

A case of meningitis caused by Toscana virus

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ABSTRACT:

— In this paper, we present a case of meningitis caused by Toscana Virus. The patient presented to the Emergency Department with a one-day history of fever, intense back pain and headache. Physical examination revealed neck stiffness and reduced reflexes, while brain CT scan and laboratory tests were unremarkable. A lumbar puncture was performed, showing normal glucose and protein levels, and increased cell count (219 cells/ μ l). Bacterial antigens and CSF PCR for EBV, CMV, HIV, Herpesviruses and JCV were negative. The patient was treated with antibiotics, antivirals, steroids and mannitol. His conditions significantly improved after two days. CSF PCR finally tested positive for Toscana Virus and he was discharged with a diagnosis of meningitis due to Toscana Virus.

— **Keywords:** Toscana virus, Viral infection, Meningitis, CNS.

INTRODUCTION

Toscana Virus (TOSV) is an arthropod-borne virus belonging to the *Phlebovirus* genus of the *Bunyaviridae* family. TOSV is transmitted to humans by *Phlebotomus*, *Sergentomyia* and *Lutzomyia* genera, especially *Phlebotomus* (*P.*) *perniciosus* and *P.* *perfiliewi*. Though TOSV animal reservoir has not been identified, there is evidence that the virus can be transmitted transovarially in the insect vectors^{1,2}. TOSV contains a negative-sense, single-stranded RNA genome consisting of 3 segments, defined large, medium, and small, which encode the RNA-dependent RNA polymerase, the envelope glycoproteins, and the nucleoprotein, respectively³.

TOSV was isolated for the first time in 1971 from *P. perniciosus* in Monte Argentario, Tuscany (Italy)^{1,2,4}. TOSV has been reported to be the most common of aseptic meningitis in Central Italy during the summer season^{5,6}. Most cases of the disease have been reported in residents or travelers in Central Italy or Spain, but a growing number of cases have been reported in other countries in the Mediterranean basin, such as France, Cyprus, Greece, Portugal and Turkey^{5,6}. Seroprevalence

studies suggest that a significant fraction of infections due to TOSV are associated with mild or no symptoms. TOSV may sometimes cause flu-like symptoms, without neurological manifestations. However, TOSV has a tropism for the central nervous system (CNS) and therefore it may represent a significant cause of meningitis/meningoencephalitis, especially during the summer season. The incubation period is variable, ranging from a few days to 2-3 weeks, and common symptoms include fever, headache, nausea, vomiting, and myalgias^{5,6}.

Here, we report a case of meningitis due to TOSV in a man living in Sicily, Italy.

CASE REPORT

In the summer of 2015, a 26-year-old man presented to the Emergency Department with a one-day history of fever, headache, intense back pain and myalgia (especially of the lower extremities), and fatigue. Previous medical history was unremarkable. The patient was born in Albania but had been living and working in Italy for several years.

Physical examination revealed a conscious patient, with a temperature of 38.9°C. Pulse rate was 120/min, and respiratory rate was 20/min. The patient had neck stiffness and reduced right tendon reflexes. A Computed Tomography scan of the head revealed no abnormalities.

Lumbar puncture was performed, revealing normal glucose and protein levels, but a nucleated cell count of 219/ μ l. Cerebrospinal fluid (CSF) bacterial antigens were negative, as well as PCR for Epstein-Barr virus (EBV), Cytomegalovirus, HIV, Herpesviruses and JCV.

Laboratory tests showed a white blood cell count of 11,900 (83.5% neutrophils), platelet and red blood count were within the normal range. Procalcitonin levels were normal. HIV test was negative. Renal and liver function tests were within normal ranges, with a modest hypokaliemia. The patient received intravenous antibiotic and antiviral therapy, as well as mannitol and steroids for 14 days. His clinical conditions dramatically improved after two days. CSF tested positive for TOSV RNA. Magnetic resonance of the brain was unremarkable.

The patient completely recovered and was discharged with a diagnosis of meningitis due to TOSV.

DISCUSSION

This case shows the importance of including TOSV in the differential diagnosis of febrile illnesses and meningitis, especially if the patient lives or is travelling from an endemic area. Aseptic meningitis is a possible presentation of TOSV, due to the viral neurotropism^{5,6}. Similarly to our case, in the other cases of TOSV-related meningitis reported so far, the CSF had normal glucose and protein levels, and increased cellularity (>5-10 cells). Though TOSV infection is often paucisymptomatic or asymptomatic, some severe cases have been reported, including deep coma, diffuse intravascular coagulopathy and severe skin rash, with lamellar desquamation⁵⁻⁸.

Diagnosis is based on the use of serologic tests and TOSV detection by PCR in the CSF. There is no treatment, though supportive therapy may be required in the most severe cases. The use of genome sequencing can provide important information to study TOSV geographic distribution and the phylogenetic relationship between the TOSV strains isolated in different countries.

CONCLUSIONS

TOSV may be associated with CNS involvement and should be included in the differential diagnosis of meningitis/encephalitis, especially in the areas where the virus commonly circulates, but also in travellers returning from endemic regions. TOSV may be considered an emerging and neglected pathogen and more epidemiological studies are required to develop effective tools for controlling the disease spread. Finally, given TOSV circulation in the Mediterranean basin during the summer, the use of blood products from viremic donors may potentially represent a concern in these epidemiologic settings.

CONFLICT OF INTERESTS:

The Authors declare that they have no conflict of interests.

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