



Emergence of a Microbe in a New Geographic Area

Meningoencephalitis caused by Non-O1, non-O139 *Vibrio cholerae* in an infant from southern Spain

W. Sánchez-Yebra Romera^{b,*}, A. Caparrós Andújar^a, J.A. Sánchez Gómez^b, L. Martínez Campos^c, M.A. Lucerna Méndez^a, C.M. De Oña Baquero^d

^a Servicio de Medicina Preventiva, Hospital Universitario Torrecárdenas, Spain

^b Servicio de Microbiología, Hospital Universitario Torrecárdenas, Spain

^c Servicio de Pediatría, Hospital Universitario Torrecárdenas, Spain

^d Distrito Sanitario Almería, Spain

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ABSTRACT

Non-O1, non-O139 *Vibrio cholerae* (NOVC) is an emergent pathogen that mainly causes gastroenteritis. Also, it causes ear, wound infections, and bacteremia but the nervous system is rarely affected. We report on a case of NOVC meningoencephalitis in an infant that recovered after antimicrobial therapy but later presented neurologic sequelae.

1. Case report

A 2-month-old male infant attended the emergency room with a sudden onset of fever of 39 °C that had started 30 min earlier without any other symptoms. The initial Paediatric Assessment Triangle was categorised as unstable by appearance (irritability, inconsolable crying, Glasgow 11/15) and by circulation (tachycardia, slow capillary refill). A complete blood count, blood culture and chemistry panel were performed. All results were within normal ranges except for procalcitonin of 63 ng/ml. As irritability and fever persisted, a lumbar puncture was performed, revealing cloudy fluid (4000 leukocytes/ μ l with 96.4 % neutrophils, protein level of 5.86 g/dL and glucose level of 16 mg/dL). Empirical antibiotic treatment was initiated with parenteral cefotaxime plus vancomycin. A multiplex PCR panel (FilmArray® Meningitis/Encephalitis, Biomerieux) including bacteria and viruses was only positive for cytomegalovirus (CMV), which was confirmed by an alternative method. Ganciclovir was added, and the patient was admitted to the paediatric ICU. The next day, a Gram-negative bacillus was isolated from the cerebrospinal fluid and blood cultures, which was identified as *Vibrio albensis* (score value 1.89) by matrix-assisted laser desorption ionisation time-of-flight mass spectrometry (system MALDI Biotyper,

Bruker Daltonik GmbH, Bremen, Germany). Biochemical identification, serotyping and 16S rRNA gene sequencing confirmed that the isolate was Non-O1, non-O139 *Vibrio cholerae* (NOVC). The isolate was sensitive to cefotaxime (MIC = 0.016, μ g/ml), and vancomycin was discontinued. During his stay in the ICU, the patient suffered seizures that required anticonvulsant agents to control. Imaging tests showed brain involvement (Fig. 1). After a 3-week antibiotic treatment, the patient continued to present irritability and spasticity, and five months later, West syndrome secondary to encephalopathy developed.

Both parents and the baby were resident in a town located 16 km from the Mediterranean coast. The baby had completed a complete vaccination schedule and was formula-fed. None of the family had previously had diarrhoea, nor was there a history of foreign travel. An epidemiological inspection revealed that the family home was not supplied by the public water consumption network but by a community pond used for irrigation. This pond water was not drinkable and tested positive for NOVC. The family used bottled water for drinking and preparing the baby's formula, but pond water for personal hygiene, bathing and washing bottles and teats.

* Corresponding author. Hermandad de donantes de sangre, s/n, 04009, Almería, Spain.

E-mail address: waldoe.sanchez.sspa@juntadeandalucia.es (W. Sánchez-Yebra Romera).

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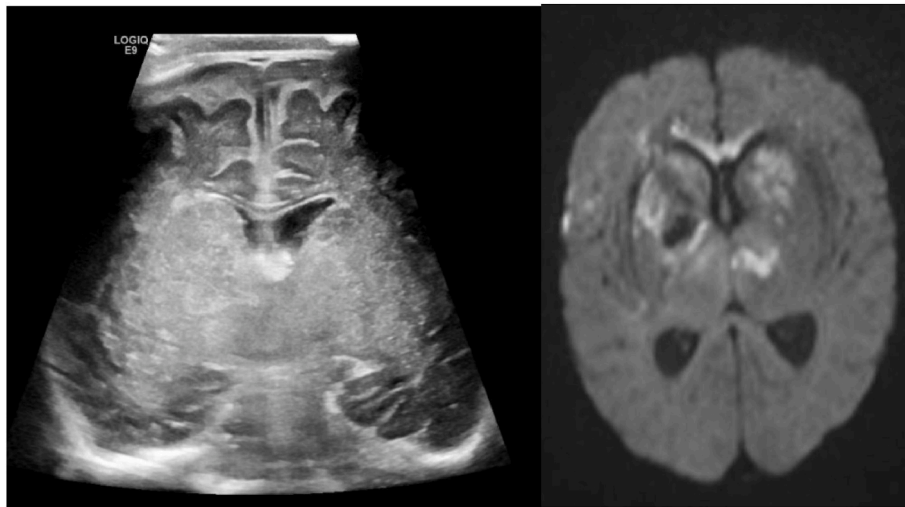


Fig. 1. Transfontanelle ultrasound: parenchymal affectation secondary to meningitis (left); NMR: encephalitis with edema, ischemia, and bleeding foci areas (right).

2. Discussion

Cholera is a severe diarrhoeal illness mainly caused by the ingestion of contaminated food or water that contains *V. cholerae* strains that produces cholera toxin. Most cholera cases are caused by serogroup O1, which has two main biotypes: the classical biotype that was responsible for the first six cholera pandemics, and El Tor biotype, which caused the seventh. In 1992, a new serotype -O139 Bengal - provoked an outbreak of cholera in India and Bangladesh that did not spread out of Asia and was not classified as a pandemic [1]. As remarked above, NOVC strains do not elaborate cholera toxin but can cause gastrointestinal and extraintestinal infections such as severe skin infections, cholecystitis, septicemia, and central nervous system affection.

To our knowledge, this is the eighth description of infant meningo-encephalitis caused by NOVC and the first in Europe [2–6]. The pond water contamination was the most probable route of pathogen acquisition, and carriage studies were disregarded as unnecessary. However, no other cohabitants or neighbours presented any symptoms of infection. Detection of CMV was negative in dried blood spots recovered from newborn screening, making a congenital infection unlikely. The role of CMV coinfection and whether it could favour or aggravate the course of bacterial infection is uncertain. The misidentification of *V. cholerae* as *V. albensis* was likely due to the absence of *V. cholerae* from the MALDI database [2]. NOVC infections are becoming more frequent due to climate change and greater population exposure to aquatic environments [7]. Preventive public health measures should be implemented to protect the most susceptible members of the population.

CRedit authorship contribution statement

W. Sánchez-Yebra Romera: Conceptualization, Methodology, Validation, Investigation, Resources, Data curation, Writing – original draft, Writing – review & editing, Visualization. **A. Caparrós Andújar:** Conceptualization, Investigation, Writing – original draft, Writing – review & editing, Visualization, Supervision, Project administration. **J.A. Sánchez Gómez:** Methodology, Validation, Resources, Data curation,

Writing – original draft. **L. Martínez Campos:** Conceptualization, Investigation, Writing – original draft, Writing – review & editing, Visualization. **M.A. Lucerna Méndez:** Conceptualization, Investigation, Writing – original draft, Supervision, Project administration. **C.M. De Oña Baquero:** Investigation, Writing – original draft, Writing – review & editing, Visualization.

Declaration of competing interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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