

# *Campylobacter jejuni* Bacteremia in the Term Infant A Rare Cause of Neonatal Hematochezia

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**Abstract:** Early-onset sepsis caused by Gram-negative spiral organisms is rarely reported, with *Campylobacter fetus* being a better known causative agent than other *Campylobacter* species. We report the case of a 2-day-old girl who presented with hematochezia and bacteremia caused by *Campylobacter jejuni*. She was born full-term. Her family ate undercooked chicken, and *Campylobacter* enteritis was diagnosed before her birth.

**Key Words:** *Campylobacter jejuni*, Gram-negative spiral bacteremia, early-onset sepsis, neonatal hematochezia, food handling practice for pregnant women

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Pathogens commonly causing early-onset sepsis in developed countries are Group B streptococcus and *Escherichia coli*.<sup>1,2</sup> *Campylobacter fetus* is known as a rare cause of Gram-negative spiral bacteremia in neonates, with bacteremia caused by other *Campylobacter* species even more infrequently reported.<sup>3,4</sup>

Pregnant women are considered to be a high-risk group for *Campylobacter* infection, and in the general population, bacteremia is reported to occur in 0.1%–1% of campylobacteriosis cases.<sup>5–7</sup> *Campylobacter* enteritis during pregnancy occurs often, but its effects on the neonate remain unknown.<sup>8,9</sup> Few guidelines focus on the management of food safety risks and *Campylobacter* infections.<sup>5</sup>

We report here a case of early-onset sepsis caused by *Campylobacter jejuni* manifesting as mucoid and bloody diarrhea in a full-term healthy infant. After careful history taking, it was found that her family had eaten undercooked chicken, and her mother and older brother exhibited symptoms of fever and watery diarrhea before her birth. *C. jejuni* was isolated from her brother's stool. The study protocol was approved by the Institutional Review Board of the Japanese Red Cross Wakayama Medical Center (no. 873).

## CASE REPORT

A 2-day-old girl was admitted to our hospital with bloody diarrhea containing mucous (Fig. 1). The neonate had been delivered normally at the gestational age of 37 weeks and 6 days to a 27-year-old woman (gravida 2, para 1). The pregnancy was uneventful. Her birth weight was 2880 g and Apgar scores were 9 at 1 minute and

10 at 5 minutes. Meconium staining was not found. She developed mucoid and bloody diarrhea on 1 day of life. On examination, she appeared well: temperature, 37.5°C; pulse, 140 beats per minute; blood pressure, 81/53 mm Hg; respiratory rate, 50 breaths per minute; and oxygen saturation, 96% on ambient air. She lost 7.6% of her birth weight during the first 2 days of her life. There was no evidence of dehydration. Her cardiovascular examination was normal, lungs were clear by auscultation, and abdominal examination was unremarkable. Neurologic examination was also unremarkable and no skin lesions were apparent. On admission, initial investigations revealed elevated total bilirubin (189.8 μmol/L) and direct bilirubin (12.0 μmol/L); otherwise, her results were unremarkable for this day of life (Table 1). At 2 days after admission, a blood culture taken on admission was positive for Gram-negative spiral organisms (Fig. 2). The patient was started on meropenem on suspicion of *C. fetus* infection. The next day, the blood culture isolate was identified as *C. jejuni*. We took stool and cerebrospinal fluid (CSF) samples before administration of antibiotics. The stool culture was positive for *C. jejuni*, but the cerebrospinal fluid culture was negative. CSF examination revealed the following: 9 cells/mm<sup>3</sup>; protein concentration, 910 g/L; glucose level, 2.7 mmol/L. Thus, the patient was diagnosed with *C. jejuni* bacteremia, and we stopped meropenem and started intravenous azithromycin for 5 days. Her bloody diarrhea improved in 4 days, and she was discharged without any complications at 10 days postadmission. Outpatient follow-up at 5 months postdiagnosis revealed no problems. A dialogue established that undercooked chicken was consumed by the mother and older



**FIGURE 1.** The patient's mucoid and bloody diarrhea on the day of admission.

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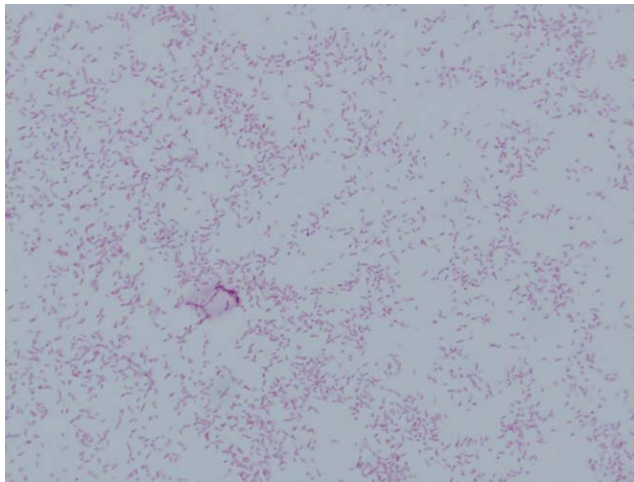
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**TABLE 1.** Laboratory findings on admission

Hematology			Biochemistry		
WBC	1.15 × 10 <sup>9</sup>	/L	TP	56	g/L
Lym	15.7	%	Alb	33	g/L
Mon	10.2	%	CK	200	U/L
Eos	1.0	%	AST	26	U/L
Bas	0.1	%	ALT	8	U/L
RBC	6.19 × 10 <sup>12</sup>	/L	TB	189.8	μmol/L
Hb	217	g/L	DB	12.0	μmol/L
Ht	0.64	L/L	LD	376	U/L
PLT	22.5 × 10 <sup>9</sup>	/L	UN	2.6	mmol/L
			Cr	63.6	μmol/L
Serology			Na	145	mmol/L
CRP	1.7	mg/L	K	4.1	mmol/L
IgG	9230	mg/L	Cl	110	mmol/L
IgM	100	mg/L	Glu	5.0	mmol/L

Alb indicates albumin; ALT, alanine aminotransferase; AST, aspartate aminotransferase; Bas, basophil; CK, creatinine kinase; Cl, chloride; Cr, creatinine; CRP, C-reactive protein; DB, direct bilirubin; Eos, eosinophil; Glu, glucose; Hb, hemoglobin; Ht, hematocrit; IgG, immunoglobulin G; IgM, immunoglobulin M; K, potassium; LD, lactate dehydrogenase; Lym, lymphocyte; Mon, monocyte; Na, sodium; PLT, platelet; RBC, red blood cell; TB, total bilirubin; TP, total protein; UN, urea nitrogen; WBC, white blood cell.

**FIGURE 2.** Gram-negative spiral organisms in blood culture smear.

brother 10 days before her birth and that they both developed fever with watery diarrhea 7 days before her birth. The mother received neither medical attention nor antibiotics before delivery.

## DISCUSSION

We learned the following important lessons. First, *C. jejuni* can cause a Gram-negative spiral bacteremia as a neonatal early-onset sepsis defined as the onset of symptoms before 7 days of age. Second, taking a family and dietary history is key to diagnosis. Third, recommendations concerning kitchen food handling practices should be provided routinely to pregnant women.

Early-onset sepsis in term infants is decreasing and Gram-negative spiral organisms are rare pathogens.<sup>1,2</sup> *Campylobacter fetus* is better known as a cause of neonatal bacteremia than *C. jejuni*, and in *C. fetus* infections the outcome for the fetus is frequently death.<sup>3,4</sup> Several studies show that *Campylobacter* bacteremia is more common in previously healthy young children or older immunocompromised patients.<sup>7,10,11</sup> The outcome after *C. jejuni* bacteremia is usually favorable. The estimated mortality rate

in children is very low; however, relapsing *Campylobacter* bacteremia has been reported in cases of humoral immunodeficiency, such as X-linked agammaglobulinemia.<sup>7,10,11</sup> Some previous studies report *C. jejuni* that is resistant to third-generation cephalosporins, fluoroquinolones and macrolides. However, they may be sensitive to aminoglycosides and carbapenems.<sup>12,6</sup> Thus, early initiation of carbapenem antibiotics is recommended. In this patient, symptoms were mild with hematochezia and her prognosis was good after treatment with azithromycin.

Family and dietary history taking was important for diagnosis. *C. jejuni* is one of the most common pathogens that cause enterocolitis in developed countries. By contrast, bacteremia is relatively rare. Abdominal pain with or without diarrhea is reported in at least half of the patients.<sup>8,9</sup> All patients should be asked about potential epidemiologic risk factors for particular diarrheal diseases and their transmission, including consumption of unsafe foods and contact with ill people. For *Campylobacter* enteritis, undercooked chicken is considered the most likely contaminated food vehicle. While the risk of infection with *Toxoplasma gondii* and *Listeria monocytogenes* in pregnant women is mentioned in some guidelines, *Campylobacter* infection in pregnant women receives less attention.<sup>5</sup> In addition to usual good food handling practices, including washing hands thoroughly with soap and clean running water, all meat, especially chicken, should be cooked to an adequate temperature of 75°C or higher.

In conclusion, *C. jejuni* can cause early-onset sepsis, and taking a family and dietary history is key to diagnosis. We must be aware that *C. jejuni* enteritis in the mother can affect her neonate via vertical transmission. Effective food handling recommendations should be provided to prevent mother-to-child transmission of *C. jejuni*.

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