IASR

The topic of This Month Vol.35 No.6(No.412)

Respiratory syncytial virus infection, as of May 2014

(IASR 35: 137-139, June 2014)

Respiratory syncytial virus (RSV) is an RNA virus belonging to *Pneumovirus* in *Paramyxoviridae* family (see p. 148 of this issue). It is propagated as droplet or contact infections. Estimatedly, more than 50% of infants acquire primary infection during the first year of life and nearly 100% before their second birthday. No first infection confers lifelong immunity (see p. 141 of this issue).

RSV infection occupies 50% of pneumonia and 50-90% of bronchiolitis among infants (see p. 139 & 142 of this issue). The clinical manifestation is indistinguishable from other respiratory virus infections. Therefore, laboratory diagnosis is indispensable for differential diagnosis.Clinical treatment of the patients is basically supportive.

Newborn, infant and immunocompromised cases tend to become serious (see pp. 139 & 150 of this issue) with development of apnea, syndrome of inappropriate antidiuretic hormone (SIADH), acute encephalopathy and other complications. Adult cases are generally mild (with flu-like symptoms) though they may transmit RSV to others. Aged cases may develop pneumonia as severe as that associated with influenza, and their case fatality rate is high (see p. 147 of this issue). Preventive measures against nosocomial RSV infection including early diagnosis should be implemented in facilities for elderlies or persons with developmental disabilities, as RSV outbreaks have been reported from such facilities (see pp. 145 & 146 of this issue).

Currently, no preventive vaccines against RSV infection are available, though a humanized monoclonal antibody to RSV F glycoprotein, palivizumab, (developed in the USA and commercially available in Japan since 2002) is administered to high risk groups, such as, premature babies, patients with chronic pulmonary or congenital heart disease(s) for preventing RSV infection.

RSV infection is a category V infectious disease under the Infectious Diseases Control Law since its amendment in 2003. In compliance with the Law and under the framework of the National Epidemiological Surveillance of Infectious Diseases (NESID), pediatric sentinels report the notified RSV cases every week to the local public health centers. Notification requires laboratory diagnosis including RSV antigen detection (notification criteria in http://www.nih.go.jp/niid/images/iasr/35/412/de4121.pdf). Though it had been limited to hospitalized patients before 17 October 2011, the medical insurance now covers RSV antigen detection testing of infants and other outpatients, to whom palivizumab is indicated (see p. 143 of this issue). Among approximately 3,000 pediatric sentinels (hospitals and clinics), now about 80% of them report RSV infection. In particular, clinics without beds increasingly report RSV infection cases in recent years, and the number of RSV infection reporting from such clinics doubled from 2008 to 2012 (Fig. 1).

RSV infections under NESID: During 2012-2013, the RSV infection epidemic started in July; the patients increased rapidly in September; the epidemic reached the peak towards the end of the year; and it continued till spring (Fig. 2). Osaka Prefecture continuously reported the highest number of patients (IASR 29: 271-273, 2008), followed by Hokkaido, Tokyo, Aichi and Fukuoka prefectures; they are all prefectures with high annual number of births. The epidemic season started earlier in Kyushu region. Okinawa Prefecture, differently from other regions, had the epidemic peak in summer (Fig. 3). From 2012 to 2013, there were 105,174 male patients (54%) and 89,370 female patients (46%). Infants under 2 years of age occupied 90% of the patients; the frequency proportion among <2 year patients was in the order of 0 year, 1 year and 2 years (Fig. 4 in p. 139 of this issue).

Since 2008, 22 RSV-related acute encephalopathy cases including 2 fatal cases (10 males, 12 females; 17 patients less than 2 years of age) have been reported. The patients' age ranged from 5 months to 13 years (median 2 years), which corresponds to the age groups whose RSV infection tends to be serious (Table 1).

Detection of RSV and other respiratory infectious viruses: Prefectural and municipal public health institutes (PHIs) isolate/detect virus from specimens sent from pathogen sentinels [corresponding about 10% of influenza sentinels (3,000 pediatric and 2,000 internal medicine clinics) and 500 sentinel hospitals]. Until 2009/10 influenza season, RSV was the second highest in detection frequencies following influenza, but since 2010/11 season, rhinovirus detections exceeded RSV detections (Table 2 in p. 139 of this issue). RSV was isolated/detected from autumn to winter; influenza in winter; and rhinovirus throughout the year (Fig. 5 in p. 139 of this issue). Human metapneumovirus and parainfluenza viruses (see p. 157 of this issue), though small in number, were isolated/detected most frequently from spring to summer.

In 2008/09-2013/14 season, 57 PHIs in 44 prefectures isolated/detected RSV from 5,441 cases (as of 20 May 2014). The most frequent RSV-positive specimens were throat swab (5,358 specimens, 98%) and the most frequent detection method applied was PCR (4,959 cases, 91%) followed by cell culture isolation (932 cases, 17%), and antigen detection (49 cases, 1%) (detection by more than one method included). The most frequent respiratory disease-related diagnosis of the cases from which the specimens were collected was lower respiratory tract inflammation (2,371 cases, 44%) followed by RSV infection (1,746 cases, 32%) and upper respiratory tract inflammation (495 cases, 9%).

Challenges in future: RSV infection is associated with high incidence of pneumonia among aged groups and serious complications among infants. To reduce the disease burden, the RSV surveillance system should be strengthened to make evidence based intervention possible.

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.
