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General Summary

We investigate infectious diseases at the points of the host, pathogen, antimicrobial agents, and infection control. This year we investigated patients with syphilis and with *Staphylococcus aureus* bacteremia, Yezo sika deer as a reservoir of *Toxoplasma*, and the efficacy of carbapenem for patients with severe acute pancreatitis.

Research Activities

Clinical analysis of trends and diagnosis among patients with syphilis

We retrospectively performed clinical analysis of 64 patients with active syphilis. Symptomatic syphilis was diagnosed in 43 patients. Diagnosing syphilis had been difficult in 4 patients because other diseases had been suspected. Early symptomatic syphilis was diagnosed in 7 patients on the basis of clinical symptoms and positive results of a treponemal, low nontreponemal test. Asymptomatic syphilis was diagnosed in 21 patients. Syphilis was diagnosed in many patients by means of screening for infectious disease. In 2 patients the diagnosis was delayed owing to the oversight of qualitative test results. To diagnose syphilis, clinicians must make a comprehensive judgement on the basis of test results and clinical findings.

Seroprevalence of Toxoplasma gondii in wild sika deer in Japan

Toxoplasmosis is a food-borne infection that is widespread around the world, causing congenital disorders and opportunistic infections. Ingestion of undercooked meat is a risk factor for infection with the causative agent, *T. gondii*. Japanese people occasionally eat rare meat as a traditional cuisine style called *sashimi*. The consumption of venison has rapidly increased in Japan, mainly because of the enhanced population control of wild Japanese sika deer (*Cervus nippon*). In particular, the meat of Yezo sika deer (*C. nippon yesoensis*) in Hokkaido (the northernmost and largest prefecture of Japan) is frequently supplied to markets as branded game/bushmeat. To study the possible burden of *T. gondii* among wild Yezo sika deer, plasma samples of deer hunted during 2 seasons, 2010 to 2012, in Eastern Hokkaido were investigated. A total of 80 samples were examined with the Sabin-Feldman dye test, which is highly specific and sensitive for identifying the development and persistence of antibodies after primary *Toxoplasma* infection; 38 cases (47.5%) were seropositive (cut-off titer < 1:16). The antibody prevalence of *T. gondii* was higher in does than in bucks. The seroprevalence was higher in adult deer 3 years or older than in younger animals. The overall seroprevalence fluctuated significantly according to the season when the deer were hunted. These results indicate widespread infection with *T.*

gondii among Japanese wild Yezo sika deer and suggest that both appropriate handling and treatment of bushmeat are required to prevent food-borne toxoplasmosis in Japan.

Early prophylactic antibiotics for severe acute pancreatitis: a population-based cohort study of a nationwide database in Japan

Previous studies evaluating the clinical benefits of prophylactic antibiotics for severe acute pancreatitis have had inconsistent results owing to heterogeneities among the study settings. To determine whether early prophylactic antibiotics improve the outcomes of patients with severe acute pancreatitis, we performed a study designed to overcome these previous methodological weaknesses. With a Japanese nationwide inpatient database we conducted a retrospective cohort study of patients with severe acute pancreatitis discharged from July 2010 through March 2016. We divided patients into those with early prophylactic carbapenem use (prophylaxis group) and those without prophylaxis (control group). The primary outcome was in-hospital mortality, and the secondary outcomes included oral vancomycin use. We identified a total of 3,354 eligible patients, including 2,493 in the prophylaxis group and 861 in the control group. The overall in-hospital mortality rate was 12.8%. Prophylactic antibiotics were not significantly associated with a reduced rate of in-hospital mortality according to Cox regression analysis (hazard ratio [HR], 0.88; 95% confidence interval [CI], 0.62–1.23) or instrumental variable analysis (risk difference, 1.2%; 95% CI, 9.8%–7.4%). However, prophylactic antibiotic use was significantly associated with in-hospital oral vancomycin use in a competing-risk model (subdistribution HR, 1.91; 95% CI, 1.02–3.56).

Conclusions: The present study suggests that routine early prophylactic antibiotic use has no significant clinical benefit in patients with severe acute pancreatitis but might increase the risk of hospital-acquired infections.

Predictive factors for metastatic infection in patients with bacteremia caused by S. aureus

To determine the predictive factors for metastatic infections with *S. aureus* bacteremia, we conducted a retrospective cohort study among patients with *S. aureus* bacteremia in The Jikei University Kashiwa Hospital. Enrolled in the study were 74 adult patients with *S. aureus* bacteremia hospitalized from January 2014 through December 2017. The most common primary site of bacteremia was catheter-related (24 [32.4%] of 74 patients). Metastatic infection occurred in 22 (29.7%) of 74 patients, and spondylitis was most common, following a psoas abscess. Of these 22 infections, 11 (50%) were community acquired. No significant differences were found in demographics and comorbidities, except central venous catheter-associated bloodstream infection, which was associated with low rate of metastatic infection. Multivariate analysis showed that the predictive factors associated with the development of metastatic infection were community onset of infection (odds ratio [OR], 11.6; 95% CI, 2.98–45.1; $P < 0.001$), fever for more than 72 hours (OR, 6.7; 95% CI, 2.12–21.8; $P = 0.001$), and higher C-reactive protein levels (> 3 mg/dl) lasting 2 weeks after the administration of appropriate antibiotics (OR, 7.47; 95% CI, 2.39–23.3; $P < 0.001$). Therefore, additional diagnostic tests to identify metastatic infection should be performed, especially in patients with community-acquired *S. aureus* bacteremia, persistent fever, or persistently high C-reactive protein levels after the admin-

istration of appropriate antibiotics.

Publications

Hoshina T, Fukumoto S, Aonuma H, Saiki E, Hori S, Kanuka H. Seroprevalence of *Toxoplasma gondii* in wild sika deer in Japan. *Parasitol Int.* 2019; **71**: 76-9.

Nakaharai K, Morita K, Jo T, Matsui H, Fushi-

mi K, Yasunaga H. Early prophylactic antibiotics for severe acute pancreatitis: A population-based cohort study using a nationwide database in Japan. *J Infect Chemother.* 2018; **24**: 753-8.