CASE REPORT

Osteomyelitis, discitis, epidural and psoas abscess secondary to *Salmonella enterica* in a man with diabetes mellitus and newly diagnosed α -thalassaemia trait

Helen Farrar, Aoife Abbey, Vinod Patel, Rajiv Nair

Department of Diabetes & Endocrinology, George Eliot Hospital, Nuneaton, UK

Correspondence to
Dr Aoife Abbey,
aoifeabbey@doctors.org.uk

Accepted 1 January 2015

SUMMARY

We report the case of a 65-year-old man with type 2 diabetes mellitus and α -thalassaemia trait. Investigations for relapsing and remitting fever found vertebral osteomyelitis, discitis and epidural and psoas abscess secondary to *Salmonella enterica*.

BACKGROUND

Salmonella accounts for just 0.45% of osteomyelitis cases and psoas abscess has only been reported rarely. This case seeks to report a rare combination of clinical features as well as to highlight the importance of invasive *Salmonella* as an emerging pathogen in clinical practice.

CASE PRESENTATION

A 65-year-old man with a 2-year history of type 2 diabetes mellitus presented to the emergency department following general practitioner referral with symptoms of polyuria, polydipsia, back pain and dysuria. There were no gastrointestinal symptoms. Although prescribed medications included simvastatin, pioglitazone, glucophage, gliclazide and aspirin, he had been non-compliant in taking his medications for the preceding 2 years. He had not had his glycosylated haemoglobin (HbA1c) checked since his initial diagnosis and was not part of a follow-up programme to prevent complications associated with diabetes.

The patient had moved to the UK in early childhood from Punjab, India. He had last visited Delhi, India, 3 months before and did not report any illness during or immediately after this visit. He lived independently with his wife, was a non-smoker and did not drink alcohol. His father had tuberculosis (TB) as a child, but there was no personal history of TB.

On admission, he was without fever with heart rate of 92 bpm, respiratory rate of 20 breaths per minute and blood pressure of 114/60 mm Hg. Initial system examinations were normal.

INVESTIGATIONS

Full blood count revealed a normal white cell count (WCC) and neutrophil count (7.42×10^9 and 6.68×10^9 , respectively). Inflammatory markers were, however, significantly raised (C reactive protein (CRP) 291 mg/L, ferritin 718 μ g/L). There was also a microcytic anaemia (haemoglobin 117 g/L, mean

corpuscular volume 71.1 fL) and acute kidney injury with creatinine 124 μ mol/L and urea 22.2 mmol/L. Urine dipstick was positive for protein, blood, ketones, leucocytes and nitrites. Blood glucose level was 21 mmol/L, blood ketone measurement confirmed presence of ketones at 3.2 mmol/L and venous blood gas sampling revealed a pH of 7.35. HbA1c was subsequently returned at 144 mmol/mol (15.3%), suggesting poor blood glucose control over the preceding months. Further investigation of this patient's microcytic anaemia showed him to be an α (+)-thalassaemia carrier.

Initial treatment with intravenous coamoxiclav was started for presumed urinary tract infection. The patient also received variable rate insulin infusion and intravenous rehydration for presumed pre-renal acute kidney injury.

Within 24 h the patient showed signs of systemic inflammatory response syndrome. He became tachycardic at 110 bpm, tachypnoeic at 27 breaths per minute, with fever of 39.1°C. Blood pressure was elevated at 219/107 mm Hg and he was started on 2 L of oxygen to maintain saturations of 94%. Examination was significant for a palpable urinary bladder and catheterisation returned a residual volume of 900 mL of urine. Sepsis secondary to urinary tract infection was suspected and antibiotics were changed to intravenous piperacillin with tazobactam (*Tazocin*).

Despite 5 days of treatment with Tazocin, the patient's fever persisted and inflammatory markers remained high (CRP and erythrocyte sedimentation rates (ESRs) at 5 days were 230 mg/L and 140 mm/h, respectively). WCC count was normal. At this point, antibiotics were changed to meropenem, leading to some improvement in CRP. ESR, however, did not improve. Comprehensive investigation for continued fever was undertaken, as detailed in [table 1](#).

Urology opinion was sought with respect to suggestion of bladder wall thickening on ultrasound scan, and cystoscopy and biopsy were recommended once the patient became more stable.

As no convincing source of persisting fever and inflammatory response was identified, wider sources were considered and MRI of the whole spine was requested. This was performed 3 weeks into the patient's hospital admission and revealed an L5/S1 discitis with associated osteomyelitis and epidural abscess ([figure 1](#)). There was also a small

CrossMark

To cite: Farrar H, Abbey A, Patel V, et al. *BMJ Case Rep* Published online: [please include Day Month Year] doi:10.1136/bcr-2014-207008

Table 1 Summary of initial investigations

Investigation	Result
First three peripheral blood cultures	No growth at 72 h
Repeat chest X-ray (CXR)	No current or old lung lesion seen
Transthoracic echocardiogram	Small pericardial effusion, no significant valve disease
Ultrasound scan of kidneys, ureters and bladder	Bladder wall thickening, no hydronephrosis
Urine microscopy	Positive for coliforms
Stool culture	Negative
CT of the chest, abdomen and pelvis	Normal
CT of the head	Possible old right lacunar infarct
Interferon γ assay for TB (t-spot)	Negative
Prostate specific antigen	2.5 $\mu\text{g/L}$ (normal)
HIV	Negative

left psoas abscess (figure 2). A fourth blood culture was then returned as positive for *Salmonella* sp, which was sensitive to meropenem.

DIFFERENTIAL DIAGNOSIS

The differential for fever of unknown origin encompasses a wide range of conditions, including infectious and non-infectious. Investigation in this case was initially targeted to infectious causes and, in particular, endocarditis, TB, abscesses (liver, pelvic, subphrenic, perinephric) and osteomyelitis.

TREATMENT

Treatment was continued with meropenem and neurosurgical advice was sought with respect to the underlying discitis. A conservative (medical) treatment approach was advocated in the first instance. Although there was no new neurological deficit present, repeat MRI showed the epidural abscess had increased

in size. There was also worsening of the discitis, which now included the L3/4 disc space. The patient was therefore transferred to a tertiary care centre for neurosurgical input.

OUTCOME AND FOLLOW-UP

Biopsy of the discitis was positive for *Salmonella enterica* (SE). There were no acid-fast bacilli seen. The patient proceeded to undergo laminectomy at L3/4. His antibiotic treatment was changed from meropenem to fuscidic acid and ertapenem for a total of 8 weeks. The patient will be managed with a further 4 weeks of bed rest followed by repeat MRI to review progress.

DISCUSSION

Salmonella sp is a Gram-negative bacillus. Infections commonly present with gastroenteritis or typhoid fever. It is an uncommon cause of bacteraemia in hospital, accounting for just 2% of 6546 bacteraemias in one study.¹ Bone and joint infections associated with *Salmonella* account for less than 1% of all *Salmonella* infections² and as a cause of osteomyelitis *Salmonella* is rare, accounting for just 0.45% of osteomyelitis cases.³

As well as osteomyelitis and discitis, this patient's MRI revealed psoas abscess and an epidural abscess that increased in size despite medical management. Although a 2006 case series of 100 consecutive patients with focal *Salmonella* infection reported abscess formation in 15%, it did not report any psoas abscess.² Literature on psoas abscess secondary to *Salmonella* is scarce⁴ and published research continues to rely heavily on single case reports. One study recording causes of bacteraemia over a 10-year period reports that of the 120 patients with *Salmonella* bacteraemia only 1.7% had psoas abscess.⁴

In this case, disc biopsy revealed the non-typhoidal species, SE. Despite public health measures, SE is responsible for an estimated 1 million cases of food-borne illness in humans annually in the USA.⁵ A population-based laboratory surveillance study of 7.7 million residents has reported the risk of non-typhoidal bacteraemia as 0.81/100 000 persons per year. It also draws attention to an overall trend upwards in the incidence of non-typhoidal *Salmonella* bacteraemia over the 7-year study. This view is supported by an 18-year study in Nottingham, two population-based studies and other case reports, highlighting the importance of SE as an emerging pathogen in clinical practice worldwide.^{1 5–8}

Diabetes mellitus is a known risk factor for spinal epidural abscess generally. Indeed, a retrospective study of 128 patients

Figure 1 Sagittal MRI of the spine showing loss of disc height at L5/S1 and appearances consistent with discitis and osteomyelitis of vertebral bodies.

Figure 2 Axial MRI of the spine showing paravertebral infective soft tissue involvement with L5/S1 discitis and 1 cm left psoas abscess.

found 21.9% to have diabetes mellitus.⁹ Diabetes mellitus is also an independent risk factor for focal *Salmonella* infections and has been found to be associated with up to 28% of cases.¹ Our patient had poorly controlled diabetes mellitus, increasing his risk of *Salmonella* discitis and abscess formation. During admission he was also diagnosed with α -thalassaemia trait.

An association between *Salmonella* osteomyelitis and haemoglobinopathies, including sickle-cell anaemia, has been previously recognised,¹⁰ but we could find only one study describing *Salmonella* osteomyelitis in a thalassaemia trait patient.³ It is not known if the presence of thalassaemia was significant in this case.

Currently no clinical studies, antibiotic or surgical guidelines exist to guide treatment of *Salmonella* osteomyelitis and ideal management (medical vs surgical) remains controversial.³ In this case, despite conservative management, there was worsening of the discitis and an increase in size of the epidural abscess. One review of 128 cases found that more than 41% of patients who were treated medically for a spinal epidural abscess went on to require surgical decompression.⁹ Our patient received 8 weeks of intravenous antibiotic therapy following laminectomy.

Learning points

- ▶ The investigation and management of patient's with relapsing fever in absence of obvious source of infection.
- ▶ *Salmonella* is a rare cause of psoas abscess.
- ▶ *Salmonella enterica* is acquiring emergent importance as a cause of invasive disease in clinical practice.
- ▶ Although more commonly associated with sickle cell and an immunocompromised state, the risk of invasive salmonellosis is not restricted to these groups.
- ▶ Diabetes mellitus is a specific risk factor for the development of invasive *Salmonella*.

Diabetes mellitus is a common comorbid condition encountered across a range of clinical specialties and although the specific combination of features in this case is rare, it highlights the importance of invasive *Salmonella* as an emerging cause of morbidity in clinical practice.

Acknowledgements The authors would like to thank Dr S Sinha, consultant radiologist, for his expertise with respect to selection and interpretation of images for this case report.

Twitter Follow Aoife Abbey at @whistlingdixie4

Competing interests None.

Patient consent Obtained.

Provenance and peer review Not commissioned; externally peer reviewed.

REFERENCES

- 1 Ispahani P, Slack RCB. Enteric fever and other extraintestinal salmonellosis in University Hospital, Nottingham, UK, between 1980 and 1997. *Eur J Clin Microbiol Infect Dis* 2000;19:679–87.
- 2 Navin P, Thambu DS, Venugopal R, et al. *Salmonella* paratyphi osteomyelitis and psoas abscess. *Trop Doct* 2006;36:58–9.
- 3 Rayan F, Mukundan C, Shukla DD. A case of relapsing *Salmonella* osteomyelitis in a thalassaemia trait patient. *J Orthopaed Traumatol* 2009;10:31–3.
- 4 Heyd J, Meallum R, Schlesinger Y, et al. Clinical characteristics of patients with psoas abscess due to non-typhi salmonella. *Eur J Clin Microbiol Infect Dis* 2003;22:770–3.
- 5 Chai SJ, White PL, Lathrop SL, et al. *Salmonella enterica* serotype enteritidis; increasing incidence of domestically acquired infections. *Clin Infect Dis* 2012; 54(Suppl 5):S488–97.
- 6 Laupland KB, Schonheyder HC, Kennedy KJ, et al. *Salmonella enterica* bacteraemia: a multinational population-based cohort study. *BMC Infect Dis* 2010;10:95.
- 7 Hall RL, Partridge R, Venkataraman N, et al. Invasive non-typhoidal salmonella infection with multifocal seeding in an immunocompetent host: an emerging disease in the developed world. *BMJ Case Rep* 2013;2013:pil: bcr2012008230.
- 8 Jean SS, Lee YT, Guo SM, et al. Recurrent infections caused by cefotaxime- and ciprofloxacin-resistant *Salmonella enterica* serotype choleraesuis treated successfully with imipenem. *J Infect* 2005;52:e163–5.
- 9 Patel AR, Alton TB, Bransford RJ, et al. Spinal epidural abscesses: risk factors, medical versus surgical management, a retrospective review of 128 cases. *Spine J* 2014;24:326–30.
- 10 Zheny X, Wang J, Chunhui W, et al. *Salmonella* osteomyelitis of multiple ribs and thoracic vertebra with large psoas muscle abscesses. *Spine J* 2009;9:e1–4.

Copyright 2015 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.

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