Danger lurking in infant formula...

Cronobacter Sakazakii

A Case History

A female infant born in New Mexico was delivered vaginally at full term. She had been fed powdered infant formula since birth. At four weeks old a family member noted that she had a fever of 100.9 deg. F., and consequently was taken to the emergency room.

She was observed then discharged without treatment, but returned to the ER again after becoming fussier, vomiting, and exhibiting seizure-like activity.

This time she was found to have a bulging fontanel, severe neck stiffness, and dehydration. Cerebrospinal fluid and blood cultures were taken. After 11 weeks of hospitalization and receiving extensive antibiotic therapy, the infant was discharged with severe brain injury. Although the blood cultures were negative, the spinal fluid cultures showed growth of Cronobacter sakazakii.

The bacteria, Cronobacter sakazakii is ubiquitous in nature, but can cause severe illness or death in newborn babies if it is ingested. The most likely cause for an infection is through contaminated powdered infant formula or if the bacteria are present in the water used to mix powdered infant formula.

Because Cronobacter sakazakii is found frequently in nature, it is important to sterilize both bottles and the water used to make the formula.

Before 2007, this Gram negative rod was known as Enterobacter sakazakii. While the organism has been found in other foods, only Powdered Infant Formula (PIF) has been linked to disease outbreaks, since PIF is not a sterile product. The organism is unusually resistant to desiccation and can be viable for years in a dried state.

Premature, low weight and immune compromised infants are at a higher risk of infection.

Jay Hardy is the founder and president of Hardy Diagnostics. He began his career in microbiology as a Medical Technologist in Santa Barbara, California.

In 1980, he began manufacturing culture media for the local hospitals. Today, Hardy Diagnostics is the third largest culture media manufacturer in the United States.

To ensure rapid and reliable turn around time, Hardy Diagnostics maintains eight US distribution centers, and produces over 3,500 products used in clinical and industrial microbiology laboratories throughout the world.

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The photo above shows colonies of *C. sakazakii* growing on Hardy Diagnostics HardyCHROM sakazakii.

Recent incidents of *C. sakazakii* contamination include:

March 2012 – *An entire shipment of baby food powder from Russia (manufactured in Israel) was impounded due to positive samples for C. sakazakii.*

December 2011 - *Four infants in the US became sick and two died from C. sakazakii bacteria believed to come from powdered infant formula or the water used during preparation. Two of the infants had consumed Mead Johnson’s Enfamil PIF, however, no pathogens could be recovered from other units within the same lot.*

November 2011 - *Several shipments of Kotex tampons were recalled due to a C. sakazakii contamination.*

April 2008 – *A male baby that was breastfed for six months was transitioned to PIF. At seven months old he died unexpectedly while taking his usual nap. The blood cultures taken at autopsy revealed a septicemia due to C. sakazakii.*

April 2001 – *A prematurely born infant in a Tennessee NICU died due to C. sakazakii. It was found that the PIF used in the NICU, called Portagen, was contaminated with C. sakazakii.*

The way powdered infant formula becomes contaminated with these bacteria is not well understood. Contamination can occur from the raw ingredients used in the formula, during the manufacturing process or during the preparation and reconstitution process.

Contamination may also occur through blenders, feeding bottles and utensils used to cleanse feeding bottles. Contamination may be more likely when reconstituted formula is kept at improper temperatures prior to use or for a longer duration than suggested by manufacturers.

The organism has been found in other foods, but only powdered infant formula has been linked to disease outbreaks. Adults can also become infected, but the disease is far less severe than with infants.

*Cronobacter sakazakii* is dangerous because once it enters the digestive system, it quickly causes death to portions of the intestines, often leading to septicemia and meningitis.

While digestive issues are common in newborn babies, a *Cronobacter sakazakii*
infections have symptoms that rapidly worsen.

C. sakazakii is a gram negative rod closely related to the Enterobacter and Citrobacter genera.

At the onset of infection, C. sakazakii would lead to digestive symptoms in newborns. These may include irritability caused by abdominal pain, fever, food intolerance, vomiting, and a complete lack of appetite. This may progress very quickly to more severe symptoms as the bacteria cause tissue necrosis in the intestines. More severe symptoms may include abdominal distention (swelling) and blood in the feces. As time passes, skin over the abdomen will turn a dark reddish color.

Due to the many problems associated with PIF, sterile liquid formula (though more expensive) would be a better choice for these infants than non-sterile PIF. Even better still, would be to continue breast feeding for as long as possible.

Hardy Diagnostics produces a chromogenic culture medium specifically for C. sakazakii, in which the colonies will turn a turquoise color, that facilitates the easy recognition of these bacteria.

More information can be found on the CDC website.

Jay Hardy
Santa Maria, California

The information contained in this article is for educational purposes only and is not intended nor recommended as a substitute for medical advice, diagnosis, or treatment.