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Premature Labor and Neonatal Septicemia Caused by *Capnocytophaga Ochracea*

Authors' Contribution:
Study Design A
Data Collection B
Statistical Analysis C
Data Interpretation D
Manuscript Preparation E
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Funds Collection G

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Conflict of interest: None declared

Patient: Female, 17-days-old
Final Diagnosis: Cardiac arrest
Symptoms: Lower abdominal pain and contractions
Medication: —
Clinical Procedure: Prematurity treatment and Management of neonatal septicemia
Specialty: Pediatrics and Neonatology

Objective: Unknown etiology

Background: *Capnocytophaga ochracea* is a gram-negative anaerobic organism commonly found in human oral flora. It is characteristically sensitive to beta-lactams and resistant to aminoglycosides.

Case Report: A 23-year-old woman presented with lower abdominal pain and was admitted for premature labor at 24-weeks of gestation. At presentation, the cervix was closed and the membrane was intact; however, contractions continued, the membrane subsequently ruptured before receiving any steroids or magnesium, and the mother gave birth to a 540-gram female baby. At birth, Apgar scores were 1 at 5 minutes, 1 at 10 minutes, and 2 at 15 minutes. On the fifth day of life, the blood culture grew *Capnocytophaga* species. Consequently, Cefotaxime was started and ampicillin continued for a total of 14 days; however, on the 6th day, the head ultrasound showed grade 4 intraventricular hemorrhage and a Do Not Resuscitate (DNR) order was placed in the chart. The patient's health continued to deteriorate, having multiple episodes of bradycardia and desaturation until cardiac arrest on the 17th day.

Conclusions: *Capnocytophaga ochracea* was isolated from the blood culture of a preterm neonate. It was thought to be the cause of the premature labor and subsequent neonatal septicemia. This case report suggests that the prevalence of *Capnocytophaga* infections is most likely underestimated and that additional premature labors and abortions could have been caused by *Capnocytophaga* infections that were never detected. Hence, more studies are needed to investigate the route of transmission.

MeSH Keywords: Bacteremia • *Capnocytophaga* • Infant, Newborn • Obstetric Labor, Premature • Sepsis

Full-text PDF: <http://www.amjcaserep.com/abstract/index/idArt/903824>

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Background

The genus *Capnocytophaga* consists of gram-negative fastidious anaerobic organisms [1,2]. The genus consists of 8 species that are usually isolated from the oral cavity; however, these organisms are opportunistic pathogens and have been described in 5 major types of infections: septicemia, central nervous system (CNS) infections, eye infections, illnesses associated with pregnancy, and infections of bone and tissue [1,2]. These infections mainly occur in immunocompromised patients, but may also occur in immunocompetent hosts. Even though this genus is rarely isolated from the female genital tract, several case reports attribute intrauterine, intra-amniotic, and perinatal organism invasion to both uncomplicated and complicated infections. Generally, these infections are often polymicrobial in origin and the role of *Capnocytophaga* in their pathogenesis remains unclear [1,2]. Organism identification is challenging; they grow very slowly and are identified using classic biochemical methods and molecular techniques [2].

Capnocytophaga ochracea and 2 other species, *Capnocytophaga sputigena* and *Capnocytophaga gingivalis* were formerly known as *Bacteroides ochracea* [2]. These 3 organisms are characterized as fastidious, fusiform, non-spore forming, gliding, gram-negative bacilli. They are usually found in the oral cavity of humans, contribute to early plaque formation, and have been associated with periodontal diseases [2,3]. *Capnocytophaga ochracea* is known to cause sepsis, purpura fulminans, and gangrene in immunocompromised patients [2]. The mortality rate is 14–43%. Additionally, intrauterine infections, endocarditis, and septic arthritis can also occur in immunocompetent patients [2]. *Capnocytophaga ochracea* has the capacity to form biofilms, which play a role in the coaggregation of other bacteria and plaque formation, and could also play a role in the degree of virulence and resistance [2]. The present case is considered the third confirmed case of *Capnocytophaga ochracea* of proven early neonatal septicemia, based on the evidence of positive cultures of *Capnocytophaga ochracea* from neonatal blood samples [4,5].

Case Report

A 23-year-old primigravida (gravida 1, para 0) presented with lower abdominal pain and was admitted for premature labor at 24 weeks of gestation. She had received prenatal care; however, the pregnancy was complicated with maternal hypertension and a chlamydia infection that was treated. The cervix was closed and the membrane was intact at presentation; however, the blood leukocyte count was $21.89 \times 10^9/L$, contractions continued, the membrane subsequently ruptured, and the mother gave birth via vaginal delivery to a female baby within 6 hours of admission. The mother did not receive any steroids, antibiotics, or magnesium prior to delivery.

The baby weighed 540 grams at birth and Apgar scores were 1 at 5 minutes, 1 at 10 minutes, and 2 at 15 minutes. The baby's heart rate was less than 100 without any respiration. The baby was then transferred to NICU and intubated successfully within 15 minutes of life and was given a dose of surfactant. Ampicillin and gentamicin were started to rule out early-onset sepsis of the newborn. Fluconazole prophylaxis was also initiated. On the fifth day of life, the blood culture grew *Capnocytophaga* species. The isolate was sent to a reference laboratory for further speciation. Gentamicin was changed to cefotaxime and ampicillin to be continued for a total of 14 days. On the 6th day, the head ultrasound showed grade 4 intraventricular hemorrhage and a DNR order was placed in the chart. The baby's health continued to deteriorate, having multiple episodes of bradycardia and desaturation until cardiac arrest on the 17th day.

Discussion

Only 2 previous case reports have reported perinatal infection caused by *Capnocytophaga ochracea* (Table 1) [4,5]. The first case of *Capnocytophaga ochracea*, reported by Paerregaard et al., was isolated from a blood sample of a

Table 1. Summary of published case reports of *Capnocytophaga ochracea*.

Author (Reference)	Age of mother (y)/gestation (w)	Symptoms/delivery status	Premature rupture of membranes	Clinical findings in neonates	Early-onset neonatal sepsis	Cite of isolation of <i>Capnocytophaga ochracea</i>	Treatment (mother/infant)	Outcomes
Paerregaard A, et al. [4]	30/28	Premature labor/Cesarean section	Yes	Respiratory failure	Proven	Maternal blood	Pivmecillinam/Ampicillin and gentamicin	Alive
Mayatepek E, et al. [5]	NA/25	Premature labor/Cesarean section	Yes	Respiratory failure and leukocytosis	NA	Endometrium, infant blood and gastric aspirate	NA/Ampicillin and tobramycin	Alive

mother that had given birth to a preterm infant after 28 weeks of gestation [4]. *Capnocytophaga* was not isolated from the baby because ampicillin and gentamicin were initiated immediately after birth to rule out sepsis before microbiological samples were obtained. *Capnocytophaga* is sensitive to ampicillin and could have caused a false-negative culture [4]. In the second case of *Capnocytophaga ochracea*, reported by Mayatebek et al., the sample was isolated from the mother's endometrium and the preterm infant's blood and gastric aspirate [5]. The infant was born after only 24 weeks of gestation and had also developed grade III intracranial hemorrhage, similar to our reported case, yet the baby survived [5]. Reports suggest that the prevalence of *Capnocytophaga* infections is most likely underestimated and that additional premature labors and abortions could have been caused by *Capnocytophaga* infections that were never detected [6–8]. Several studies have investigated the route of transmission, and 2 theories have been proposed; one suggested that maternal periodontal disease could increase the risk of premature labor. However, 2 randomized controlled trials enrolled 922 pregnant women found that treatment of maternal periodontal disease did not significantly alter the rate of preterm birth [9,10]. Three case

reports suggested that oral sex during the third trimester could cause *Capnocytophaga ochracea* to ascend to the amniotic fluid, especially after isolating *Capnocytophaga* spp. from partners with periodontal infections [11–13]. However, more studies are needed to confirm any association between oral sex in the third trimester, premature labor, and neonatal septicemia.

Conclusions

Capnocytophaga ochracea was isolated from the blood culture of a preterm neonate. It was thought to be the cause of the premature labor and subsequent neonatal septicemia. This case report suggests that the prevalence of *Capnocytophaga* infections is likely underestimated and that additional premature labors and abortions could have been caused by *Capnocytophaga* infections that were never detected. Hence, more studies are needed to investigate the route of transmission.

Conflict of interests

None.

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