

CASE REPORT

Long Jin,¹ M.D.; Joshua A. Perper,² M.D., L.L.B., M.Sc.; and Stephen J. Cina,³ M.D.

Comamonas Testosteroni Meningitis in a Homeless Man

ABSTRACT: We report a case of meningitis caused by *Comamonas testosteroni* in a 54-year-old, alcoholic, homeless man. He, as a pedestrian, was struck by a car and suffered multiple fractures of the facial bones including the left frontal sinus. Over the course of 2-week hospitalization, he was clinically diagnosed with multiple cerebral and cerebellar infarcts resulting in altered mental status. He was pronounced dead 15 days after the injury. At the time of autopsy, diffuse purulent meningitis was found on gross examination. A swab culture of the brain surface was positive for *C. Testosteroni*, a saprophytic organism commonly found in soil and water. This is the first reported case of fatal meningitis caused by this micro-organism.

KEYWORDS: forensic science, *Comamonas testosteroni*, meningitis, frontal sinus fracture, homeless, autopsy

Injuries to the base of the skull and frontal sinuses may result in life-threatening complications including cerebrospinal fluid leakage, meningitis, mucopyocele, and brain abscess (1). The causative agents of meningitis in adults are usually *Streptococcus pneumoniae* and *Neisseria meningitidis* (16–50 years of age); *Listeria monocytogene* and gram-positive/gram-negative bacilli (>50 years); and *S. pneumoniae*, *L. monocytogene*, and *Haemophilus influenzae* (seen in alcoholism or immune suppression patients) (2). *Comamonas testosteroni* is a non-glucose fermenting, motile, saprophytic, gram-negative bacillus which had been previously classified within the *Pseudomonas* group (3). It has a wide geographic distribution, is a common soil and water inhabitant and it is rarely pathogenic (4,5). We present the first case of fatal meningitis caused by infection with this micro-organism.

Case Report

The patient was a 54-year-old homeless male with a long history of alcoholism. He was struck a glancing blow by a car and presented with a Glasgow Coma Scale score of 13 upon arrival to the emergency department. Upon admission, he was complaining mainly of facial pain and appeared to be intoxicated. On physical examination, he had multiple facial abrasions and lacerations of the left supra-orbital ridge and lower lip. A CT scan of the head showed bilateral periorbital soft tissue swelling with multiple facial bone fractures and right frontal pneumocephalus associated with a minimally displaced posterior wall fracture of left frontal sinus. There was no intracranial bleeding or injury to the brain.

The patient was initially stabilized and then went into delirium tremens. He was intubated, subsequently extubated, developed diminished mental status over several days, and was eventually

reintubated. His vital signs were stable. For the first several days of his admission, he was afebrile. He was treated with moxifloxacin after a blood culture isolated *S. pneumoniae*. He developed symptoms of encephalopathy, which was attributed to multiple infarcts based on the interpretation of a CT scan of the brain. His condition continued to deteriorate and he was pronounced dead 15 days after the accident.

Gross autopsy findings were significant for diffuse purulent meningitis (Fig. 1). Histologic sections revealed extensive tissue necrosis, fibrin deposition, and a dense neutrophilic infiltrate on the cerebral and cerebellar cortical surfaces (Fig. 2). Focal extension into the cerebral parenchyma with accompanying acute inflammation and necrosis was also noted (Fig. 3). Cultures of swabs from the brain surface isolated *C. testosteroni*.

Discussion

Only a single case of *C. testosteroni* meningitis has been reported previously (6). In that report, the patient had a recurrent cholesteatoma and was treated with meropenem and responded well. This micro-organism has not caused death according to our review of the medical literature.

Our patient was a homeless man and alcoholic. As such, he had multiple opportunities for exposure to and colonization by soil inhabitants, such as *C. testosteroni*. The frontal sinus fracture received after being hit by a car certainly provided a portal for the bacteria to enter the central nervous system. The developing meningitis resulted in the clinically noted mental status changes. It also seems likely that focal extension of the infection into the cerebral parenchyma with micro-abscess formation led to a misdiagnosis of multiple cortical infarcts.

This case facilitates discussion of several issues. First, the clinical evaluation of a homeless alcoholic may provide unique challenges. Severe alcoholism may result in functional immunosuppression (7,8) rendering afflicted individuals susceptible to lethal infections by micro-organisms of low virulence, such as *C. testosteroni*. Second, since homeless people in South Florida often sleep on the ground, they may be more exposed to soil saprophytes than the population in general. They may develop atypical infections with

¹Assistant Medical Examiner, Broward County Medical Examiner's Office, 5301 SW 31st Ave, Fort Lauderdale, FL 33312.

²Chief Medical Examiner, Broward County Medical Examiner's Office, 5301 SW 31st Ave, Fort Lauderdale, FL 33312.

³Deputy Chief Medical Examiner, Broward County Medical Examiner's Office, 5301 SW 31st Ave, Fort Lauderdale, FL 33312.

Received 31 Dec. 2007; and in revised form 24 Jan. 2008; accepted 24 Jan. 2008.



FIG. 1—Purulent meningitis caused by *Comamonas testosteroni*. The brain is swollen with a purulent exudate over the cerebral convexities and cerebellum.

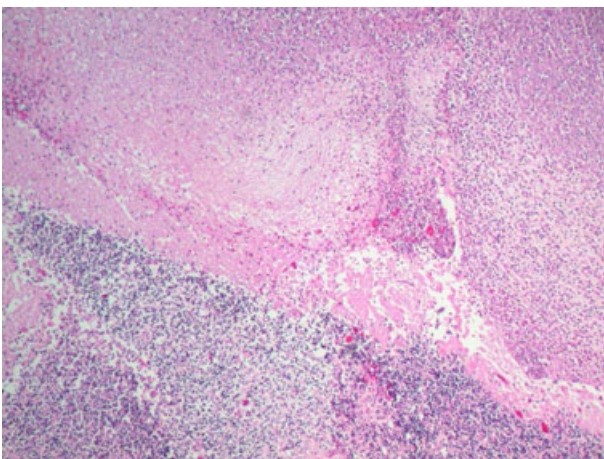


FIG. 2—Marked acute meningeal inflammation with early necrosis of the cerebellar cortex.

non-classic presentations (e.g., afebrile meningitis), which may not be diagnosed until autopsy. Third, although the facial injuries in this case were received in a motor vehicle–pedestrian accident, we have recently seen several cases of bacterial meningitis in which the infected individual presented with multiple abrasions and contusions most likely received while in a state of altered sensorium. It is important to realize that meningitis may result in altered mental status which can predispose the infected person to injury. If a central nervous system infection is identified at autopsy in a person with relatively superficial blunt force trauma, accidentally self-inflicted injuries should be considered. The gastrointestinal tract

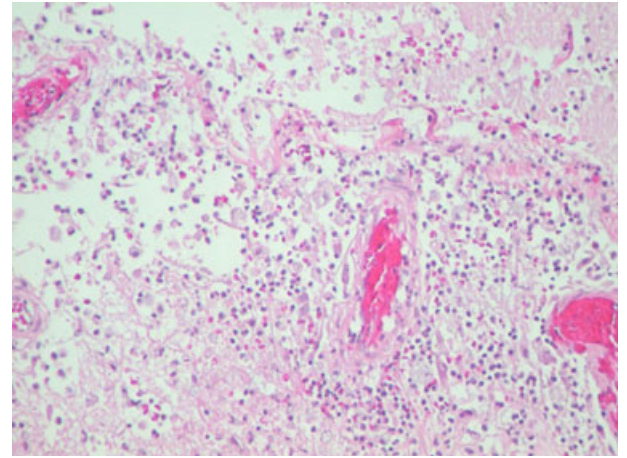


FIG. 3—Focal encephalitis, radiologically interpreted as multifocal infarcts, was characterized by extension of neutrophils into the cerebral parenchyma with microabscess formation.

should also be closely examined since *C. testosteroni* may be associated with intra-abdominal infections, particularly appendicitis (9), which may seed the bloodstream and result in remote manifestations.

References

1. Gerbino G, Rocca F, Benech A, Calderelli C. Analysis of 158 frontal sinus fractures: current surgical management and complications. *J Craniomaxillofac Surg* 2000;28:133–9.
2. van de Beek D, de Gans J, Tunkel AR, Wijdicks EF. Community-acquired bacterial meningitis in adults. *N Engl J Med* 2006;354:44–53.
3. Horowitz H, Gilroy S, Feinstein S, Gilardi G. Endocarditis associated with *Comamonas acidovorans*. *J Clin Microbiol* 1990;28:143–5.
4. Castagnola E, Tasso L, Conte M, Nantron M, Barretta A, Giacchino R. Central venous catheter-related infection due to *Comamonas acidovorans* in child with non-Hodgkin's lymphoma. *Clin Infect Dis* 1994;19:559–60.
5. Gould IM, Casewell MW. The laboratory diagnosis of peritonitis during continuous ambulatory dialysis. *J Hosp Infect* 1986;7:155–60.
6. Arda B, Aydemir S, Yamazhan T, Hassan A, Tünger A, Serter D. *Comamonas testosteroni* meningitis in a patient with recurrent cholesteatoma. *APMIS* 2003;111:474–6.
7. Potula R, Haorah J, Knipe B, Leibhart J, Chrastil J, Heilman D, et al. Alcohol abuse enhances neuroinflammation and impairs immune responses in an animal model of human immunodeficiency virus-1 encephalitis. *Am J Pathol* 2006;168:1335–344.
8. Happel K, Nelson S. Alcohol, immunosuppression, and the lung. *Proc Am Thorac Soc* 2005;2:428–32.
9. Gul M, Ciragil P, Bulbuloglu E, Aral M, Ezberci F, Alkis S. *Comamonas testosteroni* bacteraemia and perforated acute appendicitis in a patient [abstract number r203]. 16th European Congress of Clinical Microbiology and Infectious Diseases; 2006 April 1–4; Nice, France. Basel, Switzerland: European Society of Clinical Microbiology and Infectious Diseases, 2006.

Additional information and reprint requests:

Stephen J. Cina, M.D.
Deputy Chief Medical Examiner
Broward County Medical Examiner's Office
5301 SW 31st Ave.
Fort Lauderdale, FL 33312
E-mail: scina@broward.org