Rare disease

Salmonella kingabwa meningitis in a neonate

Adina Olariu,¹ Sangita Jain,² Ajay Kumar Gupta¹¹Paediatrics Department, Stafford General Hospital, Stafford, UK;²Microbiology Department, Stafford General Hospital, Stafford, UK

Correspondence to Dr Adina Olariu, adina_bt25@yahoo.com

Summary

A 23-day-old male baby was admitted with 1 day history of high temperature, irritability and poor feeding. His general examination was unremarkable. *Salmonella* species grew from CSF culture and subsequent identification revealed *Salmonella kingabwa*, a serotype which rarely causes human illness. The child lived with his parents and regularly visited his grandmother for 4 h every day. Grandmother kept five snakes and five water dragons as pets. They lived in tanks and crawled freely around the house. For decades the reptiles have been known to carry *Salmonella*, which can be transmitted directly or indirectly to humans through ingestion of the bacteria, which causes subsequent infection. Reptile exposure is a rare but significant risk factor for *Salmonella* illness in England and contact with reptiles should be avoided by children less than 5 years old, pregnant ladies, older and those with impaired immunity.

BACKGROUND

We describe a case of *Salmonella kingabwa* meningitis, a rare serotype (0:42,H 1,5) in a 23-day-old child.

CASE PRESENTATION

A 23-day-old male baby was admitted with 1 day history of high temperature, irritability and poor feeding. His birth had been uncomplicated and had been well since. On examination, his anterior fontanelle was normal, there was no neck stiffness and the systemic examination was unremarkable.

The child lived with his parents and regularly visited his grandmother for 4 h every day. Grandmother kept five snakes and five water dragons as pets. They lived in tanks and crawled freely around the house.

A direct contact with the reptiles was denied by the relatives when they were interviewed and they were also indicating that they were carefully washing their hands each time after handling the reptiles. However, they might not have changed their clothing¹ or the baby might have been in contact with an object contaminated by the reptiles or their faeces, as the reptiles crawled freely around the house.

None of the family members had suffered from significant diarrhoea and the stool samples collected from grandmother, father and mother were negative.

Although we were unable to obtain a stool sample from the pets, the reptiles have been known to be colonised with *Salmonella*, and was demonstrated that they shed the organism intermittently in their faeces.²⁻³ This intermittent excretion of the bacteria, along with insufficient number of stool samples collected from relatives may explain the negative results.

INVESTIGATIONS

His white blood cell count was $16.6 \times 10^9/l$ with neutrophils of 76%. The cerebrospinal fluid (CSF) was turbid and showed a white cell count of 9368/cumm and red cell count of 846/cumm with 80% polymorphs and 20%

lymphocytes. The protein was 6.48 g/l (normal is up to 0.45 g/l) and CSF glucose was less than 0.5 mmol/l (serum glucose was 8.6 mmol/l). Gram stain showed scanty gram negative rods.

The next day *Salmonella* species grew from the CSF culture and further identification by Health Protection Agency Centre for Infections at Colindale, London revealed *Salmonella kingabwa* (serotype 0:42,H:1,5).

TREATMENT

Sepsis was suspected and the child was started immediately on intravenous ceftriaxone (80 mg/kg once a day), gentamicin (4 mg/kg/day), amoxicillin (150 mg/kg/day in three divided doses) and intravenous saline.

Both gentamicin and amoxicillin were stopped after knowing results of CSF culture. After day 2 of treatment only ceftriaxone was continued for 3 weeks.

Although it is known that ciprofloxacin is particularly active against Gram-negative bacteria, including *Salmonella* and has been previously used as a second agent⁴ in the treatment of *Salmonella* associated meningitis in a newborn, we did not consider changing the antibiotic therapy as the infant's response to ceftriaxone and gentamicin was rapid and very satisfactory.

OUTCOME AND FOLLOW-UP

The child improved rapidly over the next few days. By day 3 he was feeding 150 mg/kg/24 h and had been afebrile for 48 h with improved inflammatory markers. Repeat lumbar puncture was not performed.

Intravenous ceftriaxone was continued for a total of 3 weeks and the child made a complete recovery with no sequelae to date.

DISCUSSION

We consider that this infant's *Salmonella kingabwa* meningitis resulted from indirect transmission of the bacteria from reptiles.

Salmonella species are a rare cause of bacterial meningitis, accidentally affecting infants and immune-compromised patients. They can be zoonotic infections associated with reptiles including turtles, iguanas, lizards and snakes.

Salmonella enterica serotype kingabwa rarely causes human illness.⁵ ⁶ This serotype was first reported in a patient in 1953 in the Democratic republic of Congo.⁷ From 1995 through 2004, only 30 human illnesses caused by *S kingabwa* were reported to the National Salmonella Surveillance System and by then no common source was identified.⁸ In 2005 an outbreak of *S kingabwa* infections associated with two lizard species was reported.⁶

Direct transmission occurs through handling of a reptile and the indirect transmission occurs by contact with an object contaminated by a reptile or its faeces. It is well known that *Salmonella* survives well in the environment and can be isolated for prolonged periods from surfaces contaminated by reptile faeces.⁹

For this reason even minimal indirect contact with a reptile can result in illness and infants and young children are more likely than the general population to become infected with *Salmonella*, being at great risk for progression of salmonellosis to complications, such as septicaemia, meningitis and death.

Attempts to treat reptiles with antibiotics to eliminate *Salmonella* carriage have been unsuccessful and might lead to increased antibiotic resistance.¹⁰

Reptile exposure is a rare but significant risk factor for *Salmonella* illness in England. A Chief Medical Officer letter released by the Department of Health in the UK advises that contact with reptiles should be avoided by children less than 5 years old, pregnant ladies, older and those with impaired immunity.¹¹

Pet store owners and veterinarians should educate owners and potential purchasers of reptiles; however, numerous reptile owners remain unaware that reptile contact places them and other household members, including children, at great risk for salmonellosis.¹²

They should also be kept away from kitchen and eating areas.

Learning points

- Reptile exposure is a rare but significant risk factor for salmonella illness in England.
- Contact with reptiles should be avoided by children less than 5 years old, pregnant ladies, older and those with impaired immunity.¹¹
- Pet store owners and veterinarians should educate owners and potential purchasers of reptiles about the great risk for salmonellosis.
- Reptiles should not be allowed to roam freely throughout a home or living area.

Competing interests None.

Patient consent Obtained.

REFERENCES

1. CDC. Reptile – associated salmonellosis – selected states, 1998–2002. *MMWR* 2003;**52**:1206–9.
2. Burnham BR, Atchley DH, DeFusco RP, *et al*. Prevalence of fecal shedding of *Salmonella* organisms among captive green iguanas and potential public health implications. *J Am Vet Med Assoc* 1998;**213**:48–50.
3. CDC. Reptile – associated salmonellosis-selected states, 1996–1998. *MMWR* 1999;**48**:1009–13.
4. Mukerji A, Sulowski C, Friedman JN, *et al*. *Salmonella* Poona meningitis and mastitis causing neonatal meningitis. *Pediatr Infect Dis J* 2009;**28**:1141–2.
5. Warwick C, Lambiris AJ, Westwood D, *et al*. Reptile-related salmonellosis. *J R Soc Med* 2001;**94**:124–6.
6. Greene S, Yartel A, Moriarty K, *et al*. *Salmonella kingabwa* infections and lizard contact, United States, 2005. *Emerg Infect Dis* 2007;**13**:661–2.
7. Kuuffman F, Vandepitte J. A new *Salmonella* type (43:y:1,5) from the Belgian Congo. *Acta Pathol Microbiol Scand* 1954;**35**:71.
8. Centres for disease control and Prevention. *Salmonella Surveillance: Annual Summary*, 2004. US Department of Health and Human Services: Atlanta (GA) 2005.
9. Friedman CR, Torigian C, Shillam PJ, *et al*. An outbreak of salmonellosis among children attending a reptile exhibit at a zoo. *J Pediatr* 1998;**132**:802–7.
10. CDC. Reptile – associated salmonellosis-selected states, 1994–1995. *MMWR* 1995;**44**:347–50.
11. Press release Chief Medical Officer. *Exotic Pet Owners Warned Over Salmonella Risk*. Department of Health: UK 2000.
12. Mermin J, Hoar B, Angulo FJ. Iguanas and *Salmonella* marina infection in children: a reflection of the increasing incidence of reptile-associated salmonellosis in the United States. *Pediatrics* 1997;**99**:399–402.

This pdf has been created automatically from the final edited text and images.

Copyright 2012 BMJ Publishing Group. All rights reserved. For permission to reuse any of this content visit <http://group.bmj.com/group/rights-licensing/permissions>.

BMJ Case Report Fellows may re-use this article for personal use and teaching without any further permission.

Please cite this article as follows (you will need to access the article online to obtain the date of publication).

Olariu A, Jain S, Gupta AK. *Salmonella kingabwa* meningitis in a neonate. *BMJ Case Reports* 2012;10:1136/bcr.10.2011.5032, Published XXX

Become a Fellow of BMJ Case Reports today and you can:

- Submit as many cases as you like
- Enjoy fast sympathetic peer review and rapid publication of accepted articles
- Access all the published articles
- Re-use any of the published material for personal use and teaching without further permission

For information on Institutional Fellowships contact consortiasales@bmjgroup.com

Visit casereports.bmj.com for more articles like this and to become a Fellow

Keep up to date with all published cases by signing up for an alert (all we need is your email address) <http://casereports.bmj.com/cgi/alerts/etoc>