Unusual association of diseases/symptoms

Ciprofloxacin resistant osteomyelitis following typhoid fever

Itunuayo V Ayeni, Graeme Calver

Department of Microbiology, William Harvey Hospital, Ashford, Kent, UK

Correspondence to Dr Itunuayo V Ayeni, iv.ayeni@doctors.org.uk

Summary

Salmonella typhi is a rare cause of chronic osteomyelitis in a non-sickle cell patient. The authors report the case of a 25-year-old gentleman with a history of typhoid fever and an infected skin nodule on his left forearm 5 years prior to the diagnosis. He was referred to our orthopaedic colleagues with chronic osteomyelitis and underwent debridement of the bone for which samples grew *Salmonella typhi*. He was commenced on intravenous ceftriaxone 2 g once daily for 6 weeks followed by oral azithromycin 500 mg once daily for a further 6 weeks. The purpose of this case report is to consider the possible mode for antibiotic resistance. In this patient, the authors believe that partial treatment of the typhoid fever 5 years prior to diagnosis of osteomyelitis enabled antibiotic resistance to ciprofloxacin. Furthermore, the authors believe that the infected nodule was the result of direct inoculation with the *Salmonella* organism which then acted as a focus for further infections.

BACKGROUND

Osteomyelitis in a non-sickle cell patient is a rare complication of *Salmonella* infections accounting for 0.45% of all osteomyelitis infections.¹ The pathogenesis of this chronic infection ranges from direct inoculation to partial treatment of an acute infection. Early identification and prompt management is therefore crucial to successful treatment.

CASE PRESENTATION

We present the case of a 25-year-old fit and well gentleman with no history of sickle cell disease or immunodeficiency but a background history of typhoid fever 5-years previously in Kenya. His admission to hospital was during the political instability and the patient reports having been treated with ciprofloxacin. The limited clinical staffing in Kenya during this time meant that many of the practical procedures were carried out by inexperienced student nurses.

The problem initially started after a cannula was inserted into his left forearm which became infected. The area eventually healed after several months but as a nodule. This nodule occasionally oozed and caused no significant problems until 12 months before admission where the consistency and frequency of the discharge had increased. Our patient was initially seen by the general surgeons, managed as an infected sebaceous cyst and the nodule was excised under local anaesthetic. Despite this, the wound continued to discharge and the patient was then referred to orthopaedics who confirmed osteomyelitis on x-ray and MRI (figures 1 and 2).

Our patient underwent debridement of the bone as an outpatient and samples were sent from the sinus tract, bone and soft tissue. The sinus tract sample grew *Candida* while both the bone and soft tissue grew *Salmonella typhi* which were resistant to both ciprofloxacin and nalidixic acid.

Our patient was studying for a master's degree and occasionally worked as a bartender when the results surfaced. Understandably, there was a great deal of concern regarding the carrier status of the patient. Was he a chronic carrier of *Salmonella* in his stools or was he chronically shedding

the *Salmonella* organism from his forearm? The Health Protection Agency was immediately notified; all close contacts were screened and no immediate public health risk identified. Serial stools samples were also obtained from the patient and all came back negative.

As specimen samples were found to be sensitive to ceftriaxone, it was decided that a 6 week course of intravenous ceftriaxone followed by a further 6 weeks of oral azithromycin would be sufficient to treat the chronic infection. The patient was discharged after several days in hospital and was due to complete his intravenous therapy within the community.

INVESTIGATIONS

- ▶ Histology from skin curettings 2011: skin with dermal abscess cavity containing a collection of chronic inflammatory cells. A single granuloma identified but clinical significance inconclusive.
- ▶ Haematological investigations on admission: white count cell $5.5 \times 10^9/l$, C reactive protein 6 mg/l.
- ▶ Orthopaedic specimen samples- sinus tract grew *Candida*; bone and soft tissue samples both grew *S typhi* phage type E1 which was resistant to nalidixic acid and ciprofloxacin. All samples were sensitive to ceftriaxone.

TREATMENT

Six weeks intravenous ceftriaxone 2 g once daily followed by 6 weeks of oral azithromycin 500 mg once daily.

OUTCOME AND FOLLOW-UP

Several weeks after discharge the patient is doing well and about to complete his oral course of antibiotics. The wound is healing well and is no longer discharging. He is awaiting follow-up appointment with the orthopaedic surgeons.

DISCUSSION

Salmonella is a rare cause of osteomyelitis in a non-sickle cell patient, accounting for 0.8% of all salmonella

Figure 1 X-ray left forearm- cortical abnormality within the distal radius.

infections and 0.45% cases of all osteomyelitis.¹ Chronic recurrent osteomyelitis is a self-limiting condition which typically affects the long bones. The infection may occur following trauma, atypical infections or from partially treated acute infections. Chronic osteomyelitis is notoriously very difficult to treat. The infected area contains necrotic bone which is surrounded by thick periosteum and seared tissue which reduces antibiotic penetration. This environment creates an ideal opportunity for bacteria to multiply and may further facilitate antibiotic resistance.²

Successful treatment of chronic infection is achieved with a combination of surgery and antibiotics. Surgery is usually a combination of sequestrectomy and resection of scarred tissue. Previous antibiotic options for salmonella infections included nalidixic acid and ciprofloxacin. However, quinolone resistance is increasingly becoming more common internationally and within the UK.^{3 4} Documented treatment regimes for quinolone resistant

Figure 2 MRI left forearm- significant cortical thickening in the distal radius with focal abnormality within the cortex and medullary cavity.

infections have included cephalosporins and macrolides such as ceftriaxone and azithromycin.⁴ Our case report demonstrates that for the treatment of chronic osteomyelitis a minimum of 6 weeks intravenous ceftriaxone followed by 6 weeks oral azithromycin may be required for resolution of infection.

Learning points

- Salmonella infections pose a significant personal and public health risk therefore, early identification and prompt treatment is crucial to management.
- In the treatment of ciprofloxacin resistant chronic osteomyelitis, we recommend 6 weeks of intravenous cephalosporin followed by 6 weeks oral macrolide.
- All patients presenting with a long-standing discharging wound should be thoroughly questioned about previous medical and travel history to rule out possibility of a ciprofloxacin resistant chronic osteomyelitis.

Competing interests None.

Patient consent Obtained.

REFERENCES

1. **Sanchez AA**, Mazurek MT, Clapper MF. Salmonella osteomyelitis presenting as fibrous dysplasia. A case report. *Clin Orthop Relat Res* 1996;**330**:185–9.
2. **Ciampolini J**, Harding KG. Pathophysiology of chronic bacterial osteomyelitis. Why do antibiotics fail so often? *Postgrad Med J* 2000;**76**:479–83.
3. **Cotter L**, Mushtaq M, Gonzalez A. Reminder of important clinical lesson. A case of vertebral osteomyelitis due to quinolone-resistant *Salmonella paratyphi* A. *BMJ Case Rep* 2000;10.1136/bcr.07.2008.0400 Published 17 March.
4. **Raveendran R**, Wattal C, Sharma A, *et al*. High level ciprofloxacin resistance in *Salmonella enterica* isolated from blood. *Indian J Med Microbiol* 2008;**26**:50–3.

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).

Ayeni IV, Calver G. Ciprofloxacin resistant osteomyelitis following typhoid fever. *BMJ Case Reports* 2012;10.1136/bcr.03.2012.6107, 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>