Toscana virus circulation in central and southern Italy

Sandfly fever viruses are widely distributed in the Mediterranean basin, where they are transmitted by the bite of sandflies in the breeding season. The most common viruses associated with human infections are sandfly fever Naples virus, sandfly fever Sicilian virus and Toscana virus, causing a febrile illness known as “pappataci fever” and characterized by fever, myalgia and headache. Toscana virus is also associated with neuroinvasive infections; in endemic areas, it is among the major causes of viral meningitis during the summer season. Nevertheless, in many cases the infection is asymptomatic, leading to underestimation of the actual spread of the virus.

In Italy, Toscana virus is mainly found in the central regions, but it has also been observed in the south. A study was conducted to estimate the presence of antibodies against Toscana virus in the population of Siena (Tuscany, Central Italy) and Bari (Apulia, Southern Italy) between 2013 and 2015, in order to include also the subjects that have contracted asymptomatic infection and therefore estimate the actual circulation of the virus among the population.

Results show that almost 27% of the population of Siena has antibodies against Toscana virus. Antibodies are virtually absent in children and show a linear age-related increase; the higher frequency of infection in adults is evident especially in subjects more than 60 years old, with a percentage of positivity reaching 42%. The increasing prevalence rate concurrent with age demonstrates that the population is consistently exposed to Toscana virus throughout life; indeed, typical hillside settlements in the province of Siena are exposed to greater contact with sandflies and the probability of being infected increases during lifetime. Previous studies conducted in southern Italy indicated Toscana virus as the cause of almost 6% of meningitis cases in the summertime in Naples (Campania); in contrast, samples collected in the province of Bari do not show a significant prevalence of antibodies against Toscana virus, which is 2%. The difference between prevalence rates found in Siena and Bari is highly significant. This may be due to the different biological and climatic niches of these geographical areas, which could be differentially hospitable to the sandflies. Interestingly, almost all the positive samples collected in the province of Bari are from subjects over 60 years old, suggesting a greater circulation of the virus in previous decades. Immunity against sandfly fever Naples virus and sandfly fever Sicilian virus was detected in 1% of the samples, most of them collected from subjects over 60 years old. These findings are consistent with previous serological studies that observed the decrease or disappearance of these viral infections after the 1940s malaria eradication campaigns in Italy.

This study shows that Tuscany is still an area of high circulation of Toscana virus, while in Apulia the virus seems to be somewhat rare. Studies conducted on subjects hospitalized for neurological disorders showed that Toscana virus neuroinvasive infections appear to be more frequent in adults than in children; therefore, high prevalence of antibodies among older adults is a concern. While residents in endemic areas could be better protected from neurological infections, owing to repeated exposure to the virus boosting immunity, pathogenicity is higher in subjects who come from non-endemic areas, because they are more susceptible to infection in later life as they do not

have previously acquired immunity. Thus, it is necessary to continue monitoring the spread of Toscana virus in these areas, in order to assess the risk for the health of both residents and tourist.

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