Department of Infection Control

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Research Activities

Epidemiological research on sexually transmitted diseases

The Ministry of Health, Labour and Welfare's "Specific STD Injection Prevention Policy Promotion Study" Group has been operating, since 2006, with Professor Onodera as the lead researcher. This study group was formed to research, develop, and promote policies for preventing the emergence and spread of sexually transmitted diseases (STDs), according to the "STD Specific Infection Prevention Guidelines" that were revised in 2006. The study group's activities have included: 1) an epidemiological survey of STD emergence patterns; 2) experimental research for the early discovery and treatment of STDs in young adults; 3) the development of fast and accurate test methods for genital herpes and genital warts; and 4) drug-resistant gonococcus surveillance and the development of methods for diagnosing and treating gonococcal pharyngitis.

In Japan, the patterns of emergence of genital chlamydial infections, gonococcal infections, genital herpes infections, and genital warts (condyloma acuminata) are being investigated by means of a fixed-point survey. The selection of the designated reporting institutions in this fixed-point survey was left up to the individual local governments, and problems with this selection method have already been noted. The current study group investigated all cases of STDs in a limited geographical area to assess the validity of this fixed-point survey. In 2006, the 4 prefectures of Chiba, Ishikawa, Gifu, and Hyogo were designated as representative prefectures, and, in 2007, the 3 prefectures of Iwate, Ibaraki, and Tokushima were added; the cooperation of these 7 representative prefectures was requested in conducting a survey of all cases of STDs in each of these regions, in cooperation with the Japan Medical Association, the prefectural medical associations, physician's associations, and other bodies in each of the regions, to verify the validity of the fixed-point survey. Comparison of the fixed-point survey with this survey of all cases revealed a clear discrepancy between the 2 surveys in terms of the number of reported patients with STDs, particularly among young adults. In light of these results, we intend to propose that the study group reconsider the existing fixed-point [method] and establish specific criteria regarding how the fixed points are selected.

Effect of silver-based antimicrobial agents for multidrug-resistant Pseudomonas aeruginosa

Nosocomial infections caused by multidrug-resistant *P. aeruginosa* have become a problem in recent years. In our daily lives, we come across many different kinds of antimicrobial products, including silver-based antimicrobials, which have excellent safety, durability, and practicality. We, therefore, investigated the antimicrobial effects of silver-based antimicrobial agents. *P. aeruginosa* (1,359 strains) was detected in 472

patients at The Jikei University Hospital from May 1, 2006, through March 31, 2007. *P. aeruginosa* exhibiting resistance to 2 of the 3 drugs imipenem, amikacin, and ciprofloxacin accounted for 137 of these isolates (10.1%) in 36 of these patients (7.6%). We then investigated 50 of these isolates (excluding those detected in the same samples or from the same patients). Muller-Hinton broth containing silver ions or nanocolloidal silver at various concentrations (0.5 to 64 ppm [mg/L]) was prepared and inoculated with 5×10^4 bacteria (50 strains) and, after 24 hours, was checked for the presence or absence of growth, and the minimum inhibitory concentrations (MICs) were measured. Of the *P. aeruginosa* isolates studied, 137 (10.1%) were observed to exhibit resistance to 2 of the 3 drugs imipenem, amikacin, and ciprofloxacin; the silver ion MICs with respect to 50 of these strains ranged from 1 to 8 ppm, and the nanocolloidal silver MICs from 1 to 4 ppm. Silver-coated filters inhibited bacterial growth and possessed an antimicrobial effect. The bacteria counts decreased over time in Muller-Hinton broth containing 4 to 20 ppm of nanocolloidal silver. They are expected to be useful for combating nosocomial infections caused by multidrug-resistant *P. aeruginosa.*

Clinical investigation of P. aeruginosa septicemia

Clinical and demographic factors, including age, sex, underlying diseases, and portals of entry, were investigated in 89 patients at The Jikei University Hospital from whose blood *P. aeruginosa* was isolated from April 2003 through December 2007, to investigate poor-prognosis factors for *P. aeruginosa* septicemia. Leukemia, present in 28 (31.5%) patients, was the most common underlying disease in the patients with *P. aeruginosa* septicemia, and the most common portal of entry was urogenital, in 20 (22.5%) of the patients. Of the 89 patients, 22 died within 30 days of the emergence of *P. aeruginosa* septicemia, for a mortality rate of 24.7%. Although no significant differences were seen in age, underlying disease, portal of entry, or other factors between patients who died and patients who survived, patients who died had significantly lower platelet counts and serum albumin levels than did surviving patients and were more likely to have blood cultures positive for bacteria other than *P. aeruginosa.* We also investigated the use of appropriate antimicrobial agents in the early stages of *P. aeruginosa* septicemia but obtained no evidence that such use improved the survival rate.

Study of patients receiving linezolid

We investigated patient characteristics and the clinical efficacy of linezolid at The Jikei University Hospital. The patients ranged in age from 0 to 80 years (mean: 66 years), and the reasons they received linezolid (multiple answers possible) were: previous treatment ineffective (10 patients); renal impairment (5 patients); and change of medication required due to adverse reaction(s) with previous treatment (4 patients). The clinical efficacy of linezolid was: effective (13 patients); ineffective (1 patient); and indeterminate (1 patient). Although mild anemia (in 4 patients), thrombocytopenia (in 3 patients), and hepatic impairment (in 1 patient) developed during treatment with linezolid, they resolved with conservative treatment. Linezolid is effective against drug-resistant gram-positive bacterial infections, even when existing drugs are ineffective or poorly tolerated, and also has an acceptable rate of adverse reactions. However,

because of concerns that the liberal use of linezolid could increase bacteria resistance, each patient should be examined carefully to ensure that linezolid is used appropriately.

Preventing outbreaks of norovirus gastroenteritis at medical institutions

We adopted the transcription-reverse transcription concerted (TRC) method, a new genetic amplification/detection method for nosocomial norovirus, and analyzed the results. Investigation of nosocomial outbreaks suggested that the TRC method is fast and is as sensitive as the reverse transcriptase-polymerase chain reaction. In addition, pediatric patients were observed in whom the virus was excreted over a long period of time. We concluded that, in the pediatric ward, close attention should be paid to measures for combating infection, even if symptoms have resolved.

Next, we investigated whether or not norovirus genes were present in the feces of medical professionals complaining of symptoms of gastroenteritis who were examined at The Jikei University Hospital. Of 123 medical professionals examined, 54 (43.9%) had positive results on the TRC NORO2 test and were, therefore, given a diagnosis of norovirus gastroenteritis. Of the 324 patients who were admitted during this same period, 90 (27.8%) had positive results, meaning that the rate of positive results on the norovirus test was significantly higher among medical professionals. Our results demonstrate the importance of monitoring the health of medical professionals.

Publications

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Books

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