria colonize the renal tubules of rodents and other mammals and are excreted in urine. Humans are infected by the bacteria through direct contact with the urine of the carrier animal or indirectly through contact with contaminated water and/or soil; occasionally, infection may occur through ingestion of contaminated food and/or water.

Leptospirosis is an acute febrile disease. The incubation period is 3-14 days and the disease onset is sudden with chills and fever. The clinical spectrum is broad, ranging from mild flu-like symptoms to severe disease (Weil's disease), including jaundice, hemorrhage, and renal failure.

National Epidemiological Surveillance of Infectious Diseases (NESID)

Leptospirosis is a category IV infectious disease that requires immediate notification of all the diagnosed cases under the Infectious Diseases Control Law, amended in November 2003 (see <http://www.nih.go.jp/niid/images/iasr/37/436/de4361.pdf> for notification criteria).

Notified cases and suspected place of infection: From January 2007 to April 30, 2016, a total of 284 cases were reported from thirty prefectures, among which 258 (91%) cases were domestic cases (as of April 30, 2016, Table 1 in p. 105 of this issue). Annually, there were 15-42 domestic cases reported. There were 25 prefectures that were suspected to be the place of infection; Okinawa was suspected for 142 (55%) cases and Tokyo for 27 (10%) cases (Fig. 1). There were 26 (9%) cases infected abroad, with at least one such case being reported every year (Table 1 in p. 105 of this issue). The suspected places of infection were mostly Southeast Asian countries: 4 cases each from Indonesia (2 cases from Bali Island), Thailand, and Malaysia (3 cases from Borneo Island); 3 cases from Palau; 2 cases each from Vietnam and Laos; and one case each from Cambodia, Panama, Fiji, and the Philippines; there were 3 cases with visit to multiple countries. As Fig. 2 shows, incidence (by month of onset) was highest during summer to autumn; for domestic cases, incidence peaked in September (36% of cases), and 77% of cases occurred during July-October (IASR 29: 1-2, 2008).

Sex and age distribution of cases: Among 284 patients, 87% were male, and 13% female (Fig. 3). Higher incidence (>90%) among males has also been reported from overseas (see p. 110 of this issue). The median age was 44.5 years (range: 8-84 years). There were 6 fatal cases (5 males and 1 female) at the time of report.

Suspected source of infection: Leptospirosis is acquired through direct contact with animal urine or blood or from exposure to an environmental source contaminated by urine of carrier animals. According to the reported NESID data, both for infections in

Japan and abroad, most infections were linked to activities (occupational or recreational) related to rivers (47% of domestic cases and 81% of imported cases) (Table 2). As for the infection source, 51 domestic cases were suspected to be contact with rats/mice or their urine and 34 cases to farming-related activities.

There was also a large scale leptospirosis outbreak at a US Military basecamp in Okinawa in 2014 (not included in the NESID data) (see p. 106 of this issue). Countries in the tropics such as the Philippines often experience large scale leptospirosis outbreaks after flooding caused by typhoons or heavy rain (see p. 110

Figure 1. Distribution of domestic leptospirosis cases, by suspected place of infection, January 2007-April 2016, Japan

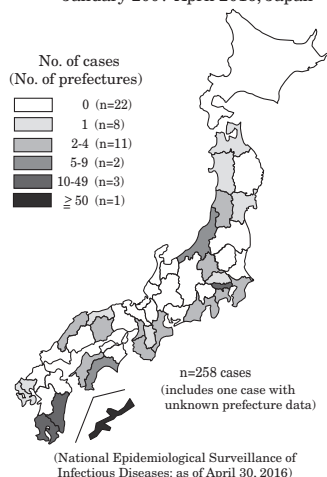
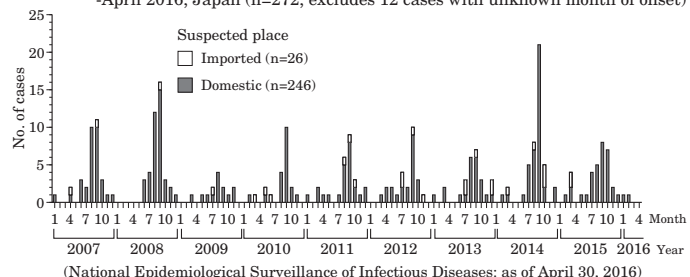
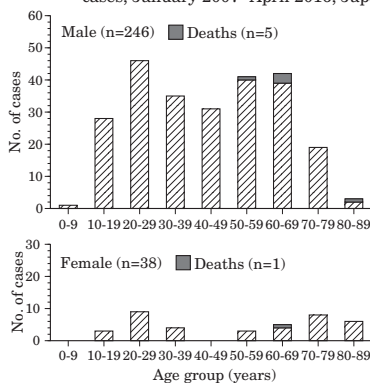


Figure 2. Number of reported leptospirosis cases, by month of onset, January 2007-April 2016, Japan (n=272, excludes 12 cases with unknown month of onset)



(THE TOPIC OF THIS MONTH-Continued)

Figure 3. Age distribution of reported leptospirosis cases, January 2007 -April 2016, Japan



(National Epidemiological Surveillance of Infectious Diseases: as of April 30, 2016)

of this issue). Reports of leptospirosis after a typhoon or heavy rain has also been reported in Japan (IASR 32: 368-369, 2011; 33: 14-15, 2012; & 35: 16, 2014).

Signs and symptoms: Among the 284 cases reported to NESID, the frequency of the signs/symptoms were: fever 97%, conjunctival suffusion 60%, myalgia 59%, proteinuria 51%, renal failure 48%, jaundice 45%, and hemorrhage 13%. Other signs/symptoms included respiratory failure, shock syndrome (6 cases each) and DIC (3 cases).

Laboratory diagnosis and serogroups: Laboratory diagnoses of the 284 cases reported were as follows: antibody detection by microscopic agglutination test (MAT) (169 cases, 60%); detection of *Leptospira* DNA by PCR (118 cases, 42%) from blood (88 cases), urine (48 cases) and/or cerebrospinal fluid (3 cases); isolation of the bacteria (65 cases, 23%) from blood (62 cases), urine (6 cases) and/or other sources (2 cases); and/or other methods (3 cases, 1%) (see <http://www.nih.go.jp/niid/images/lab-manual/leptospirosis.ver2015-2-2.pdf>; "Laboratory testing manual for leptospirosis").

Fifteen serovars from 11 serogroups have been reported in Japan. Identification of serogroups is possible by serotyping the isolates using reference antisera or by the detection of serogroup-specific antibody using MAT. Through such methods, ten serogroups were detected during the period: the predominant serogroup was Hebdomadis (28%, 71/258), followed by Autumnalis (11%, 28/258) and Icterohaemorrhagiae (6%, 15/258). Serogroups Pyrogenes (3%, 7/258) and Ballum (1%, 3/258) were detected only in Okinawa (Table 3).

Notification based on the Domestic Animal Infectious Diseases Control Law

Leptospirosis in domestic animals is notifiable under the Domestic Animal Infectious Diseases Control Law. During 2007-2015, there were 20-52 infected dogs per year, 3 infected cattle (2 in 2007 and 1 in 2014), and 8 infected pigs (6 in 2007 and 2 in 2011) (http://www.maff.go.jp/j/syouan/douei/kansi_densen/kansi_densen.html). As the reporting is limited to certain serovars, however, the reported number of leptospirosis in domestic animals may be underestimates (see p.111 of this issue).

Treatment, prevention and measures to be taken

For milder cases, the first choice for treatment is doxycycline, but for severe cases, penicillin is recommended. As intravenous administration may cause Jarisch-Herxheimer reaction, careful monitoring of the patient is necessary. For prevention, minimizing the chance of contact with the infection source (e.g. blood or urine of the infected animal, contaminated water or soil) is recommended. Although several countries produce leptospirosis vaccines for human use, the effectiveness of the vaccine is serovar-specific. The chemoprophylactic use of doxycycline has been reported.

Further remarks

Most leptospirosis infections are asymptomatic or mild. Clinical diagnosis of such cases is generally difficult, and may be missed outside of endemic areas such as Okinawa (see p. 105 of this issue; IASR 35: 14-15, 2014 & 35: 216-217, 2014). In addition, differential diagnosis from dengue fever or malaria is necessary given similar clinical pictures (see p. 109 of this issue, IASR 34: 111-112, 2013). Inquiring about the patients' occupation or travel or contact history with potentially contaminated soil or water is thus important and may assist with diagnosis (see p. 107 of this issue).

Laboratory diagnosis of leptospirosis requires special media for pathogen isolation and special methods for sero-diagnosis. The Department of Bacteriology I of the National Institute of Infectious Diseases, along with several prefectural and municipal public health institutes, can perform laboratory diagnosis upon request.

Table 2. Suspected source of reported leptospirosis cases*, January 2007-April 2016 (n=284)

Suspected source of infection	Suspected place of infection			Total
	Domestic case (Okinawa) n=258	Imported case n=26		
Farming-related activities	34	(14)	-	34
River-related activities (recreational or occupational)**	121	(105)	21	142
Contact with freshwater other than river	12	(2)	-	12
Contact with water (details unknown)	14	(11)	5	19
Contact with rat (includes its urine)	51	(2)	3	54
Contact with dog***	3		1	4
Contact with other animals (details unknown)	16	(6)	1	17
Others/unknown	16	(4)	-	16

*May include more than one suspected source **Includes other bodies of freshwater (e.g. waterfall, swamp)
***Leptospirosis in the dog unconfirmed.

(National Epidemiological Surveillance of Infectious Diseases: as of April 30, 2016)

Table 3. Reported leptospirosis cases by *Leptospira* serogroup, January 2007-April 2016 (n=284)

Serogroup*	Suspected place of infection			Total
	Domestic	(Okinawa)	Imported	
Hebdomadis**	71	(57)	4	75
Autumnalis**	28	(12)	1	29
Icterohaemorrhagiae**	15	(2)	1	16
Javanica**	7	(4)	2	9
Pyrogenes	7	(7)	-	7
Australis	4	(2)	-	4
Canicola	3		1	4
Grippotyphosa	4	(3)	-	4
Ballum	3	(3)	-	3
Pomona	1		-	1
More than one serogroup	15	(4)	-	15
Unknown***	100	(48)	17	117
Total	258	(142)	26	284

*Serogroups determined by *Leptospira* isolation or microagglutination test (MAT) results.

**Hebdomadis includes serovar Kremastos, Autumnalis includes serovar Rachmati, Icterohaemorrhagiae includes serovar Copenhageni, Javanica includes serovar Poi.

***Includes cases confirmed only by PCR

(National Epidemiological Surveillance of Infectious Diseases: as of April 30, 2016)

The statistics in this report are based on 1) the data concerning patients and laboratory findings obtained by the National Epidemiological Surveillance of Infectious Diseases undertaken in compliance with the Law Concerning the Prevention of Infectious Diseases and Medical Care for Patients of Infections, and 2) other data covering various aspects of infectious diseases. The prefectural and municipal health centers and public health institutes (PHIs), the Department of Food Safety, the Ministry of Health, Labour and Welfare, and quarantine stations, have provided the above data.

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<特集関連情報>

沖縄県におけるレプトスピラ症患者の発生状況、2008～2015

レプトスピラ症は、病原性レプトスピラの感染によって起こる急性熱性の人獣共通感染症である。ヒトへの感染は、レプトスピラを保菌する動物の尿や、その尿で汚染された水や土壌との接触で起こる。沖縄県での患者発生は他県に比べて多く、注意が必要な感染症のひとつである (IASR 29: 8-10, 2008)。今回は、2008～2015年に確定診断されたレプトスピラ症について報告する。

患者発生状況

2008年1月～2015年12月の8年間にレプトスピラ症が疑われた257症例について検査を実施した結果、103例 (40.1%) が本症と確定した。年別検査件数を図1に示す。患者発生は、6～12月および3月で確認され、特に8月と9月に集中し、この2カ月で全体の70.9% (73例) を占めていた (図2)。患者の性別は男性89例 (86.4%)、女性14例 (13.6%) であった。患者の年齢は10歳～84歳までと幅広く、年齢群別では20～30代50例 (48.5%)、40～50代24例 (23.3%)、10代20例 (19.4%)、60代以上9例 (8.7%) の順であった。推定感染地域は、八重山地域が51例、沖縄本島の北部地域42例、中部地域2例、南部地域2例の順で、不明は5例であった。海外からの輸入感染例も1例あった。集積事例は2件発生し、2008年に北部地域での19例、2013年に八重山地域

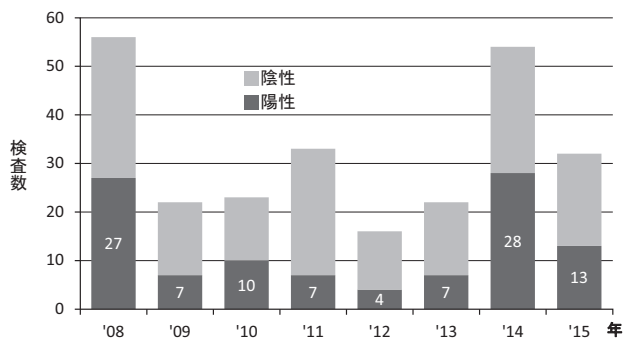


図1. 年別検査件数

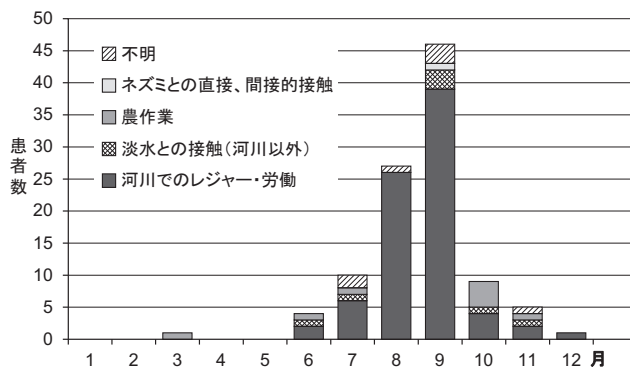


図2. 患者発生数と推定感染機会 (月別)

での6例 (IASR 35: 14-15, 2014) であった。

主な臨床症状は発熱 (95.1%)、筋肉痛 (49.5%)、関節痛 (44.7%)、眼球結膜充血 (46.6%) で、血液または尿検査では肝機能障害 (39.8%) や腎機能障害 (39.8%)

(特集つづき) (THE TOPIC OF THIS MONTH-Continued)

表1. レプトスピラ症年別、推定感染地別報告数、2007年1月～2016年4月
Table 1. Number of reported leptospirosis cases, by suspected place of infection and year, January 2007-April 2016, Japan

推定感染地 Suspected place of infection	診断年 Year of diagnosis										総数 Total
	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016*	
青森県 Aomori	-	-	-	-	-	-	-	1	-	-	1
宮城県 Miyagi	-	-	-	-	-	-	-	-	1	-	1
秋田県 Akita	-	1	-	-	-	-	-	-	-	-	1
山形県 Yamagata	-	-	-	-	-	1	2	1	-	-	4
群馬県 Gunma	-	-	1	1	-	-	-	1	-	-	3
埼玉県 Saitama	1	-	-	-	-	-	-	-	-	-	1
千葉県 Chiba	-	-	1	1	-	-	-	-	-	-	2
東京都 Tokyo	2	4	-	1	2	4	3	2	7	2	27
神奈川県 Kanagawa	-	-	-	-	1	-	1	-	-	1	3
新潟県 Niigata	1	1	1	1	-	-	1	2	1	-	8
静岡県 Shizuoka	1	1	-	-	-	-	1	-	-	-	3
三重県 Mie	-	-	1	-	1	-	-	-	-	-	2
大阪府 Osaka	-	-	-	-	1	1	1	-	1	-	4
奈良県 Nara	-	-	-	1	-	-	-	-	-	-	1
和歌山県 Wakayama	-	-	-	-	-	1	-	1	1	-	3
鳥取県 Tottori	-	-	-	1	-	-	-	-	-	-	1
島根県 Shimane	-	-	-	-	1	-	-	1	2	-	4
岡山県 Okayama	-	-	-	-	-	-	2	-	-	-	2
愛媛県 Ehime	-	-	-	-	1	2	-	-	-	-	3
高知県 Kochi	-	-	1	-	4	2	1	-	-	-	8
佐賀県 Saga	1	-	-	-	-	-	-	-	-	-	1
長崎県 Nagasaki	-	-	-	-	1	-	-	-	-	-	1
宮崎県 Miyazaki	4	1	1	3	4	3	1	-	1	-	18
鹿児島県 Kagoshima	-	3	2	-	1	3	3	-	1	-	13
沖縄県 Okinawa	22	31	7	10	6	8	9	33	16	-	142
都道府県不明 Unknown	-	-	-	-	-	1	-	-	-	-	1
国内計 Domestic	32	42	15	19	23	26	25	42	31	3	258
国外 Imported	2	1	1	3	3	4	4	6	2	-	26
総数 Total	34	43	16	22	26	30	29	48	33	3	284

*2016年は4月までの暫定値

*provisional data

(感染症発生動向調査: 2016年4月30日現在報告数)

(National Epidemiological Surveillance of Infectious Diseases: as of April 30, 2016)