Rapid communications

DENMARK: BOTULISM IN AN INFANT OR INFANT BOTULISM?

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A 4.5 months old, previously healthy Danish girl was admitted to a paediatric department after six days of passive behaviour and weak suck. Over the next days she became increasingly weak, developed bilateral ptosis, the muscle stretch reflexes were lost, and mydriasis with slow pupillary responses was noted. Botulism was suspected and confirmed by testing of patient serum in a bioassay. The condition of the patient improved following administration of botulism antiserum. The clinical picture was suggestive of intestinal (infant) botulism. However, botulism acquired from consumption of food with preformed neurotoxin could not be excluded. The food history revealed consumption of a commercially produced banana/peach puree which was suspected as a possible source, and based on a precautionary principle this product was recalled. The case description illustrates a risk-management dilemma between suspected foodborne versus intestinal botulism. Taking the potentially very serious consequences of foodborne botulism into consideration, the measures taken were justified.

Background

There are three forms of botulism:

- 1) Intestinal botulism: formerly infant botulism, i.e. intestinal germination of spores of *Clostridium botulinum* with subsequent in vivo production and release of neurotoxin – also described in adults;
- 2) Foodborne botulism: usually seen in adults, caused by ingestion of food contaminated with *C. botulinum* bacteria which have grown and produced neurotoxin; and
- 3) Wound botulism: wound infection with *C. botulinum* and subsequent release of neurotoxin.

Intestinal botulism has been verified in more than 1,000 cases in North America over the last decades, but is rarely reported in Europe [1,2]. We report a recent case of botulism in a Danish infant; the report illustrates a risk-management dilemma between suspected foodborne versus intestinal botulism.

Clinical picture

The patient was a 4.5 months old, previously healthy girl. She was admitted to a paediatric department after six days of constipation, passive behaviour and weak suck. She was without fever and did not vomit, but was hypotonic with a weak cry. A plain X-ray of the abdomen revealed signs of paralytic ileus. She was treated symptomatically with intravenous fluids and enteric

tube feeding, and screened over the next days for a number of suspected diagnoses (colonic enema for possible intussusception, screening for drug intoxication, metabolic diseases, encephalitis and other infections, cerebral abnormalities, increased intracranial pressure) without any abnormalities detected. Her suck and cry became increasingly weak, she developed bilateral ptosis, the muscle stretch reflexes were lost, and mydriasis with slow pupillary responses was noted. Respiration was not affected and neither respiratory support nor supplementary oxygen were needed. Eight days after admission intestinal (infant) botulism was suspected and blood was drawn for inoculation of serum in a mouse bioassay for detection of neurotoxin of *C. botulinum* and faecal samples were taken for possible detection of *C. botulinum* by culture. Two days later botulism immune globulin was administered. Fourteen days after admission she was found to have improved significantly with decreasing ptosis and increasing muscular tonus, cry, and oral food intake.

Toxin testing

The presence of toxin was demonstrated by applying patient serum intraperitoneally in a mouse model; presence of botulism toxin was suspected within 18 hours. Indicative symptoms in the mice, i.e. wasp-like waist, spiky hair and inactivity could be neutralised by adding *C. botulinum* antitoxin to types A, B, E and F to the serum prior to the intraperitoneal injection. Serum yielded no growth of bacteria, and faecal specimens did not exhibit growth of *C. botulinum*.

Food history and source investigation

The infant was still breastfed but had started to receive supplementary feeding during the last 3-4 weeks prior to admission. Five days before admission the infant was fed with three spoonfuls of an organic banana/peach puree from a European commercial company. The mother had noticed that the baby food had a very pervading and unusual smell, and the product appeared to be fermented. However, no gas production was noticed from the glass jar and the normal click occurred when opening it. The glass jar was thrown out afterwards.

Other supplementary foods consumed by the infant included gruel made by the mother from organic produced corn, buckwheat flour, whole meal with rice and millet to which grapeseed oil was added.

Based on a precautionary principle, a press release was issued warning about the specific batch of banana/peach puree and the lot (which was marked 'best before December 2008') was recalled by the company. Warnings were issued through the Rapid Alert System for Food and Feed (RASFF) and the European Early Warning and Response System (EWRS).

In total, 11 jars of baby food, four samples of the gruel ingredients and one sample of oil have been investigated for botulinum toxin using a mouse model. No preformed botulinum toxin was detected in these samples. Currently the samples are being investigated for botulinum toxin production after spore germination, as well as detection of botulinum toxin after trypsin activation of the samples.

Conclusion

The clinical picture in combination with the positive toxin testing confirms the case as botulism in an infant. However, it remains unsettled if it is a case of intestinal (infant) botulism or foodborne botulism. The clinical picture is compatible with infant botulism, and we tend to think this is the most probable diagnosis. However, stool samples have not shown growth of *C. botulinum*. Many cases of intestinal botulism in infants are traditionally ascribed to honey exposure, but there was no such history of exposure. Nonetheless, it is conceivable that the child could have picked up spores from other environmental or food sources. Foodborne botulism cannot be completely ruled out, in particular because the mother described the baby food as foul smelling and fermented and, furthermore, high toxin contents have been detected in products which have looked and smelled acceptable. Taking the potentially very serious consequences into consideration the press statement and the warning of other countries was justified. Additional cases have not occurred

References

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